Tables of Atomic Spectral Lines for the 10000 Å to 40000 Å Region

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This compilation of atomic spectral lines for the 10000 Å to 40000 Å region tabulates 8885 selected lines, belonging to 57 elements, extracted from computer based data records. The tables are divided into three sections. In section I the strong lines in the 10000 Å to 25000 Å range are listed for 27 elements. Section II is a table of classified and unclassified lines, arranged in order of increasing vacuum wavenumber. Section III consists of vacuum wavenumber tables, with appropriate energy level and J values for the classified lines, listed by element. Detailed explanation of the data and sources used for the compilation are given.

Key words: Atomic spectra; infrared spectra; optical spectra.

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1. Introduction

There are several comprehensive wavelength tables for atomic spectra in the visible, ultraviolet and vacuum ultraviolet regions (references [1][1] to [5]) but no similar listing is available for the infrared region (10000 Å to 40000 Å, 1 μm to 4 μm, 10000 cm^{-1} to 2500 cm^{-1}). This leads to two difficulties when making wavelength measurements on infrared atomic spectra: (a) it is difficult to ascertain the possibility of interference from lines of other elements and (b) even when, from evidence in other spectral regions, it is known that small traces of impurity elements are present in the source the data on the impurity spectrum in the infrared is not readily available and reference to original papers for wavelength lists is tedious. For many years the only infrared atomic wavelengths available were those dating from about 1930 but over the past few years an increasing amount of additional data has been published. It is now considered feasible to produce, as a convenient source of reference for spectroscopic work, this first permanent compilation which is a continuation of the work, first reported by Outred [6], on a computer based compilation for the infrared atomic spectral region of 10000 Å to 40000 Å. The data has been extracted primarily from information in the literature published up to October 1976. A synopsis of the data is given in table 1 and it can be seen that for many elements there continues to be a need for further observation of the infrared atomic spectra so that all elements have at least been extensively recorded up to 25000 Å.

For wavelength standards in the infrared region references [7], [8], and [9] should be consulted.

1.1. Arrangement of Tables

The information contained in this compilation is divided into three sections. Section I tabulates the strong lines observed for the various elements. Section II is a table of selected spectral lines in order of increasing wavenumber. Finally section III has its entries arranged in order of element name with each element table containing classified and unclassified lines.

1.2. The Strong Lines—Section I

In this section the strongest lines are tabulated for those elements whose first spectrum has been observed extensively, by one observer, over the wavelength range 10000 Å to 25000 Å. The element lists are arranged alphabetically according to chemical name and each entry gives the vacuum wavenumber, air wavelength, intensity and reference code.

[1] Figures in brackets indicate literature references at the end of the Introduction.

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TABLE 1. Synopsis of the selected data

Element	Spectrum	Range (Å)	Number of classified lines	Number of recorded lines	Page
Aluminium	Al I	10000–21170	14	14	80
Argon	Ar I	10000–40880	332	334	81
	Ar II	10000–12490	84	85	
Arsenic	As II	10000–11070	10	10	89
Barium	Ba I[a]	10000–11890	34	40	90
Beryllium	Be I	10000–31780	14	14	91
	Be II	10000–12100	7	8	
Boron	B I	10000–36020	12	12	92
Bromine	Br I	10000–41040	384	389	93
Calcium	Ca I	10000–22660	60	60	100
	Ca II	10000–11950	3	3	
Carbon	C I	10000–25850	84	84	102
Cerium	Ce I, Ce II	10000–21820	349	417	104
	Ce III	10000–25760	47	47	
Cesium	Cs I	10000–39430	11	11	113
Chlorine	Cl I	10000–40540	451	490	114
	Cl II	10000–10960	30	31	
Chromium	Cr I	10000–11620	33	34	123
Copper	Cu I, Cu II	10000–10180	15	15	124
Curium	Cm I, Cm II	10000–26490	298	315	125
Dysprosium	Dy I, Dy II	10000–11390	39	40	131
Fluorine	F I, F II	10000–11560	45	45	132
Gadolinium	Gd I, Gd II	10000–23910	401	425	133
	Gd III[b]		8	8	
Gallium	Ga I	10000–22570	14	14	141
Germanium	Ge I	10000–23930	132	144	142
Hafnium	Hf I	10000–25250	224	521	145
Helium	He I	10000–40480	19	19	154
Indium	In I	10000–23880	17	17	155
Iodine	I I	10000–41640	478	536	156
	I II	10000–14110	4	4	
Iron	Fe I	10000–28340	216	377	165

Calcium

Ca, Z = 20

Ca I Normal state of valence electrons $4s^2\ {}^1S_0$ I.P. = 49306 cm^{-1}

Ca II Normal state of valence electrons $4s\ {}^2S_{1/2}$ I.P. = 95752 cm^{-1}

Ca

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4413.100	22653.63		15	37757 – *42170*	3 – 3	Ca I	RI68
4413.567	22651.23		30	37757 – *42171*	3 – 4	Ca I	RI68
4418.353	22626.69		15	37751 – *42170*	2 – 2	Ca I	RI68
4418.698	22624.93		25	37751 – *42170*	2 – 3	Ca I	RI68
4422.021	22607.93		20	37748 – *42170*	1 – 2	Ca I	RI68
5008.186	19961.86		18	31539 – *36547*	1 – 0	Ca I	RI68
5015.262	19933.70		24	31539 – *36554*	1 – 1	Ca I	RI68
5019.418	19917.19		23	*15315* – 20335	2 – 1	Ca I	RI68
5033.309	19862.22		34	*15315* – 20349	2 – 2	Ca I	RI68
5035.623	19853.10		35	31539 – *36575*	1 – 2	Ca I	RI68
5045.300	19815.02		19	37298 – *42343*	2 – 3	Ca I	RI68
5055.051	19776.79		50	*15315* – 20371	2 – 3	Ca I	RI68
5125.303	19505.72		47	*15210* – 20335	1 – 1	Ca I	RI68
5139.195	19452.99		49	*15210* – 20349	1 – 2	Ca I	RI68
5177.466	19309.20		48	*15157* – 20335	0 – 1	Ca I	RI68
5230.008	19115.21		17	*38259* – 43489	3 – 3	Ca I	RI68
5248.975	19046.14		30	*38259* – 43508	3 – 4	Ca I	RI68
5255.696	19021.78		17	*38219* – 43474	2 – 2	Ca I	RI68
5270.004	18970.14		24	*38219* – 43489	2 – 3	Ca I	RI68
5282.444	18925.47		20	*38192* – 43474	1 – 2	Ca I	RI68
6169.604	16204.07		16	*36575* – 42744	2 – 2	Ca I	RI68
6172.280	16197.04		21	*36575* – 42747	2 – 3	Ca I	RI68
6187.440	16157.36		22	*36731* – 42919	1 – 2	Ca I	RI68
6188.243	16155.26		16	*36554* – 42743	1 – 1	Ca I	RI68
6189.964	16150.77		20	*36554* – 42744	1 – 2	Ca I	RI68
6195.298	16136.87		17	*36547* – 42743	0 – 1	Ca I	RI68
7592.219	13167.78		18	*35896* – 43489	4 – 3	Ca I	RI68
7611.195	13134.95		24	*35896* – 43508	4 – 4	Ca I	RI68
7639.409	13086.44		21	*35835* – 43474	2 – 2	Ca I	RI68
7653.79	13061.84		8	*35835* – 43489	2 – 3	Ca I	HU51
7656.123	13057.87		17	*35818* – 43474	3 – 2	Ca I	RI68
7670.399	13033.57		30	*35818* – 43489	3 – 3	Ca I	RI68
7689.362	13001.42		18	*35818* – 43508	3 – 4	Ca I	RI68
7744.355	12909.10		25	*35730* – 43474	2 – 2	Ca I	RI68
7758.71	12885.21		15	*35730* – 43489	2 – 3	Ca I	HU51
7793.911	12827.02		18	31539 – *39333*	1 – 0	Ca I	RI68
7795.833	12823.86		24	31539 – *39335*	1 – 1	Ca I	RI68
7800.588	12816.04		25	31539 – *39340*	1 – 2	Ca I	RI68
8361.749	11955.95		17	33317 – *41679*	0 – 1	Ca I	RI68
8366.11	11949.72	0.01	1 L	52166 – *60533*	½ – ½	Ca II	ED56
8444.36	11838.99	0.01	2 L	52166 – *60611*	½ – 1½	Ca II	ED56
9155.495	10919.411		12	*35896* – 45052	4 – 3	Ca I	RI68
9163.559	10909.802		11	*36575* – 45738	2 – 1	Ca I	RI68
9181.62	10888.35		10	37298 – *46479*	2 – 1	Ca I	RI68
9183.920	10885.615		10	*36554* – 45738	1 – 1	Ca I	RI68
9188.769	10879.871		14	*39335* – 48524	1 – 0	Ca I	RI68
9197.540	10869.496		14	*39340* – 48537	2 – 1	Ca I	RI68
9202.304	10863.868		13	*39335* – 48537	1 – 1	Ca I	RI68
9204.244	10861.578		13	*39333* – 48537	0 – 1	Ca I	RI68
9216.806	10846.775		10	*38259* – 47475	3 – 3	Ca I	RI68
9223.439	10838.974		13	*39340* – 48563	2 – 2	Ca I	RI68
9228.204	10833.378		11	*39335* – 48563	1 – 2	Ca I	RI68
9231.70	10829.275		11	*35818* – 45050	3 – 2	Ca I	RI68
9318.57	10728.322		10	*35730* – 45049	2 – 1	Ca I	RI68
9506.59	10516.14		10	*38259* – 47765	3 – 3	Ca I	RI68
9664.967	10343.812		20	*23652* – 33317	1 – 0	Ca I	RI68

Ca—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9726.73	10278.14		10	*36575* – 46301	2 – 1	Ca I	RI68
9728.530	10276.229		10	*36575* – 46303	2 – 2	Ca I	RI68
9730.934	10273.690		12	*36575* – 46306	2 – 3	Ca I	RI68
9747.224	10256.520		10	*36554* – 46301	1 – 1	Ca I	RI68
9748.890	10254.767		11	*36554* – 46303	1 – 2	Ca I	RI68
9754.280	10249.101		10	*36547* – 46301	0 – 1	Ca I	RI68
9779.14	10223.04	0.01	10 L	*74521* – 84300	1½ – ½	Ca II	RI68

Ca References

HU51 Humphreys, C. J., J. Res. Nat. Bur. Stds. **47**, 262–268 (1951).
Source: D.C. arc
Instrument: 1 m Littrow spectrometer
Detector: PbS
Uncertainty in σ: Not given

ED56 Edlén, B., and Risberg, P., Ark. Fys. **10**, 553–566 (1956).
Source: Hollow cathode
Instrument: 6 m Wadsworth spectrograph
Detector: Photographic

RI68 Risberg, G., Ark. Fys. **37**, 231–249 (1968).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer for wavelengths above 11500 Å
b) 6 m Wadsworth spectrograph for wavelengths below 11500 Å
Detector: a) PbS cooled with liquid nitrogen
b) Photographic
Uncertainty in σ: Average deviation between observed and calculated wavenumbers is 0.016 cm^{-1}

Carbon

C, Z = 6

C I Normal state of valence electrons $2s^22p^2\ ^3P_0$ I.P. = 90820 cm^{-1}

C II Normal state of valence electrons $2s^22p\ ^2P^\circ_{1/2}$ I.P. = 196665 cm^{-1}

C

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3868.58	25842.20	0.02	1	71385 – *75253*	2 – 1	C I	JO65
3869.86	25833.66	0.02	1	71385 – *75255*	2 – 2	C I	JO65
3889.08	25706.03	0.02	1	71364 – *75253*	1 – 1	C I	JO65
3890.36	25697.56	0.02	1	71364 – *75255*	1 – 2	C I	JO65
4364.37	22906.56	0.02	7	73975 – *78340*	0 – 1	C I	JO65
4694.60	21295.27	0.02	1	*79318* – 84013	1 – 2	C I	JO65
4702.41	21259.89	0.02	8 B	*79310* – 84013	2 –	C I	JO65
4713.13	21211.55	0.02	2	*79323* – 84036	0 – 1	C I	JO65
4717.61	21191.41	0.02	4 B	*79318* – 84036	1 –	C I	JO65
4755.37	21023.13	0.02	8	73975 – *78731*	0 – 1	C I	JO65
5069.10	19721.99	0.02	23	72610 – *77679*	1 – 2	C I	JO65
5282.14	18926.54	0.02	3	*78731* – 84013	1 – 2	C I	JO65
5305.16	18844.42	0.02	2 B	*78731* – 84036	1 –	C I	JO65
5456.83	18320.67	0.02	8 B	*78529* – 83986	3 –	C I	JO65
5486.64	18221.12	0.02	8	*78529* – 84016	3 – 4	C I	JO65
5511.24	18139.80	0.02	13	69744 – *75255*	3 – 2	C I	JO65
5543.30	18034.86	0.02	5	69710 – *75253*	2 – 1	C I	JO65
5544.65	18030.47	0.02	2	69710 – *75255*	2 – 2	C I	JO65
5564.51	17966.12	0.02	2	69689 – *75253*	1 – 1	C I	JO65
5566.64	17959.24	0.02	3	69689 – *75256*	1 – 0	C I	JO65
5579.34	17918.38	0.02	4	*75255* – 80834	2 – 3	C I	JO65
5608.15	17826.33	0.02	4 B	*78318* – 83926	3 –	C I	JO65
5612.02	17814.03	0.02	3 B	*78307* – 83919	2 –	C I	JO65
5626.26	17768.94	0.02	3	*78293* – 83919	1 – 2	C I	JO65
5668.23	17637.38	0.02	3 B	*78318* – 83986	3 –	C I	JO65
5710.89	17505.64	0.02	3 B	*78215* – 83926	3 –	C I	JO65
5727.13	17455.97	0.02	2	*78199* – 83926	2 – 3	C I	JO65
5729.56	17448.60	0.02	11	72610 – *78340*	2 – 1	C I	JO65
5765.92	17338.56	0.02	10 B	*78249* – 84015	4 –	C I	JO65
5770.93	17323.51	0.02	2 B	*78215* – 83986	3 –	C I	JO65
5787.14	17274.99	0.02	3	*78199* – 83986	2 – 3	C I	JO65
5800.74	17234.48	0.02	2	*78215* – 84016	3 – 4	C I	JO65
5918.92	16890.38	0.02	50	72610 – *78529*	2 – 3	C I	JO65
6239.86	16021.64	0.02	3 B	*77679* – 83919	2 –	C I	JO65
6246.42	16004.81	0.02	2	*77679* – 83926	2 – 3	C I	JO65
6762.69	14782.98	0.02	4	71385 – *78148*	2 – 2	C I	JO65
6830.12	14637.03	0.02	2	71385 – *78215*	2 – 3	C I	JO65
6874.52	14542.50	0.02	179	*61981* – 68856	1 – 1	C I	JO65
6922.24	14442.24	0.02	13	71385 – *78307*	2 – 2	C I	JO65
6928.58	14429.03	0.02	12	71364 – *78293*	1 – 1	C I	JO65
6932.86	14420.12	0.02	61	71385 – *78318*	2 – 3	C I	JO65
6940.98	14403.25	0.02	16	71352 – *78293*	0 – 1	C I	JO65
6942.72	14399.65	0.02	38	71364 – *78307*	1 – 2	C I	JO65
7262.67	13765.29	0.02	1	*64089* – 71352	1 – 0	C I	JO65
7273.95	13743.93	0.02	3	*64090* – 71364	2 – 1	C I	JO65
7275.05	13741.86	0.02	1	*64089* – 71364	1 – 1	C I	JO65
7294.39	13705.41	0.02	1	*64090* – 71385	2 – 2	C I	JO65
7298.44	13697.81	0.02	6	*64086* – 71385	3 – 2	C I	JO65
7361.03	13581.35	0.02	5	70743 – *78104*	1 – 0	C I	JO65
7372.80	13559.66	0.02	12	70743 – *78116*	1 – 1	C I	JO65
7404.14	13502.27	0.02	20	70743 – *78148*	1 – 2	C I	JO65
7925.47	12614.10	0.02	26	71385 – *79310*	2 – 2	C I	JO65
7933.40	12601.48	0.02	8	71385 – *79318*	2 – 1	C I	JO65
7945.95	12581.59	0.02	6	71364 – *79310*	1 – 2	C I	JO65
7953.88	12569.04	0.02	5	71364 – *79318*	1 – 1	C I	JO65
7958.26	12562.12	0.02	6	71364 – *79323*	1 – 0	C I	JO65

C—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7966.28	12549.48	0.02	5	71352 – *79318*	0 – 1	C I	JO65
8404.07	11895.75	0.02	30	69744 – *78148*	3 – 2	C I	JO65
8406.07	11892.91	0.02	17	69710 – *78116*	2 – 1	C I	JO65
8415.50	11879.59	0.02	8	69689 – *78104*	1 – 0	C I	JO65
8427.27	11862.99	0.02	5	69689 – *78116*	1 – 1	C I	JO65
8437.42	11848.73	0.02	6	69710 – *78148*	2 – 2	C I	JO65
8471.48	11801.08	0.02	7	69744 – *78215*	3 – 3	C I	JO65
8488.41	11777.54	0.02	11	69710 – *78199*	2 – 2	C I	JO65
8504.86	11754.76	0.02	114	69710 – *78215*	2 – 3	C I	JO65
8505.91	11753.32	0.02	142	69744 – *78249*	3 – 4	C I	JO65
8509.60	11748.22	0.02	82	69689 – *78199*	1 – 2	C I	JO65
8563.60	11674.14	0.02	7	69744 – *78307*	3 – 2	C I	JO65
8566.91	11669.63	0.02	24	70743 – *79310*	1 – 2	C I	JO65
8574.22	11659.68	0.02	47	69744 – *78318*	3 – 3	C I	JO65
8574.83	11658.85	0.02	13	70743 – *79318*	1 – 1	C I	JO65
8579.20	11652.91	0.02	5	70743 – *79323*	1 – 0	C I	JO65
8582.82	11647.99	0.02	5	69710 – *78293*	2 – 1	C I	JO65
8596.97	11628.83	0.02	23	69710 – *78307*	2 – 2	C I	JO65
8604.02	11619.29	0.02	12	69689 – *78293*	1 – 1	C I	JO65
8823.49	11330.285	0.02	6 L	68856 – *77679*	1 – 2	C I	JO66
9296.33	10753.985	0.02	2 L	60393 – *69689*	2 – 1	C I	JO66
9317.52	10729.533	0.02	6 L	60393 – *69710*	2 – 2	C I	JO66
9336.84	10707.333	0.02	6 L	60352 – *69689*	1 – 1	C I	JO66
9350.88	10691.250	0.02	10 L	60393 – *69744*	2 – 3	C I	JO66
9356.05	10685.345	0.02	6 L	60333 – *69689*	0 – 1	C I	JO66
9358.03	10683.082	0.02	8 L	60352 – *69710*	1 – 2	C I	JO66
9483.96	10541.226	0.02	4 L	68856 – *78340*	1 – 1	C I	JO66
9874.94	10123.871	0.02	6 L	68856 – *78731*	1 – 1	C I	JO66

C References

JO65 Johansson, L., and Litzén, U., Ark. Fys. **29**, 175–179 (1965).
Source: Condensed hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

JO66 Johansson, L., Ark. Fys. **31**, 201–235 (1966).
Source: Condensed hollow cathode
Instrument: 5.5 m Czerny-Turner spectrograph
Detector: Photographic

Additional References

Minnhagen, L., Ark. Fys. **7**, 413 (1954).
Minnhagen, L., Ark. Fys. **14**, 481, (1959).

Cerium

Ce, Z = 58

Ce I Normal state of valence electrons $4f5d6s^2\ {}^1G^\circ_4$ I.P. = 44100 cm^{-1}

Ce II Normal state of valence electrons $4f5d^2\ {}^4H^\circ_{7/2}$ I.P. = 87500 cm^{-1}

Ce III Normal state of balence electrons $4f^2\ {}^3H_4$ I.P. = 162906 cm^{-1}

Ce

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3882.110	25752.160		3	*12641* – 16523	2 – 1	Ce III	LI72
4459.366	22418.590	0.01	5	*11612* 16072	1 0	Ce III	LI72
4583.400	21811.91		3 L	*11061* – 15644	7 – 6	Ce I	VE72
4652.880	21486.20		3 L	13389 – *18042*	3 – 4	Ce I	VE72
4675.942	21380.230	0.01	12	*12641* – 17317	2 – 2	Ce III	LI72
4700.400	21268.98		3 L	*7059* – 11759	4½ – 5½	Ce II	VE72
4762.760	20990.50		5 L	*0* – 4762	4 – 4	Ce I	VE72
4820.111	20740.75		4 L	*6638* – 11458	4½ – 5½	Ce II	VE72
4832.954	20685.630	0.01	30	1528 – *6361*	5 – 5	Ce III	LI72
4846.201	20629.09		3 L	*13519* – 18365	5 – 5	Ce I	VE72
4876.770	20499.78		3 L	*5437* – 10314	3½ – 4½	Ce II?	VE72
4876.770	20499.78		3 L	*13815* – 18692	4 – 4	Ce I?	VE72
4876.770	20499.78		3 L	*13044* – 17921	4 – 3	Ce I?	VE72
4918.680	20325.11		3 L	13124 – *18042*	5 – 4	Ce I	VE72
4937.390	20248.09		3 L	7011 – *11949*	4½ – 3½	Ce II?	VE72
4937.390	20248.09		3 L	*12454* – 17391	2 – 1	Ce I?	VE72
4937.390	20248.09		3 L	*9709* – 14646	2 – 2	Ce I?	VE72
4946.507	20210.770		4	*11577* – 16523	0 – 1	Ce III	LI72
4959.500	20157.82		5 L	*1279* – 6238	4 – 5	Ce I	VE72
4987.120	20046.18		5 L	*5716* – 10703	3½ – 4½	Ce II?	VE72
4987.120	20046.18		5 L	*14027* – 19014	4 – 4	Ce I?	VE72
4988.349	20041.24		3 L	*4737* – 9725	2½ – 3½	Ce II	VE72
5050.550	19794.42		4 L	*4266* – 9316	3½ – 3½	Ce II	VE72
5068.440	19724.55		3 L	*6389* – 11458	4½ – 5½	Ce II?	VE72
5068.440	19724.55		3 L	*8055* – 13124	6 – 5	Ce I?	VE72
5089.501	19642.93		3 L			Ce	VE72
5103.119	19590.51		3 L	*3793* – 8896	6½ – 5½	Ce II	VE72
5113.189	19551.93		5 L	*8400* – 13513	5 – 4	Ce I	VE72
5120.456	19524.180	0.01	55	5006 – *10126*	4 – 3	Ce III	LI72
5121.251	19521.15		5 L	*6638* – 11759	4½ – 5½	Ce II	VE72
5127.239	19498.35		4 L	*13283* – 18411	3 – 4	Ce I?	VE72
5127.239	19498.35		4 L	13605 – *18732*	6 – 5	Ce I?	VE72
5127.295	19498.140	0.01	20	0 – *5127*	4 – 4	Ce III	LI72
5135.722	19466.140	0.01	26	4764 – *9900*	3 – 2	Ce III	LI72
5137.901	19457.89		4 L	*1873* – 7011	3½ – 4½	Ce II	VE72
5147.329	19422.25		6 L	*4910* – 10058	5½ – 6½	Ce II	VE72
5159.308	19377.150	0.01	27	3762 – *8922*	2 – 1	Ce III	LI72
5183.029	19288.47		3 L	*15917* – 21100	7 – 6	Ce I	VE72
5189.979	19262.64		3 L	*12425* – 17615	4 – 4	Ce I	VE72
5214.500	19172.06		3 L	*4511* – 9725	2½ – 3½	Ce II?	VE72
5214.500	19172.06		3 L	8235 – *13450*	2 – 3	Ce I?	VE72
5222.882	19141.290	0.01	38	3127 – *8349*	6 – 6	Ce III	LI72
5229.691	19116.37		3 L			Ce	VE72
5302.891	18852.49		3 L	*3593* – 8896	4½ – 5½	Ce II	VE72
5323.629	18779.05		5 L	12960 – *18284*	6 – 5	Ce I	VE72
5335.491	18737.30		3 L			Ce	VE72
5353.050	18675.84		3 L			Ce	VE72
5361.792	18645.390		3	4764 – *10126*	3 – 3	Ce III	LI72
5373.100	18606.15		5 L	14609 – *19982*	7 – 6	Ce I?	VE72
5373.100	18606.15		5 L	*13569* – 18943	4 – 5	Ce I?	VE72
5373.100	18606.15		5 L	*13214* – 18587	1 – 2	Ce I?	VE72
5380.714	18579.820	0.01	42	7120 – *12500*	4 – 3	Ce III	LI72
5381.299	18577.80		3 L	8278 – *13659*	5½ – 4½	Ce II?	VE72
5381.299	18577.80		3 L	15240 – *20621*	4 – 4	Ce I?	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5466.039	18289.79		3 L	14064 – *19530*	4 – 5	Ce I	VE72
5466.959	18286.71		3 L	*12425* – 17892	4 – 4	Ce I	VE72
5479.641	18244.39		3 L	*15333* – 20812	8 – 7	Ce I?	VE72
5479.641	18244.39		3 L	*11357* – 16836	5 – 6	Ce I?	VE72
5479.641	18244.39		3 L	*7715* – 13194	5 – 4	Ce I?	VE72
5489.621	18211.22		6 L	*2641* – 8131	3½ – 4½	Ce II	VE72
5502.370	18169.030	0.01	6	0 – *5502*	4 – 3	Ce III	LI72
5505.098	18160.02		3 L	*7522* – 13027	5½ – 6½	Ce II	VE72
5505.211	18159.65		3 L			Ce	VE72
5549.950	18013.26		5 L	*2581* – 8131	4½ – 4½	Ce II	VE72
5557.701	17988.14		3 L			Ce	VE72
5568.039	17954.74		6 L	*4203* – 9771	6½ – 7½	Ce II	VE72
5595.730	17865.89		3 L	13194 – *18790*	4 – 5	Ce I	VE72
5601.521	17847.42		4 L	*1410* – 7011	4½ – 4½	Ce II	VE72
5608.534	17825.100	0.01	5	12835 – *18443*	2 – 1	Ce III	LI72
5613.861	17808.19		3 L	*9135* – 14748	3 – 4	Ce I	VE72
5621.739	17783.230		4	1528 – *7150*	5 – 4	Ce III	LI72
5636.021	17738.17		3 L	*10243* – 15879	4 – 5	Ce I	VE72
5636.930	17735.31		3 L	*8902* – 14539	3 – 3	Ce I	VE72
5638.599	17730.06		4 L	*6475* – 12114	4 – 4	Ce I	VE72
5649.381	17696.22		3 L	*12948* – 18598	5 – 6	Ce I	VE72
5663.091	17653.38		3 L	*13572* – 19235	7 – 6	Ce I	VE72
5666.590	17642.48		3 L	13124 – *18790*	5 – 5	Ce I	VE72
5671.939	17625.84		3 L	*7841* – 13513	5 – 4	Ce I	VE72
5672.831	17623.07		4 L			Ce	VE72
5675.858	17613.67		6 L	12366 – *18042*	5 – 4	Ce I	VE72
5681.971	17594.72		6 L	*1410* – 7092	4½ – 5½	Ce II	VE72
5690.879	17567.18		3 L			Ce	VE72
5696.820	17548.86		6 L	*2581* – 8278	4½ – 5½	Ce II	VE72
5704.846	17524.170		3	*11612* – 17317	1 – 2	Ce III	LI72
5706.500	17519.09		6 L			Ce	VE72
5709.939	17508.54		7 L	*5455* – 11165	7½ – 8½	Ce II	VE72
5749.618	17387.71		3 L			Ce	VE72
5771.299	17322.39		5 L	12960 – *18732*	6 – 5	Ce I	VE72
5782.629	17288.45		3 L	*5675* – 11458	4½ – 5½	Ce II	VE72
5790.399	17265.25		3 L	*5969* – 11759	5½ – 5½	Ce II	VE72
5803.391	17226.60		4 L	*5651* – 11454	5½ – 6½	Ce II	VE72
5804.601	17223.01		3 L	*6663* – 12467	5 – 5	Ce I	VE72
5813.640	17196.23		3 L			Ce	VE72
5814.360	17194.10		3 L	*9830* – 15644	6 – 6	Ce I	VE72
5816.708	17187.16		3 L	*8280* – 14097	2½ – 3½	Ce II?	VE72
5816.708	17187.16		3 L	12467 – *18284*	5 – 5	Ce I?	VE72
5820.748	17175.23		3 L	*15021* – 20842	7 – 6	Ce I?	VE72
5820.748	17175.23		3 L	*9787* – 15607	3 – 2	Ce I?	VE72
5843.151	17109.38		4 L	*13219* – 19062	6 – 5	Ce I	VE72
5844.090	17106.63		4 L	*12297* – 18141	5 – 4	Ce I	VE72
5852.949	17080.74		3 L	*2595* – 8448	1½ – 2½	Ce II	VE72
5854.069	17077.47		5 L	*5455* – 11309	7½ – 7½	Ce II	VE72
5854.241	17076.97		4 L	*4459* – 10314	3½ – 4½	Ce II?	VE72
5854.241	17076.97		4 L	*4203* – 10058	6½ – 6½	Ce II?	VE72
5860.449	17058.88		7 L	*2563* – 8423	5½ – 6½	Ce II	VE72
5864.498	17047.10		3 L	*12297* – 18162	5 – 4	Ce I	VE72
5890.230	16972.63		3 L			Ce	VE72
5893.709	16962.61		3 L	*7890* – 13784	4 – 5	Ce I	VE72
5925.400	16871.89		5 L	13605 – *19530*	6 – 5	Ce I	VE72
5928.499	16863.07		5 L			Ce	VE72
5953.498	16792.26		3 L	*3363* – 9316	2½ – 3½	Ce II	VE72
5956.709	16783.21		3 L	*10243* – 16200	4 – 3	Ce I	VE72
5978.330	16722.51		7 L	*3793* – 9771	6½ – 7½	Ce II	VE72
5979.861	16718.23		4 L	*10243* – 16223	4 – 5	Ce I	VE72
6017.061	16614.87		3 L	*2879* – 8896	5½ – 5½	Ce II	VE72
6024.200	16595.18		7 L	*987* – 7011	4½ – 4½	Ce II	VE72
6042.369	16545.28		3 L	13939 – *19982*	6 – 6	Ce I	VE72
6104.651	16376.48		7 L	*987* – 7092	4½ – 5½	Ce II	VE72
6107.642	16368.46		3 L	12114 – *18221*	4 – 5	Ce I	VE72
6123.031	16327.32		4 L	*4523* – 10646	4½ – 5½	Ce II	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6137.739	16288.200		3	3762 – *9900*	2 – 2	Ce III	LI72
6158.601	16233.02		4 L			Ce	VE72
6192.821	16143.32		3 L	*2581* – 8774	4½ – 4½	Ce II	VE72
6194.072	16140.06		3 L			Ce	VE72
6198.414	16128.750	0.01	87	3127 – *9325*	6 – 5	Ce III	LI72
6257.241	15977.12		6 L	*1873* – 8131	3½ – 4½	Ce II	VE72
6263.722	15960.590	0.01	12	*6571* – 12835	2 – 2	Ce III	LI72
6264.581	15958.40		6 L	*3793* – 10058	6½ – 6½	Ce II	VE72
6265.211	15956.790	0.01	80	*0* – *6265*	4 – 3	Ce III	*LI72*
6278.981	15921.80		3 L	*3100* – 9379	4 – 4	Ce I	VE72
6280.338	15918.36		4 L	*8366* – 14646	2 – 2	Ce I	VE72
6308.388	15847.580	0.01	80	1528 – *7836*	5 – 4	Ce III	LI72
6310.021	15843.48		3 L	12366 – *18676*	5 – 4	Ce I	VE72
6314.540	15832.14		5 L			Ce	VE72
6315.462	15829.83		6 L	*2581* – 8896	4½ – 5½	Ce II?	VE72
6315.462	15829.83		6 L	13194 – *19510*	4 – 4	Ce I?	VE72
6322.759	15811.56		3 L	12467 – *18790*	5 – 5	Ce I	VE72
6333.498	15784.75		7 L	*2563* – 8896	5½ – 5½	Ce II	VE72
6365.351	15705.76		3 L	12366 – *18732*	5 – 5	Ce I	VE72
6386.329	15654.17		4 L	13124 – *19510*	5 – 4	Ce I	VE72
6391.110	15642.46		5 L			Ce	VE72
6473.129	15444.26		3 L	*7202* – 13675	2½ – 2½	Ce II	VE72
6479.321	15429.50		4 L			Ce	VE72
6509.511	15357.94		3 L	*10035* – 16545	5½ – 5½	Ce II	VE72
6514.461	15346.27		3 L	*2382* – 8896	4½ – 5½	Ce II	VE72
6543.721	15277.65		5 L	*4910* – 11454	5½ – 6½	Ce II?	VE72
6543.721	15277.65		5 L	*13519* – 20063	5 – 6	Ce I?	VE72
6569.439	15217.84		4 L	12960 – *19530*	6 – 5	Ce I	VE72
6574.689	15205.69		3 L	*1873* – 8448	3½ – 2½	Ce II	VE72
6577.548	15199.08		3 L	*8762* – 15339	4 – 5	Ce I	VE72
6623.170	15094.390		4	*9900* – 16523	2 – 1	Ce III	LI72
6689.619	14944.45		4 L			Ce	VE72
6694.910	14932.64		3 L			Ce	VE72
6720.861	14874.98		5 L	*1410* – 8131	4½ – 4½	Ce II	VE72
6749.051	14812.85		3 L	5616 – *12365*	4½ – 4½	Ce II	VE72
6827.979	14641.62		3 L	6589 – 13217	4½ – 3½	Ce II	VE72
6867.698	14556.94		6 L	*1410* – 8278	4½ – 5½	Ce II	VE72
6934.610	14416.48		3 L	*2382* – 9316	4½ – 3½	Ce II	VE72
6999.030	14283.79		3 L			Ce	VE72
7011.758	14257.86		7 L	*0* – 7011	3½ – 4½	Ce II	VE72
7052.159	14176.18		5 L	*3593* – 10646	4½ – 5½	Ce II	VE72
7052.159	14176.18		5 L	*8509* – *15561*	4 – 5	*Ce I*	*VE72*
7056.937	14166.58		4 L	*8587* – 15644	7 – 6	Ce I	VE72
7064.338	14151.74		4 L	*8307* – 15371	3 – 4	Ce I	VE72
7080.012	14120.41		3 L	*12600* – 19680	3 – 4	Ce I?	VE72
7080.012	14120.41		3 L	*7715* – 14795	5 – 5	Ce I?	VE72
7102.859	14074.99		3 L	*7522* – 14625	5½ – 5½	Ce II	VE72
7106.211	14068.35		4 L			Ce	VE72
7143.538	13994.84		4 L	*987* – 8131	4½ – 4½	Ce II?	VE72
7143.538	13994.84		4 L	12366 – *19510*	5 – 4	Ce I?	VE72
7150.032	13982.130		4	*8922* – 16072	1 – 0	Ce III?	LI72
7150.032	13982.130		4	0 – *7150*	4 – 4	Ce III?	LI72
7153.418	13975.51		4 L	*7233* – 14387	5½ – 4½	Ce II	VE72
7178.551	13926.58		3 L	*2879* – 10058	5½ – 6½	Ce II?	VE72
7178.551	13926.58		3 L	*8902* – 16080	3 – 2	Ce I?	VE72
7190.951	13902.570	0.01	6	*10126* – 17317	3 – 2	Ce III	LI72
7254.379	13781.01		4 L	*4203* – 11458	6½ – 5½	Ce II	VE72
7290.447	13712.83		4 L	*987* – 8278	4½ – 5½	Ce II	VE72
7317.250	13662.60		3 L	*5674* – 12992	1 – 2	Ce I	VE72
7337.901	13624.15		3 L	*5118* – 12456	2½ – 3½	Ce II	VE72
7401.670	13506.77		4 L	*5716* – 13117	3½ – 4½	Ce II	VE72
7417.137	13478.610		3	*9900* – 17317	2 – 2	Ce III	LI72
7419.402	13474.49		3 L	*8402* – 15822	3½ – 3½	Ce II	VE72
7421.578	13470.54		3 L	*5283* – 12704	½ – 1½	Ce II	VE72
7422.608	13468.67		3 L			Ce	VE72
7430.669	13454.06		3 L			Ce	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7434.448	13447.22		6 L	*2879* – 10314	5 – 4	Ce II	VE72
7471.882	13379.85		3 L	*5964* – 13436	3½ – 2½	Ce II	VE72
7478.998	13367.12		3 L	*8587* – 16066	7 – 6	Ce I	VE72
7482.491	13360.88		5 L			Ce	VE72
7485.791	13354.99		3 L	*5904* – 13389	2 – 3	Ce I	VE72
7486.379	13353.94		6 L	*1410* – 8896	4½ – 5½	Ce II	VE72
7494.950	13338.67		4 L	*2563* – 10058	5½ – 6½	Ce II	VE72
7507.129	13317.03		3 L			Ce	VE72
7516.289	13300.80		6 L	*3793* – 11309	6½ – 7½	Ce II	VE72
7525.347	13284.79		3 L	*7715* – 15240	5 – 4	Ce I	VE72
7528.028	13280.06		3 L	*13572* – 21100	7 – 6	Ce I	VE72
7532.111	13272.86		3 L	*6517* – 14049	2½ – 1½	Ce II?	VE72
7532.111	13272.86		3 L	*11874* – 19406	3 – 3	Ce I?	VE72
7542.141	13255.21		4 L	*10243* – 17785	4 – 3	Ce I	VE72
7543.188	13253.37		5 L	*1663* – 9206	3 – 3	Ce I	VE72
7544.332	13251.36		3 L	*8400* – 15945	5 – 4	Ce I	VE72
7566.389	13212.73		4 L	*7059* – 14625	4½ – 5½	Ce II	VE72
7576.659	13194.82		3 L	4165 – *11742*	4½ – 5½	Ce II	VE72
7584.419	13181.32		3 L	*5942* – 13527	3½ – 4½	Ce II	VE72
7589.371	13172.72		3 L	*8055* – 15644	6 – 6	Ce I	VE72
7601.654	13151.440		4	*8922* – 16523	1 – 1	Ce III	LI72
7620.599	13118.74		3 L	*10673* – 18294	6 – 6	Ce I	VE72
7622.057	13116.23		3 L	7341 – *14963*	5½ – 5½	Ce II	VE72
7630.761	13101.27		3 L			Ce	VE72
7637.990	13088.87		6 L	*6638* – 14276	4½ – 5½	Ce II	VE72
7643.339	13079.71		3 L	*1410* – 9053	4½ – 3½	Ce II	VE72
7661.028	13049.51		3 L	*3793* – 11454	6½ – 6½	Ce II?	VE72
7661.028	13049.51		3 L	*11796* – 19457	4 – 3	Ce I?	VE72
7664.681	13043.29		3 L	*3793* – 11458	6½ – 5½	Ce II	VE72
7665.692	13041.57		3 L	*7061* – 14727	½ – 1½	Ce II	VE72
7680.468	13016.48		5 L	*5437* – 13117	3½ – 4½	Ce II	VE72
7700.048	12983.38		3 L	*7696* – 15396	6 – 6	Ce I	VE72
7701.430	12981.05		3 L	*10274* – 17976	3½ – 2½	Ce II	VE72
7707.718	12970.46		4 L	*6389* – 14097	4½ – 3½	Ce II	VE72
7716.029	12956.49		3 L	*1663* – 9379	3 – 4	Ce I	VE72
7719.360	12950.90		6 L	*4737* – 12456	2½ – 3½	Ce II?	VE72
7719.360	12950.90		6 L	*7841* – 15561	5 – 5	Ce I?	VE72
7727.218	12937.73		3 L			Ce	VE72
7749.722	12900.16		3 L	*8402* 16152	3½ – 3½	Ce II	VE72
7752.697	12895.21		3 L	*13572* – 21324	7 – 6	Ce I	VE72
7758.990	12884.75		6 L	*7522* – 15281	5½ – 6½	Ce II	VE72
7779.470	12850.83		3 L	*10924* – 18704	4½ – 5½	Ce II	VE72
7781.650	12847.23		3 L			Ce	VE72
7783.438	12844.28		3 L	*7746* – 15529	2½ – 2½	Ce II	VE72
7783.601	12844.01		3 L	4165 – *11949*	4½ – 3½	Ce II	VE72
7786.529	12839.18		3 L	*987* – 8774	4½ – 4½	Ce II	VE72
7787.227	12838.03		3 L	*9333* – 17120	6 – 5	Ce I	VE72
7797.191	12821.620	0.01	12	1528 – *9325*	5 – 5	Ce III	LI72
7807.460	12804.76		3 L	*9135* – 16942	3 – 4	Ce I	VE72
7811.077	12798.83		6 L	*5716* – 13527	3½ – 4½	Ce II	VE72
7830.797	12766.60		5 L	*5437* – 13268	3½ – 2½	Ce II	VE72
7836.712	12756.960	0.01	15	0 – *7836*	4 – 4	Ce III	LI72
7845.189	12743.18		3 L	*8991* – 16836	5 – 6	Ce I	VE72
7850.789	12734.09		3 L			Ce	VE72
7851.788	12732.47		4 L	*1873* – 9725	3½ – 3½	Ce II	VE72
7856.533	12724.78		3 L	*13297* – 21153	5 – 5	Ce I?	VE72
7856.533	12724.78		3 L	*10901* – 18758	2 – 3	Ce I?	VE72
7877.767	12690.48		3 L	*8991* – 16869	5 – 4	Ce I	VE72
7880.972	12685.32		3 L	*11061* – 18942	7 – 7	Ce I	VE72
7886.368	12676.64		4 L	*6389* – 14276	4½ – 5½	Ce II	VE72
7897.501	12658.77		4 L	7780 – *15677*	6 – 7	Ce I	VE72
7906.633	12644.15		3 L	*1410* – 9316	4½ – 3½	Ce II	VE72
7907.627	12642.56		3 L	*8101* – 16008	2 – 3	Ce I	VE72
7908.253	12641.56		3 L	*13089* – 20998	3 – 4	Ce I?	VE72
7908.253	12641.56		3 L	*9200* – 17108	2 – 2	Ce I?	VE72
7909.141	12640.14		5 L	*987* – 8896	4½ – 5½	Ce II	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7912.008	12635.56		3 L	*11545* – 19457	4 – 3	Ce I?	VE72
7912.008	12635.56		3 L	*11030* – 18942	6 – 7	Ce I?	VE72
7928.491	12609.29		3 L	*8088* – 16017	2 – 3	Ce I	VE72
7945.549	12582.22		4 L	*4511* – 12456	2½ – 3½	Ce II	VE72
7948.777	12577.11		3 L	*7696* – 15644	6 – 6	Ce I	VE72
7975.932	12534.29		3 L			Ce	VE72
7976.581	12533.27		3 L	*8175* – 16152	2½ – 3½	Ce II?	VE72
7976.581	12533.27		3 L	*11271* – 19247	4 – 3	Ce I?	VE72
7980.657	12526.87		3 L			Ce	VE72
7987.390	12516.31		3 L			Ce	VE72
7988.430	12514.68		3 L			Ce	VE72
8006.747	12486.05		6 L	*228* – 8235	2 – 2	Ce I	VE72
8048.012	12422.03		5 L	*7233* – 15281	5½ – 6½	Ce II	VE72
8049.690	12419.44		4 L	*3312* – 11361	4 – 4	Ce I	VE72
8061.107	12401.85		3 L	*9709* – 17770	2 – 2	Ce I	VE72
8063.689	12397.88		3 L	*6475* – 14539	4 – 3	Ce I	VE72
8071.039	12386.59		3 L	*7522* – 15593	5½ – 6½	Ce II	VE72
8075.922	12379.10		4 L	*7746* – 15822	2½ – 3½	Ce II	VE72
8089.868	12357.76		6 L	*5437* – 13527	3½ – 4½	Ce II	VE72
8099.719	12342.73		5 L	*1279* – 9379	4 – 4	Ce I	VE72
8111.397	12324.96		5 L	*8587* – 16699	7 – 6	Ce I	VE72
8131.209	12294.93		6 L	*0* – 8131	3½ – 4½	Ce II	VE72
8132.089	12293.60		4 L	*11796* – 19928	4 – 3	Ce I?	VE72
8132.089	12293.60		4 L	*6663* – 14795	5 – 5	Ce I?	VE72
8134.047	12290.64		6 L	*4322* – 12456	2½ – 3½	Ce II	VE72
8168.120	12239.37		3 L	*8055* – 16223	6 – 5	Ce I	VE72
8173.743	12230.95		3 L	*7061* – 15235	½ – 1½	Ce II	VE72
8176.792	12226.39		6 L	*7341* – 15517	5½ – 6½	Ce II	VE72
8183.599	12216.22		5 L	*7696* – 15879	6 – 5	Ce I	VE72
8185.750	12213.01		3 L	*2634* – 10820	2½ – 2½	Ce II	VE72
8193.377	12201.64		3 L	*4511* – 12704	2½ – 1½	Ce II?	VE72
8193.377	12201.64		3 L	*4173* – 12366	4 – 5	Ce I?	VE72
8200.300	12191.34		3 L	4165 – *12365*	4½ – 4½	Ce II	VE72
8205.880	12183.05		3 L	*13519* – 21725	5 – 5	Ce I?	VE72
8205.880	12183.05		3 L	*12425* – 20631	4 – 5	Ce I?	VE72
8208.103	12179.75		5 L	*11742* – 19950	5½ – 6½	Ce II	VE72
8248.697	12119.81		3 L	*8587* – 16836	7 – 6	Ce I	VE72
8250.698	12116.87		4 L	*7278* – 15529	1½ – 2½	Ce II	VE72
8261.772	12100.63		3 L	*3100* – 11361	4 – 4	Ce I	VE72
8263.882	12097.54		5 L	*2382* – 10646	4½ – 5½	Ce II	VE72
8273.456	12083.54		3 L			Ce	VE72
8297.710	12048.22		3 L	*7278* – 15576	1½ – 1½	Ce II	VE72
8303.106	12040.39		3 L			Ce	VE72
8309.387	12031.29		3 L	*5942* – 14252	3½ – 3½	Ce II?	VE72
8309.387	12031.29		3 L	*5572* – 13881	4 – 5	Ce I?	VE72
8309.387	12031.29		3 L	*6337* – 14646	3 – 2	Ce I?	VE72
8320.237	12015.60		5 L	*7696* – 16016	6 – 5	Ce I	VE72
8321.110	12014.34		3 L	*2382* – 10703	4½ – 4½	Ce II	VE72
8329.380	12002.41		5 L			Ce	VE72
8336.291	11992.46		3 L	*7715* – 16051	5 – 4	Ce I	VE72
8364.791	11951.60		3 L	*6234* – 14599	3 – 4	Ce I	VE72
8368.243	11946.67		4 L	*6913* – 15281	6½ – 6½	Ce II	VE72
8381.531	11927.73		5 L	*5716* – 14097	3½ – 3½	Ce II	VE72
8381.953	11927.13		4 L	*4322* – 12704	2½ – 1½	Ce II	VE72
8393.719	11910.41		3 L	*3703* – 12097	3½ – 3½	Ce II	VE72
8406.268	11892.63		5 L	*7746* – 16152	2½ – 3½	Ce II	VE72
8421.947	11870.49		3 L	*5675* – 14097	4½ – 3½	Ce II	VE72
8422.869	11869.19		3 L	*8270* – 16693	3 – 4	Ce I	VE72
8430.818	11858.00		4 L			Ce	VE72
8435.570	11851.32		3 L	*13629* – 22064	5 – 6	Ce I	VE72
8441.047	11843.63		5 L	*12720* – 21161	4 – 4	Ce I?	VE72
8441.047	11843.63		5 L	*8695* – 17136	1 – 1	Ce I?	VE72
8448.630	11833.00		6 L	*0* – 8448	3½ – 2½	Ce II	VE72
8457.221	11820.98		5 L	*5819* – 14276	4½ – 5½	Ce II	VE72
8461.258	11815.34		4 L	*3995* – 12456	3½ – 3½	Ce II	VE72
8493.563	11770.40		3 L	*5409* – 13902	2 – 3	Ce I	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8495.829	11767.26		4 L	*6638* – 15134	4½ – 4½	Ce II	VE72
8510.939	11746.37		3 L	8789 – *17300*	2½ – 3½	Ce II	VE72
8519.337	11734.79		3 L	*4737* – 13256	2½ – 1½	Ce II?	VE72
8519.337	11734.79		3 L	*9135* – 17654	3 – 3	Ce I?	VE72
8527.447	11723.63		3 L	*7696* – 16223	6 – 5	Ce I	VE72
8536.017	11711.86		3 L	*5716* – 14252	3½ – 3½	Ce II	VE72
8553.347	11688.13		3 L	*8762* – 17315	4 – 4	Ce I?	VE72
8553.347	11688.13		3 L	*7696* – 16249	6 – 6	Ce I?	VE72
8568.030	11668.10		4 L	*5819* – 14387	4½ – 4½	Ce II	VE72
8575.012	11658.60		5 L	*2879* – 11454	5½ – 6½	Ce II	VE72
8577.388	11655.37		3 L	*6663* – 15240	5 – 4	Ce I	VE72
8579.677	11652.26		3 L	*8587* – 17167	7 – 7	Ce I	VE72
8586.243	11643.35		4 L	4165 – *12751*	4½ – 5½	Ce II?	VE72
8586.243	11643.35		4 L	*13139* – 21725	2 – 1	Ce I?	VE72
8587.932	11641.06		4 L	*6475* – 15063	4 – 3	Ce I	VE72
8594.902	11631.62		3 L	*4523* – 13117	4½ – 4½	Ce II	VE72
8600.299	11624.32		4 L	*7259* – 15859	3½ – 4½	Ce II	VE72
8614.699	11604.89		3 L	*9996* – 18611	3 – 3	Ce I?	VE72
8614.699	11604.89		3 L	*8307* – 16921	3 – 3	Ce I?	VE72
8625.759	11590.01		5 L	*7233* – 15859	5½ – 4½	Ce II	VE72
8625.952	11589.75		3 L			Ce	VE72
8668.277	11533.16		3 L	*4455* – 13124	6 – 5	Ce I	VE72
8703.853	11486.02		5 L	*3764* – 12467	5 – 5	Ce I	VE72
8719.696	11465.15		4 L	*8400* – 17120	5 – 5	Ce I	VE72
8727.072	11455.46		5 L	*5409* – 14136	2 – 3	Ce I	VE72
8742.442	11435.32		3 L	*5904* – 14646	2 – 2	Ce I	VE72
8744.400	11432.76		4 L			Ce	VE72
8751.289	11423.76		3 L	*9135* – 17886	3 – 2	Ce I?	VE72
8751.289	11423.76		3 L	*6836* – 15587	2 – 2	Ce I?	VE72
8758.112	11414.86		3 L	*4459* – 13217	3½ – 3½	Ce II	VE72
8789.173	11374.52		3 L			Ce	VE72
8793.750	11368.60		3 L	*8509* – 17302	4 – 3	Ce I	VE72
8797.310	11364.00		3 L	*7169* – 15967	3 – 2	Ce I	VE72
8806.997	11351.50		3 L	*5802* – 14609	7 – 7	Ce I?	VE72
8806.997	11351.50		3 L	9379 – *18186*	4 – 3	Ce I?	VE72
8858.368	11285.67		3 L	*4746* – 13605	6 – 6	Ce I	VE72
8879.762	11258.48		3 L	*2879* – 11759	5½ – 5½	Ce II	VE72
8890.201	11245.26		4 L	*12793* – 21683	5 – 5	Ce I?	VE72
8890.201	11245.26		4 L	*7696* – 16586	6 – 5	Ce I?	VE72
8917.488	11210.85		4 L	*3196* – 12114	4 – 4	Ce I	VE72
8931.949	11192.70		3 L			Ce	VE72
8951.607	11168.12		5 L	*4266* – 13217	3½ – 3½	Ce II	VE72
8960.400	11157.16		5 L	*5674* – 14635	1 – 1	Ce I	VE72
8980.983	11131.59		3 L	*9723* – 18704	4½ – 5½	Ce II	VE72
9001.798	11105.85		3 L	*4266* – 13268	3½ – 2½	Ce II	VE72
9013.77	11091.10		150	12835 – *21849*	2 – 3	Ce III	SU65
9013.973	11090.85		4 L	*3100* – 12114	4 – 4	Ce I	VE72
9020.577	11082.73		3 L	*7853* – 16873	1 – 1	Ce I	VE72
9022.677	11080.15		3 L	*7522* – 16545	5½ – 5½	Ce II	VE72
9032.322	11068.320		4	7120 – *16152*	4 – 5	Ce III	LI72
9032.57	11068.02		60			Ce	SU65
9034.590	11065.54		5 L	*6337* – 15371	3 – 4	Ce I?	VE72
9034.590	11065.54		5 L	*4160* – 13194	3 – 4	Ce I?	VE72
9037.759	11061.66		4 L	*6663* – 15700	5 – 4	Ce I	VE72
9038.29	11061.01		150	*92526* – 101564	6 – 7	Ce III	SU65
9059.438	11035.19		3 L	*10901* – 19961	2 – 1	Ce I	VE72
9061.072	11033.20		5 L	*8587* – 17649	7 – 6	Ce I	VE72
9079.110	11011.28		3 L	*6621* – 15700	3 – 4	Ce I	VE72
9080.487	11009.61		3 L	*6475* – 15555	4 – 3	Ce I	VE72
9093.297	10994.10		3 L	*7059* – 16152	4½ – 3½	Ce II?	VE72
9093.297	10994.10		3 L	*3363* – 12456	2½ – 3½	Ce II?	VE72
9093.297	10994.10		3 L	*10586* – 19680	4 – 4	Ce I?	VE72
9097.89	10988.55		100	*92080* – 101178	4 – 5	Ce III	SU65
9104.00	10981.17		30	*94508* – 103612	1 – 1	Ce III	SU65
9130.478	10949.33		3 L	*6836* – 15967	2 – 2	Ce I	VE72
9140.429	10937.41		3 L	*7696* – 16836	6 – 6	Ce I?	VE72

Ce—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9140.429	10937.41		3 L	4762 – *13903*	4 – 3	Ce I?	VE72
9143.120	10934.19		5 L	6238 – *15382*	5 – 6	Ce I	VE72
9146.893	10929.68		3 L	*8270* – 17417	3 – 2	Ce I	VE72
9149.279	10926.83		5 L	*4455* – 13605	6 – 6	Ce I	VE72
9152.227	10923.31		3 L	*6856* – 16008	4 – 3	Ce I	VE72
9159.841	10914.23		6 L	*6856* – 16016	4 – 5	Ce I	VE72
9162.158	10911.47		5 L	*4746* – 13908	6 – 7	Ce I	VE72
9164.409	10908.79		4 L			Ce	VE72
9168.300	10904.16		5 L	*8270* – 17438	3 – 4	Ce I	VE72
9170.01	10902.13		60	*89743* – 98913	3 – 3	Ce III	SU65
9170.167	10901.94		5 L			Ce	VE72
9176.868	10893.98		3 L	*5572* – 14748	4 – 4	Ce I	VE72
9182.068	10887.81		5 L			Ce	VE72
9187.359	10881.54		3 L	*4417* – 13605	5 – 6	Ce I	VE72
9193.146	10874.69		3 L	*4746* – 13939	6 – 6	Ce I	VE72
9196.943	10870.20		6 L	8278 – *17475*	5½ – 4½	Ce II?	VE72
9196.943	10870.20		6 L	*3764* – 12960	5 – 6	Ce I?	VE72
9207.167	10858.13		5 L	*7696* – 16903	6 – 5	Ce I	VE72
9210.577	10854.11		3 L	*7174* – 16384	4 – 3	Ce I	VE72
9218.951	10844.25		4 L	*6337* – 15555	3 – 3	Ce I	VE72
9226.013	10835.95		6 L	*7467* – 16693	5 – 4	Ce I?	VE72
9226.013	10835.95		6 L	*5409* – 14635	2 – 1	Ce I?	VE72
9227.307	10834.43		5 L	*7715* – 16942	5 – 4	Ce I	VE72
9229.198	10832.21		4 L	*5519* – 14748	3 – 4	Ce I	VE72
9230.076	10831.18		4 L	*12351* – 21581	4 – 5	Ce I?	VE72
9230.076	10831.18		4 L	*9462* – 18692	5 – 4	Ce I?	VE72
9233.162	10827.56		3 L	*7841* – 17075	5 – 5	Ce I	VE72
9235.550	10824.76		3 L			Ce	VE72
9236.847	10823.24		4 L	*8762* – 17998	4 – 4	Ce I	VE72
9237.197	10822.83		4 L	*5409* – 14646	2 – 2	Ce I	VE72
9266.711	10788.36		3 L	*3100* – 12366	4 – 5	Ce I	VE72
9270.990	10783.38		3 L			Ce	VE72
9276.109	10777.43		3 L	*9135* – 18411	3 – 4	Ce I	VE72
9281.638	10771.01		3 L	*3710* – 12992	1 – 2	Ce I	VE72
9287.29	10764.45		30	*90902* – 100189	0 – 1	Ce III	SU65
9288.226	10763.37		5 L	*8055* – 17343	6 – 5	Ce I	VE72
9290.591	10760.63		4 L			Ce	VE72
9292.560	10758.35		3 L	*9135* – 18427	3 – 3	Ce I	VE72
9299.752	10750.03		5 L	*9996* – 19296	3 – 4	Ce I	VE72
9310.91	10737.15		30	*90878* – 100189	1 – 1	Ce III	SU65
9325.37	10720.50		50	0 – *9325*	4 – 5	Ce III?	SU65
9325.37	10720.50		50	*92018* – 101343	2 – 3	Ce III?	SU65
9346.327	10696.46		4 L	*5616* – 14963	4½ – 5½	Ce II	VE72
9356.82	10684.46		400	*90658* – 100015	5 – 6	Ce III	SU65
9360.039	10680.79		5 L	*3764* – 13124	5 – 5	Ce I	VE72
9366.520	10673.40		3 L	*4417* – 13784	5 – 5	Ce I	VE72
9367.871	10671.86		3 L	*6475* – 15843	4 – 4	Ce I	VE72
9369.004	10670.57		4 L	*12454* – 21823	2 – 1	Ce I	VE72
9369.478	10670.03		5 L	*7467* – 16836	5 – 6	Ce I	VE72
9371.533	10667.69		3 L	*8603* – 17975	6 – 6	Ce I	VE72
9373.176	10665.82		3 L	*9947* – 19321	2 – 2	Ce I?	VE72
9373.176	10665.82		3 L	*6234* – 15607	3 – 2	Ce I?	VE72
9379.147	10659.03		5 L	*0* – 9379	4 – 4	Ce I	VE72
9379.719	10658.38		3 L	*8762* – 18141	4 – 4	Ce I	VE72
9382.413	10655.32		3 L	*9947* – 19330	2 – 2	Ce I?	VE72
9382.413	10655.32		3 L	*8307* – 17689	3 – 2	Ce I?	VE72
9383.663	10653.90		3 L	*11578* – 20962	1 – 2	Ce I	VE72
9386.976	10650.14		3 L	*6621* – 16008	3 – 3	Ce I	VE72
9388.237	10648.71		5 L	*6663* – 16051	5 – 4	Ce I	VE72
9402.116	10632.99		3 L	*7467* – 16869	5 – 4	Ce I	VE72
9405.628	10629.02		4 L	*4199* – 13605	5 – 6	Ce I	VE72
9414.122	10619.43		6 L			Ce	VE72
9417.731	10615.36		3 L			Ce	VE72
9419.826	10613.00		3 L	*8366* – 17785	2 – 3	Ce I	VE72
9430.853	10600.59		4 L	*3764* – 13194	5 – 4	Ce I	VE72
9453.102	10575.64		3 L	*4455* – 13908	6 – 7	Ce I	VE72

Ce—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9459.104	10568.93		3 L	*10879* – 20338	5 – 5	Ce I	VE72
9463.886	10563.59		3 L			Ce	VE72
9475.241	10550.93		3 L	*8055* – 17530	6 – 5	Ce I	VE72
9480.309	10545.29		3 L	*9462* – 18943	5 – 5	Ce I	VE72
9484.69	10540.42		200	*90223* – 99708	2 – 3	Ce III	SU65
9490.15	10534.36		300	*90086* – 99577	3 – 4	Ce III	SU65
9498.449	10525.15		3 L	*7169* – 16668	3 – 3	Ce I	VE72
9509.119	10513.34		3 L	*9787* – 19296	3 – 4	Ce I	VE72
9526.26	10494.42		400	*89651* – 99178	4 – 5	Ce III	SU65
9531.76	10488.37		50	*90045* – 99577	4 – 4	Ce III	SU65
9533.294	10486.68		3 L	*6475* – 16008	4 – 3	Ce I	VE72
9541.884	10477.24		3 L			Ce	VE72
9558.725	10458.78		3 L			Ce	VE72
9559.10	10458.37		400	*90045* – 99604	4 – 5	Ce III	SU65
9560.480	10456.86		3 L			Ce	VE72
9563.69	10453.35		150	*89350* – 98913	2 – 3	Ce III	SU65
9600.251	10413.54		3 L	*11340* – 20940	3½ – 3½	Ce II?	VE72
9600.251	10413.54		3 L	*7715* – 17315	5 – 4	Ce I?	VE72
9600.878	10412.86		3 L	*8088* – 17689	2 – 2	Ce I	VE72
9607.762	10405.40		3 L	*8400* – 18008	5 – 5	Ce I	VE72
9608.048	10405.09		3 L	*6337* – 15945	3 – 4	Ce I	VE72
9610.680	10402.24		3 L	*4173* – 13784	4 – 5	Ce I	VE72
9621.48	10390.56		50	*90086* – 99708	3 – 3	Ce III	SU65
9624.670	10387.12		5 L	*5969* – 15593	5½ – 6½	Ce II	VE72
9628.851	10382.61		3 L	*3976* – 13605	6 – 6	Ce I	VE72
9651.961	10357.75		3 L	*11517* – 21168	1 – 2	Ce I?	VE72
9651.961	10357.75		3 L	*5904* – 15555	2 – 3	Ce I?	VE72
9668.549	10339.98		5 L	*5572* – 15240	4 – 4	Ce I	VE72
9670.48	10337.91		50	*90223* – 99894	2 – 2	Ce III	SU65
9671.823	10336.48		5 L			Ce	VE72
9674.331	10333.80		5 L	*8055* – 17729	6 – 5	Ce I	VE72
9674.846	10333.25		3 L	*7715* – 17390	5 – 4	Ce I	VE72
9676.475	10331.51		6 L	*2437* – 12114	4 – 4	Ce I	VE72
9682.295	10325.30		3 L	*7933* – 17615	5 – 4	Ce I	VE72
9683.927	10323.56		3 L	*5904* – 15587	2 – 2	Ce I	VE72
9688.807	10318.36		3 L	*9947* – 19636	2 – 3	Ce I?	VE72
9688.807	10318.36		3 L	*7841* – 17530	5 – 5	Ce I?	VE72
9695.112	10311.65		3 L	*7174* – 16869	4 – 4	Ce I	VE72
9697.849	10308.74		3 L	*6836* – 16534	2 – 2	Ce I	VE72
9725.538	10279.39		4 L			Ce	VE72
9733.284	10271.21		4 L	*3703* – 13436	3½ – 2½	Ce II?	VE72
9733.284	10271.21		4 L	*10586* – 20320	4 – 4	Ce I?	VE72
9738.963	10265.22		4 L			Ce	VE72
9742.247	10261.76		3 L	*5006* – 14748	3 – 4	Ce I	VE72
9745.058	10258.80		5 L	*2369* – 12114	3 – 4	Ce I	VE72
9747.861	10255.85		3 L	*7174* – 16921	4 – 3	Ce I	VE72
9749.895	10253.71		3 L	*8902* – 18652	3 – 3	Ce I?	VE72
9749.895	10253.71		3 L	*3764* – 13513	5 – 4	Ce I?	VE72
9751.388	10252.14		3 L	*11061* – 20812	7 – 7	Ce I	VE72
9752.197	10251.29		3 L	*7169* – 16921	3 – 3	Ce I	VE72
9758.108	10245.08		4 L	*5519* – 15277	3 – 3	Ce I	VE72
9768.310	10234.38		3 L			Ce	VE72
9782.619	10219.41		3 L			Ce	VE72
9785.224	10216.69		3 L	*8101* – 17886	2 – 2	Ce I	VE72
9796.375	10205.06		3 L			Ce	VE72
9798.103	10203.26		3 L			Ce	VE72
9799.314	10202.00		3 L			Ce	VE72
9799.650	10201.65		3 L			Ce	VE72
9815.246	10185.44		3 L	*2641* – 12456	3½ – 3½	Ce II	VE72
9822.836	10177.57		3 L	*11796* – 21619	4 – 4	Ce I	VE72
9825.770	10174.53		3 L	*5455* – 15281	7½ – 6½	Ce II?	VE72
9825.770	10174.53		3 L	*10604* – 20430	3 – 3	Ce I?	VE72
9836.608	10163.32		3 L	*7853* – 17689	1 – 2	Ce I?	VE72
9836.608	10163.32		3 L	*6856* – 16693	4 – 4	Ce I?	VE72
9842.816	10156.91		4 L	*5802* – 15644	7 – 6	Ce I	VE72
9847.955	10151.61		5 L	*5904* – 15751	2 – 1	Ce I	VE72

Ce—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9848.265	10151.29		3 L	*7467* – 17315	5 – 4	Ce I	VE72
9852.87	10146.55		50	*93226* – 103079	5 – 4	Ce III	SU65
9854.488	10144.88		5 L	*5904* – 15758	2 – 2	Ce I	VE72
9861.992	10137.16		3 L			Ce	VE72
9900.727	10097.50		3 L			Ce	VE72
9938.799	10058.82		4 L			Ce	VE72
9939.02	10058.60		50			Ce	SU65

Ce References

SU65 Sugar, J., J. Opt. Soc. Amer. 55, 33–58 (1965).
Source: Sliding spark (Ce III)
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

LI72 Johansson, S., and Litzén, U., Physica Scripta **6**, 139–140 (1972).
Source: Pulsed hollow cathode (Ce III)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

VE72 Vergès, J., Corliss, C. H., and Martin, W. C., J. Res. Nat. Bur. Stds. **76A**, 285–304 (1972).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS
Uncertainty in σ: Average deviation between observed and calculated wavenumbers is 0.023 cm^{-1}

Additional References

Smith, K. L., Ph.D. Thesis, University of London (1971).
Corliss, C. H., J. Res. Nat. Bur. Stds. **77A**, 419 (1973).

Cesium

Cs, Z = 55

Cs I Normal state of valence electrons $5p^6 6s\ ^2S_{1/2}$ I.P. = 31407 cm^{-1}

Cs II Normal state of valence electrons $5p^6\ ^1S_0$ I.P. = 186600 cm^{-1}

Cs

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2535.830	39424.060	0.01		*24472* – 27008		Cs I	LZ70
2536.012	39421.230	0.01		*24472* – 27008		Cs I	LZ70
3320.99	30103.3	0.01		*11178* – 14499	½ – 1½	Cs I	JO61
6803.21	14694.93	0.01		*11732* – 18535	1½ – ½	Cs I	JO61
7266.07	13758.83	0.01		14499 – *21765*	1½ – ½	Cs I	JO61
7349.54	13602.57	0.01		14596 – *21946*	2½ – 1½	Cs I	JO61
7357.25	13588.31	0.01		*11178* – 18535	½ – ½	Cs I	JO61
7447.13	13424.32	0.01		14499 – *21946*	1½ – 1½	Cs I	JO61
9875.201	10123.602	0.01		14596 – *24472*	2½ – 3½	Cs I	ER70
9875.384	10123.413	0.01		14596 – *24472*	2½ – 2½	Cs I	ER70
9972.970	10024.355	0.01		14499 – *24472*	1½ – 2½	Cs I	ER70

Cs References

JO61 Johansson, I., Ark. Fys. **20**, 135–146 (1961).
Source: Hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

ER70 Eriksson, K. B. S., and Wenåker, I., Physica Scripta **1**, 21–24 (1970).
Source: Hollow cathode
Instrument: 5.5 m Czerny-Turner spectrograph
Detector: Photographic

LZ70 Litzén, U., Physica Scripta **1**, 253–255 (1970).
Source: Hollow cathode
Instrument: 1 m Pfund and 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Fisher, R. A., Knoff, W. C., and Kinney, F. E., Astrophys. J. **130**, 683 (1959).

Chlorine

Cl, Z = 17

Cl I Normal state of valence electrons $3s^2 3p^5\ ^2P^\circ_{3/2}$ I.P. = 104591 cm^{-1}

Cl II Normal state of valence electrons $3s^2 3p^4\ ^3P_2$ I.P. = 192070 cm^{-1}

Cl

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2466.50	40532.16		15 B	*97739* – 100205		Cl I	HU71
2478.53	40335.56		25 B	*97712* – 100190		Cl I?	HU71
2480.07	40310.52		25 B	*98419* – 100899		Cl I?	HU71
2488.67	40171.21		100 B	*97712* – 100201		Cl I	HU71
2493.73	40089.57		25	*97703* – 100197	2½ – 3½	Cl I	HU71
2493.98	40085.59		30	*97703* – 100197	1½ – 2½	Cl I	HU71
2500.21	39985.68		35 B	*98693* – 101193		Cl I	HU71
2506.77	39881.09		25	*98383* – 100890	3½ – 4½	Cl I	HU71
2507.13	39875.33		40	*98383* – 100890	4½ – 5½	Cl I	HU71
2514.98	39750.83		20	*98373* – 100888	2½ – 3½	Cl I	HU71
2515.41	39744.11		18	*98372* – 100888	1½ – 2½	Cl I	HU71
2517.19	39716.04		70 B	*97674* – 100191		Cl I	HU71
2523.58	39615.48		80	*97667* – 100190	3½ – 4½	Cl I	HU71
2524.32	39603.79		70	*97666* – 100190	4½ – 5½	Cl I	HU71
2530.22	39511.42		16 B	*97667* – 100197	3½ – 2½	Cl I?	HU72
2530.27	39510.64		16 B	*97667* – 100197	3½ – 3½	Cl I?	HU72
2574.05	38838.65		9	*94663* – 97237	1½ – 2½	Cl I	HU72
2575.45	38817.64		6	91906 – *94482*	2½ – 2½	Cl I	HU72
2606.59	38353.88		12	*94732* – 97338	3½ – 2½	Cl I	HU72
2631.33	37993.23		22	*94314* – 96945	1½ – 2½	Cl I	HU72
2633.22	37966.02		160	91680 – *94314*	1½ – 1½	Cl I	HU72
2644.25	37807.61		30	*95400* – 98044	2½ – 1½	Cl I	HU72
2653.51	37675.60		40 B	*94827* – 97480	2½ – 1½	Cl I?	HU72
2653.63	37674.01		40 B	91660 – *94314*	2½ – 1½	Cl I?	HU72
2680.47	37296.77		11	*94468* – 97149	½ – ½	Cl I	HU72
2682.56	37267.72		20 B	95700 – *98383*	3½ – 4½	Cl I?	HU72
2682.85	37263.69		20 B	95700 – *98383*	3½ – 3½	Cl I?	HU72
2684.21	37244.81		19	*95706* – 98390	1½ – ½	Cl I	HU72
2687.02	37205.76		20	92140 – *94827*	1½ – 2½	Cl I	HU72
2689.88	37166.31		22	*94314* – 97004	1½ – 1½	Cl I	HU72
2702.04	36998.97		11	*94482* – 97184	2½ – 3½	Cl I	HU72
2711.05	36876.03		19	92602 – *95313*	½ – 1½	Cl I	HU72
2749.91	36354.96		10	91564 – *94314*	½ – 1½	Cl I	HU72
2755.49	36281.33		18	*94482* – 97237	2½ – 2½	Cl I	HU72
2756.88	36263.00		14	91906 – *94663*	2½ – 1½	Cl I	HU72
2777.58	35992.81		15	*94482* – 97259	2½ – 1½	Cl I	HU72
2786.59	35876.36		24	*95313* – 98100	1½ – ½	Cl I	HU72
2787.87	35859.94		35	91680 – *94468*	1½ – ½	Cl I	HU72
2790.95	35820.27		12	*94468* – 97259	½ – 1½	Cl I	HU72
2793.15	35792.15		55	*95597* – 98390	½ – ½	Cl I	HU72
2795.65	35760.04		11	95897 – *98693*	1½ – 2½	Cl I	HU72
2801.25	35688.67		30	91680 – *94482*	1½ – 2½	Cl I	HU72
2801.83	35681.23		13	*94732* – 97534	3½ – 2½	Cl I	HU72
2821.66	35430.52		120	91660 – *94482*	2½ – 2½	Cl I	HU72
2822.30	35422.40		22	92151 – *94973*	½ – ½	Cl I	HU72
2825.51	35382.19		13	91906 – *94732*	2½ – 3½	Cl I	HU72
2830.95	35314.16		13 B	97338 – *100169*	2½ – 3½	Cl I?	HU72
2831.12	35312.04		13 B	97338 – *100170*	2½ – 2½	Cl I?	HU72
2833.56	35281.72		30	92140 – *94973*	1½ – ½	Cl I	HU72
2835.12	35262.30		11	*94314* – 97149	1½ – ½	Cl I	HU72
2856.65	34996.48		40	*94482* – 97338	2½ – 2½	Cl I	HU72
2868.47	34852.26		8	*96486* – 99354	1½ – 1½	Cl I	HU72
2870.46	34828.12		17	*94663* – 97534	1½ – 2½	Cl I	HU72
2904.56	34419.27		14	91564 – *94468*	½ – ½	Cl I	HU72
2906.26	34399.09		16 B	95786 – *98693*	2½ – 3½	Cl I?	HU72
2906.47	34396.64		16 B	95786 – *98693*	2½ – 2½	Cl I?	HU72

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
2930.36	34116.23		35	91538 – *94468*	1½ – ½	Cl I	HU72
2932.22	34094.52		13	92602 – *95534*	½ – ½	Cl I	HU72
2970.71	33652.85		60	91343 – *94314*	2½ – 1½	Cl I	HU72
2980.56	33541.63		13	*94827* – 97807	2½ – 3½	Cl I	HU72
2982.68	33517.75		24 B	91680 – *94663*	1½ – 1½	Cl I?	HU72
2983.00	33514.20		24 B	95700 – *98683*	3½ – 2½	Cl I?	HU72
2991.64	33417.39		14	95786 – *98778*	2½ – 1½	Cl I	HU72
2994.89	33381.07		28	92602 – *95597*	½ – ½	Cl I	HU72
2998.43	33341.72		20 B	*94482* – 97480	2½ – 1½	Cl I?	HU72
2998.57	33340.16		20 B	95786 – *98785*	2½ – 3½	Cl I?	HU72
3003.09	33289.95		45	91660 – *94663*	2½ – 1½	Cl I	HU72
3004.40	33275.41		15 B	97184 – *100188*	3½ – 4½	Cl I?	HU72
3004.50	33274.38		15 B	92140 – *95144*	1½ – 2½	Cl I?	HU72
3009.66	33217.32		40	92602 – *95612*	½ – 1½	Cl I	HU72
3011.81	33193.60		14	*94468* – 97480	½ – 1½	Cl I	HU72
3024.68	33052.32		40	*94314* – 97338	1½ – 2½	Cl I	HU72
3051.89	32757.60		50	*94482* – 97534	2½ – 2½	Cl I	HU72
3063.85	32629.80		18	97807 – *100871*	2½ – 3½	Cl I	HU72
3071.72	32546.17		70	91660 – *94732*	2½ – 3½	Cl I	HU72
3084.45	32411.89		13	95700 – *98785*	3½ – 3½	Cl I	HU72
3091.56	32337.29		22	*84988* – 88080	1½ – 2½	Cl I	HU72
3103.83	32209.43		140	92602 – *95706*	½ – 1½	Cl I	HU72
3138.74	31851.27		160	91343 – *94482*	2½ – 2½	Cl I	HU72
3140.70	31831.29		35	91173 – *94314*	1½ – 1½	Cl I	HU72
3146.16	31776.11		340	91680 – *94827*	1½ – 2½	Cl I	HU72
3162.37	31613.24		120	92151 – *95313*	½ – 1½	Cl I	HU72
3166.57	31571.30		70	91660 – *94827*	2½ – 2½	Cl I	HU72
3173.62	31501.15		30	92140 – *95313*	1½ – 1½	Cl I	HU72
3181.14	31426.71		19 B	97004 – *100185*	1½ – 1½	Cl I?	HU72
3181.35	31424.67		19 B	97004 – *100185*	1½ – 2½	Cl I?	HU72
3198.27	31258.39		11 B	97004 – *100202*	1½ – ½	Cl I?	HU72
3198.53	31255.85		11 B	97004 – *100202*	1½ – 1½	Cl I?	HU72
3200.07	31240.80		20	*84988* – 88188	1½ – 1½	Cl I	HU72
3206.54	31177.75		22	92194 – *95400*	1½ – 2½	Cl I	HU72
3221.09	31036.94		24	*96313* – 99534	1½ – ½	Cl I	HU72
3225.11	30998.23		14	*96486* – 99711	1½ – ½	Cl I	HU72
3260.60	30660.80		360	92140 – *95400*	1½ – 2½	Cl I	HU72
3273.63	30538.81		13	91906 – *95180*	2½ – 3½	Cl I	HU72
3284.24	30440.14		14	*84988* – 88272	1½ – ½	Cl I	HU72
3288.65	30399.32		160	91538 – *94827*	1½ – 2½	Cl I	HU72
3292.69	30362.00		110	91680 – *94973*	1½ – ½	Cl I	HU72
3320.17	30110.73		40	91343 – *94663*	2½ – 1½	Cl I	HU72
3325.47	30062.73		13	*94482* – 97807	2½ – 2½	Cl I	HU72
3331.39	30009.31		50	*84648* – 87979	2½ – 3½	Cl I	HU72
3333.56	29989.81		12	97842 – *101176*	1½ – 2½	Cl I	HU72
3340.73	29925.39		10	92194 – *95534*	1½ – ½	Cl I	HU72
3355.21	29796.30		300	91127 – *94482*	2½ – 2½	Cl I	HU72
3365.68	29703.61		11	90948 – *94314*	1½ – 1½	Cl I	HU72
3368.46	29679.02		14	97807 – *101176*	2½ – 3½	Cl I	HU72
3373.93	29630.98		40	*94468* – 97842	½ – 1½	Cl I	HU72
3381.31	29566.28		14	*94663* – 98044	1½ – 1½	Cl I	HU72
3383.54	29546.76		40	92151 – *95534*	½ – ½	Cl I	HU72
3388.80	29500.92		160	91343 – *94732*	2½ – 3½	Cl I	HU72
3392.79	29466.26		11	91089 – *94482*	3½ – 2½	Cl I	HU72
3394.80	29448.82		150	92140 – *95534*	1½ – ½	Cl I	HU72
3397.98	29421.23		10	*96313* – 99711	1½ – ½	Cl I	HU72
3406.96	29343.68		24	91906 – *95313*	2½ – 1½	Cl I	HU72
3431.94	29130.08		50	*84648* – 88080	2½ – 2½	Cl I	HU72
3435.18	29102.59		20	91538 – *94973*	1½ – ½	Cl I	HU72
3436.67	29090.00		9	*94663* – 98100	1½ – ½	Cl I	HU72
3446.21	29009.45		110	92151 – *95597*	½ – ½	Cl I	HU72
3457.47	28914.93		50 B	92140 – *95597*	1½ – ½	Cl I?	HU72
3457.51	28914.68		50 B	96731 – *100188*	3½ – 4½	Cl I?	HU72
3460.98	28885.70		60	92151 – *95612*	½ – 1½	Cl I	HU72
3472.23	28792.08		100	92140 – *95612*	1½ – 1½	Cl I	HU72
3483.65	28697.70		12	91343 – *94827*	2½ – 2½	Cl I	HU72

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
3490.16	28644.17		14	91173 – *94663*	1½ – 1½	Cl I	HU72
3493.94	28613.17		25	91906 – *95400*	2½ – 2½	Cl I	HU72
3499.91	28564.35		100	*84688* – 88188	½ – 1½	Cl I	HU72
3519.84	28402.64		16 B	91660 – *95180*	2½ – 3½	Cl I?	HU72
3520.33	28398.70		16 B	90948 – *94468*	1½ – ½	Cl I?	HU72
3536.64	28267.71		240	91127 – *94663*	2½ – 1½	Cl I	HU72
3540.45	28237.29		30	*84648* – 88188	2½ – 1½	Cl I	HU72
3555.15	28120.50		170	92151 – *95706*	½ – 1½	Cl I	HU72
3562.59	28061.83		14 B	*95706* – 99269	1½ – 2½	Cl I?	HU72
3562.74	28060.60		14 B	*94482* – 98044	2½ – 1½	Cl I?	HU72
3564.85	28044.05		35	90749 – *94314*	2½ – 1½	Cl I	HU72
3566.41	28031.78		9	92140 – *95706*	1½ – 1½	Cl I	HU72
3584.08	27893.53		40	*84688* – 88272	½ – ½	Cl I	HU72
3594.73	27810.89		180	*84485* – 88080	1½ – 2½	Cl I	HU72
3605.27	27729.61		400	91127 – *94732*	2½ – 3½	Cl I	HU72
3632.76	27519.78		80	91680 – *95313*	1½ – 1½	Cl I	HU72
3653.17	27366.03		60 B	91660 – *95313*	2½ – 1½	Cl I?	HU72
3653.64	27362.50		60 B	91173 – *94827*	1½ – 2½	Cl I?	HU72
3686.93	27115.42		19 B	97184 – *100871*	3½ – 4½	Cl I?	HU72
3687.28	27112.89		19 B	97184 – *100871*	3½ – 3½	Cl I?	HU72
3693.95	27063.92		30 B	96494 – *100188*	4½ – 5½	Cl I?	HU72
3693.96	27063.85		30 B	96494 – *100188*	4½ – 4½	Cl I?	HU72
3700.12	27018.78		40	91127 – *94827*	2½ – 2½	Cl I	HU72
3703.24	26996.01		40	*84485* – 88188	1½ – 1½	Cl I	HU72
3705.57	26979.06		11	91906 – *95612*	2½ – 1½	Cl I	HU72
3710.63	26942.25		80	92602 – *96313*	½ – 1½	Cl I	HU72
3719.74	26876.26		14	91680 – *95400*	1½ – 2½	Cl I	HU72
3737.70	26747.12		60	91089 – *94827*	3½ – 2½	Cl I	HU72
3775.25	26481.09		30	91538 – *95313*	1½ – 1½	Cl I	HU72
3787.41	26396.06		60	*84485* – 88272	1½ – ½	Cl I	HU72
3799.74	26310.38		40	91906 – *95706*	2½ – 1½	Cl I	HU72
3827.88	26116.96		30	*95706* – 99534	1½ – ½	Cl I	HU72
3847.23	25985.65		180	*84132* – 87979	2½ – 3½	Cl I	HU72
3862.23	25884.71		20	91538 – *95400*	1½ – 2½	Cl I	HU72
3883.50	25742.96		22	92602 – *96486*	½ – 1½	Cl I	HU72
3908.78	25576.48		12	*96594* – 100502	½ – 1½	Cl I	HU72
3916.60	25525.36		24	91680 – *95597*	1½ – ½	Cl I	HU72
3947.78	25323.78		300	*84132* – 88080	2½ – 2½	Cl I	HU72
3947.80	25323.7		6	*84132* – 88080	2½ – 2½	Cl I	RA69
3951.78	25298.17		100	91660 – *95612*	2½ – 1½	Cl I	HU72
3970.25	25180.47		60 B	91343 – *95313*	2½ – 1½	Cl I?	HU72
3970.62	25178.10		60 B	91564 – *95534*	½ – ½	Cl I?	HU72
3971.11	25174.99		40	91173 – *95144*	1½ – 2½	Cl I	HU72
3991.36	25047.3		6	92602 – *96594*	½ – ½	Cl I	RA69
3994.37	25028.43		40	90487 – *94482*	3½ – 2½	Cl I	HU72
3996.42	25015.55		40	91538 – *95534*	1½ – ½	Cl I	HU72
4025.15	24837.00		50 B	90948 – *94973*	1½ – ½	Cl I?	HU72
4025.54	24834.59		50 B	91680 – *95706*	1½ – 1½	Cl I?	HU72
4033.29	24786.87		9	91564 – *95597*	½ – ½	Cl I	HU72
4045.95	24709.31		11	91660 – *95706*	2½ – 1½	Cl I	HU72
4048.06	24696.47		12	91564 – *95612*	½ – 1½	Cl I	HU72
4056.29	24646.36		150	*84132* – 88188	2½ – 1½	Cl I	HU72
4057.23	24640.63		60	91343 – *95400*	2½ – 2½	Cl I	HU72
4059.09	24629.32		14	91538 – *95597*	1½ – ½	Cl I	HU72
4073.86	24540.07		40	91538 – *95612*	1½ – 1½	Cl I	HU72
4077.79	24516.40		60	90749 – *94827*	2½ – 2½	Cl I	HU72
4085.52	24470.0		100	*83894* – 87979	3½ – 3½	Cl I	RA69
4119.14	24270.29		50	92194 – *96313*	1½ – 1½	Cl I	HU72
4140.30	24146.2		4	91173 – *95313*	1½ – 1½	Cl I	RA69
4168.03	23985.58		55	91538 – *95706*	1½ – 1½	Cl I	HU72
4173.16	23956.1		11	92140 – *96313*	1½ – 1½	Cl I	RA69
4185.99	23882.7		18	*83894* – 88080	3½ – 2½	Cl I	RA69
4227.22	23649.75		70	91173 – *95400*	1½ – 2½	Cl I	HU72
4244.43	23553.86		50 B	90487 – *94732*	3½ – 3½	Cl I?	HU72
4244.73	23552.20		50 B	91069 – *95313*	½ – 1½	Cl I?	HU72
4265.61	23436.91		12	*95706* – 99972	1½ – ½	Cl I	HU72

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
4268.86	23419.08		60	91343 – *95612*	2½ – 1½	Cl I	HU72
4273.70	23392.54		30	91127 – *95400*	2½ – 2½	Cl I	HU72
4311.24	23188.8		12	91089 – *95400*	3½ – 2½	Cl I	RA69
4337.58	23048.07		12	*95180* – 99517	3½ – 4½	Cl I	HU72
4339.32	23038.8		17	90487 – *94827*	3½ – 2½	Cl I	RA69
4342.76	23020.54		11	92140 – *96482*	1½ – 2½	Cl I	HU72
4346.07	23003.01		20	92140 – *96486*	1½ – 1½	Cl I	HU72
4361.41	22922.09		19	91173 – *95534*	1½ – ½	Cl I	HU72
4363.03	22913.58		40	91343 – *95706*	2½ – 1½	Cl I	HU72
4365.22	22902.11		60	90948 – *95313*	1½ – 1½	Cl I	HU72
4367.16	22891.9		4			Cl	RA69
4380.99	22819.68		20	*94973* – 99354	½ – 1½	Cl I	HU72
4383.09	22808.74		16 B	95786 – *100169*	2½ – 3½	Cl I?	HU72
4383.26	22807.86		16 B	95786 – *100170*	2½ – 2½	Cl I?	HU72
4399.87	22721.7		5	92194 – *96594*	1½ – ½	Cl I	RA69
4406.28	22688.7		12	91906 – *96313*	2½ – 1½	Cl I	RA69
4418.73	22604.7		3			Cl	RA69
4424.08	22597.39		35	91173 – *95597*	1½ – ½	Cl I	HU72
4434.22	22545.71		30	*94973* – 99407	½ – ½	Cl I	HU72
4437.22	22530.48		28	*95534* – 99972	½ – ½	Cl I	HU72
4438.73	22522.8		6	91173 – *95612*	1½ – 1½	Cl I	RA69
4442.72	22502.61		20	92151 – *96594*	½ – ½	Cl I	HU72
4452.20	22454.67		17	90948 – *95400*	1½ – 2½	Cl I	HU72
4453.97	22445.76		20	92140 – *96594*	1½ – ½	Cl I	HU72
4464.45	22393.08		18	*95706* – 100170	1½ – 1½	Cl I	HU72
4465.90	22385.78		10	91069 – *95534*	½ – ½	Cl I	HU72
4468.08	22374.86		50	*94732* – 99200	3½ – 3½	Cl I	HU72
4485.39	22288.5		9	91127 – *95612*	2½ – 1½	Cl I	RA69
4528.57	22075.99		24	91069 – *95597*	½ – ½	Cl I	HU72
4533.02	22054.31		28	91173 – *95706*	1½ – 1½	Cl I	HU72
4538.66	22026.92		500	90193 – *94732*	4½ – 3½	Cl I	HU72
4538.71	22026.7		40	90193 – *94732*	4½ – 3½	Cl I	RA69
4543.34	22004.25		40	91069 – *95612*	½ – 1½	Cl I	HU72
4564.48	21902.3		14	90749 – *95313*	2½ – 1½	Cl I	RA69
4576.10	21846.71		9	91906 – *96482*	2½ – 2½	Cl I	HU72
4579.52	21830.4		10	91127 – *95706*	2½ – 1½	Cl I	RA69
4586.39	21797.68		24	90948 – *95534*	1½ – ½	Cl I	HU72
4605.45	21707.48		22	*94663* – 99269	1½ – 2½	Cl I	HU72
4632.14	21582.4		12	91680 – *96313*	1½ – 1½	Cl I	RA69
4637.51	21557.39		35	91069 – *95706*	½ – 1½	Cl I	HU72
4649.06	21503.84		80	90948 – *95597*	1½ – ½	Cl I	HU72
4651.37	21493.17		30	90749 – *95400*	2½ – 2½	Cl I	HU72
4691.00	21311.60		15	*94663* – 99354	1½ – 1½	Cl I	HU72
4718.15	21188.98		50	*94482* – 99200	2½ – 3½	Cl I	HU72
4744.24	21072.45		10	*94663* – 99407	1½ – ½	Cl I	HU72
4785.69	20889.91		24	*94732* – 99517	3½ – 4½	Cl I	HU72
4823.67	20725.4		56	*83364* – 88188	½ – 1½	Cl I	RA69
4907.81	20370.1		85	*83364* – 88272	½ – ½	Cl I	RA69
4912.86	20349.18		50 B	90487 – *95400*	3½ – 2½	Cl I?	HU72
4913.11	20348.17		50 B	91680 – *96594*	1½ – ½	Cl I?	HU72
4949.30	20199.4		227	*83130* – 88080	1½ – 2½	Cl I	RA69
4957.17	20167.28		16	90749 – *95706*	2½ – 1½	Cl I	HU72
4969.83	20115.92		100	91343 – *96313*	2½ – 1½	Cl I	HU72
5057.61	19766.8		185	*83130* – 88188	1½ – 1½	Cl I	RA69
5060.56	19755.3		717	*82918* – 87979	2½ – 3½	Cl I	RA69
5141.76	19443.3		6	*83130* – 88272	1½ – ½	Cl I	RA69
5161.13	19370.3		227	*82918* – 88080	2½ – 2½	Cl I	RA69
5269.61	18971.6		21	*82918* – 88188	2½ – 1½	Cl I	RA69
5333.94	18742.8		22	*85735* – 91069	1½ – ½	Cl I	RA69
5391.87	18541.4		74	*85735* – 91127	1½ – 2½	Cl I	RA69
5438.54	18382.3		40	*85735* – 91173	1½ – 1½	Cl I	RA69
5608.33	17825.8		5	*85735* – 91343	1½ – 2½	Cl I	RA69
5626.67	17767.7		7	*85442* – 91069	1½ – ½	Cl I	RA69
5646.58	17705.0		3	*85917* – 91564	½ – ½	Cl I	RA69
5684.65	17586.4		60	*85442* – 91127	1½ – 2½	Cl I	RA69
5693.49	17559.1		3			Cl	RA69

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5706.29	17519.7		4			Cl	RA69
5731.09	17443.9		46	*85442* – 91173	1½ – 1½	Cl I	RA69
5803.49	17226.3		27	*85735* – 91538	1½ – 1½	Cl I	RA69
5839.83	17119.1		28	*84648* – 90487	2½ – 3½	Cl I	RA69
5899.60	16945.7		3			Cl	RA69
5901.07	16941.4		10	*85442* – 91343	1½ – 2½	Cl I	RA69
5925.44	16871.8		18	*85735* – *91660*	1½ – 2½	Cl I	RA69
5945.87	16813.8		14	*85735* – 91680	1½ – 1½	Cl I	RA69
5950.50	16800.7		10	*95180* – 101130	3½ – 4½	Cl I	RA69
5965.06	16759.7		6			Cl	RA69
5996.67	16671.4		55	*95144* – 101141	2½ – 3½	Cl I	RA69
6013.48	16624.8		4	91660 – *97674*	2½ – 3½	Cl I	RA69
6101.22	16385.7		7	*84648* – 90749	2½ – 2½	Cl I	RA69
6135.78	16293.4		15	91538 – *97674*	1½ – 2½	Cl I	RA69
6138.50	16286.2		39	*84988* – 91127	1½ – 2½	Cl I	RA69
6139.25	16284.2		7	91564 – *97703*	½ – 1½	Cl I	RA69
6165.45	16215.0		10	91538 – *97703*	1½ – 2½	Cl I	RA69
6171.74	16198.5		259	*85735* – *91906*	1½ – 2½	Cl I	RA69
6175.01	16189.9		14	91564 – *97739*	½ – 1½	Cl I	RA69
6179.12	16179.1		10	92194 – *98372*	1½ – 1½	Cl I	RA69
6218.13	16077.6		129	*85442* – 91660	1½ – 2½	Cl I	RA69
6222.10	16067.3		10	*85917* – 92140	½ – 1½	Cl I	RA69
6224.79	16060.4		10	92194 – *98419*	1½ – 2½	Cl I	RA69
6238.56	16025.0		25	*85442* – 91680	1½ – 1½	Cl I	RA69
6259.84	15970.5		283	*84688* – 90948	½ – 1½	Cl I	RA69
6263.96	15960.0		735	*84485* – 90749	1½ – 2½	Cl I	RA69
6276.18	15928.9		342	*85917* – 92194	½ – 1½	Cl I	RA69
6294.19	15883.3		277	*85244* – 91538	½ – 1½	Cl I	RA69
6299.61	15869.7		2780	*83894* – *90193*	3½ – 4½	Cl I	RA69
6320.02	15818.4		193	*85244* – 91564	½ – ½	Cl I	RA69
6323.97	15808.5		25	91343 – *97667*	2½ – 3½	Cl I	RA69
6330.59	15792.0		21	91343 – *97674*	2½ – 3½	Cl I	RA69
6355.52	15730.1		1487	*84132* – 90487	2½ – 3½	Cl I	RA69
6360.52	15717.7		4	91343 – *97703*	2½ – 2½	Cl I	RA69
6380.43	15668.6		7	*84688* – 91069	½ – ½	Cl I	RA69
6402.29	15615.2		7	88080 – *94482*	2½ – 2½	Cl I	RA69
6405.19	15608.1		18	*85735* – 92140	1½ – 1½	Cl I	RA69
6416.46	15580.7		5	*85735* – 92151	1½ – ½	Cl I	RA69
6441.42	15520.3		1094	*84648* – 91089	2½ – 3½	Cl I	RA69
6459.11	15477.8		15	*85735* – 92194	1½ – 1½	Cl I	RA69
6463.37	15467.6		169	*84485* – 90948	1½ – 1½	Cl I	RA69
6464.42	15465.1		381	*85442* – 91906	1½ – 2½	Cl I	RA69
6476.96	15435.1		27	91906 – *98383*	2½ – 3½	Cl I	RA69
6484.97	15416.1		32	*84688* – 91173	½ – 1½	Cl I	RA69
6494.43	15393.6		1			Cl	RA69
6497.67	15385.9		3			Cl	RA69
6499.20	15382.3		17	92194 – *98693*	1½ – 2½	Cl I	RA69
6502.76	15373.9		23	87979 – *94482*	3½ – 2½	Cl I	RA69
6508.30	15360.8		3	*96594* – 103102	½ – 1½	Cl I	RA69
6512.28	15351.4		2	91906 – *98419*	2½ – 2½	Cl I	RA69
6525.43	15320.5		7	*84648* – 91173	2½ – 1½	Cl I	RA69
6530.29	15309.1		28	91173 – *97703*	1½ – 2½	Cl I?	RA69
6530.29	15309.1		28	91173 – *97703*	1½ – 1½	Cl I?	RA69
6547.07	15269.8		8	91127 – *97674*	2½ – 3½	Cl I	RA69
6550.01	15263.0		150	*84988* – 91538	1½ – 1½	Cl I	RA69
6566.04	15225.7		13	91173 – *97739*	1½ – 1½	Cl I	RA69
6575.65	15203.5		15	*84988* – 91564	1½ – ½	Cl I	RA69
6577.30	15199.7		22	91089 – *97666*	3½ – 4½	Cl I	RA69
6584.09	15184.0		8	92194 – *98778*	1½ – 1½	Cl I	RA69
6584.98	15181.9		5	91089 – *97674*	3½ – 2½	Cl I	RA69
6594.00	15161.2		145	*83894* – 90487	3½ – 3½	Cl I	RA69
6617.18	15108.0		269	*84132* – 90749	2½ – 2½	Cl I	RA69
6623.29	15094.1		48	91089 – *97712*	3½ – 4½	Cl I	RA69
6634.48	15068.7		1	91069 – *97703*	½ – 1½	Cl I	RA69
6642.00	15051.6		4	*84485* – 91127	1½ – 2½	Cl I	RA69
6670.32	14987.7		29	91069 – *97739*	½ – 1½	Cl I	RA69

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6672.18	14983.5		95	*84988* – 91660	1½ – 2½	Cl I	RA69
6684.75	14955.3		78	*85917* – 92602	½ – ½	Cl I	RA69
6688.15	14947.7		43	*84485* – 91173	1½ – 1½	Cl I	RA69
6692.45	14938.1		108	*84988* – 91680	1½ – 1½	Cl I	RA69
6695.33	14931.7		294	*84648* – 91343	2½ – 2½	Cl I	RA69
6698.36	14925.0		7			Cl	RA69
6701.18	14918.7		6	88272 – *94973*	½ – ½	Cl I	RA69
6708.98	14901.3		10	*85442* – 92151	1½ – ½	Cl I	RA69
6713.03	14892.3		3	91660 – *98373*	2½ – 2½	Cl I	RA69
6726.04	14863.5		5	90948 – *97674*	1½ – 2½	Cl I	RA69
6751.83	14806.7		82	*85442* – 92194	1½ – 1½	Cl I	RA69
6755.60	14798.5		5	90948 – *97703*	1½ – 2½	Cl I	RA69
6758.43	14792.3		50	91660 – *98418*	2½ – 3½	Cl I	RA69
6786.38	14731.4		45	91906 – *98693*	2½ – 2½	Cl I	RA69
6808.82	14682.8		6	91564 – *98372*	½ – 1½	Cl I	RA69
6835.11	14626.3		9	91538 – *98373*	1½ – 2½	Cl I	RA69
6858.35	14576.8		3	*94314* – 101172	1½ – 1½	Cl I	RA69
6867.83	14556.7		25	*85735* – 92602	1½ – ½	Cl I	RA69
6874.83	14541.8		3			Cl	RA69
6880.84	14529.1		4	91538 – *98419*	1½ – 2½	Cl I	RA69
6890.57	14508.6		16	*84648* – 91538	2½ – 1½	Cl I	RA69
6895.90	14497.4		60	*85244* – 92140	½ – 1½	Cl I	RA69
6918.31	14450.4		95	*84988* – 91906	1½ – 2½	Cl I	RA69
6925.11	14436.3		13	90749 – *97674*	2½ – 2½	Cl I	RA69
6949.82	14384.9		4	*85244* – 92194	½ – 1½	Cl I	RA69
6957.18	14369.7		148	*84132* – 91089	2½ – 3½	Cl I	RA69
6992.30	14297.5		2	*84688* – 91680	½ – 1½	Cl I	RA69
6994.97	14292.1		73	*84132* – 91127	2½ – 2½	Cl I	RA69
7012.78	14255.8		3	*84648* – 91660	2½ – 2½	Cl I	RA69
7029.69	14221.5		2	91343 – *98372*	2½ – 1½	Cl I	RA69
7032.93	14215.0		5	*84648* – 91680	2½ – 1½	Cl I	RA69
7041.19	14198.3		48	*84132* – 91173	2½ – 1½	Cl I	RA69
7053.33	14173.8		11	*84485* – 91538	1½ – 1½	Cl I	RA69
7058.71	14163.0		1			Cl	RA69
7075.31	14129.8		14	91343 – *98418*	2½ – 3½	Cl I	RA69
7078.99	14122.4		4	*84485* – 91564	1½ – ½	Cl I	RA69
7149.42	13983.3		4			Cl	RA69
7152.07	13978.1		120	91680 – *98833*	1½ – 2½	Cl I	RA69
7154.97	13972.5		1	91538 – *98693*	1½ – 2½	Cl I	RA69
7160.62	13961.5		19	*85442* – 92602	1½ – ½	Cl I	RA69
7163.00	13956.8		2	*84988* – 92151	1½ – ½	Cl I	RA69
7175.26	13933.0		15	*84485* – 91660	1½ – 2½	Cl I	RA69
7179.92	13923.9		20	*90487* – *97667*	3½ – 3½	Cl I	RA69
7186.55	13911.1		2	90487 – *97674*	3½ – 2½	Cl I	RA69
7195.85	13893.1		110	*84485* – 91680	1½ – 1½	Cl I	RA69
7199.97	13885.1		7	91173 – *98373*	1½ – 2½	Cl I	RA69
7211.31	13863.3		13	*84132* – 91343	2½ – 2½	Cl I	RA69
7224.72	13837.6		125	90487 – *97712*	3½ – 4½	Cl I	RA69
7229.90	13827.7		9			Cl	RA69
7233.01	13821.7		525	*83894* – 91127	3½ – 2½	Cl I	RA69
7242.92	13802.8		11	*94482* – 101725	2½ – 1½	Cl I	RA69
7258.87	13772.5		50	*84648* – 91906	2½ – 2½	Cl I	RA69
7291.92	13710.1		2	91127 – *98418*	2½ – 3½	Cl I	RA69
7294.02	13706.1		5	91089 – *98383*	3½ – 4½	Cl I	RA69
7328.76	13641.1		3			Cl	RA69
7349.70	13602.2		11	91343 – *98693*	2½ – 2½	Cl I	RA69
7358.50	13586.0		6	*85244* – 92602	½ – ½	Cl I	RA69
7362.60	13578.5		28			Cl	RA69
7406.32	13498.3		160	*84132* – 91538	2½ – 1½	Cl I	RA69
7421.89	13470.0		9	*84485* – 91906	1½ – 2½	Cl I	RA69
7424.56	13465.1		2	90948 – *98372*	1½ – 1½	Cl I	RA69
7449.59	13419.9		90	*83894* – 91343	3½ – 2½	Cl I	RA69
7462.85	13396.0		95	*84688* – 92151	½ – ½	Cl I	RA69
7470.42	13382.5		30	90948 – *98419*	1½ – 2½	Cl I	RA69
7472.89	13378.0		33	90193 – *97666*	4½ – 4½	Cl I	RA69
7492.09	13343.8		550	*84648* – 92140	2½ – 1½	Cl I	RA69

Cl—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7518.99	13296.0		310	90193 – *97712*	4½ – 5½	Cl I	RA69
7548.62	13243.8		350	*84132* – 91680	2½ – 1½	Cl I	RA69
7558.90	13225.8		2			Cl	RA69
7566.00	13213.4		7	91127 – *98693*	2½ – 3½	Cl I	RA69
7568.93	13208.3		20	*82918* – 90487	2½ – 3½	Cl I	RA69
7583.70	13182.6		8	*83364* – 90948	½ – 1½	Cl I	RA69
7591.71	13168.9		13			Cl	RA69
7614.26	13129.7		100	*84988* – 92602	1½ – ½	Cl I	RA69
7618.36	13122.6		16	*83130* – 90749	1½ – 2½	Cl I	RA69
7626.85	13108.0		4	*94482* – 102108	2½ – 1½	Cl I	RA69
7634.34	13095.1		49	90749 – *98383*	2½ – 3½	Cl I	RA69
7637.73	13089.3		3			Cl	RA69
7653.28	13062.7		5			Cl	RA69
7655.05	13059.7		4	*84485* – 92140	1½ – 1½	Cl I	RA69
7666.03	13041.0		125	*84485* – 92151	1½ – ½	Cl I	RA69
7669.80	13034.6		9	90749 – *98419*	2½ – 2½	Cl I	RA69
7703.97	12976.8		20	*83364* – 91069	½ – ½	Cl I	RA69
7708.19	12969.7		2	92194 – *99902*	1½ – ½	Cl I	RA69
7744.67	12908.6		24	90948 – *98693*	1½ – 2½	Cl I	RA69
7749.26	12900.9		3			Cl	RA69
7766.62	12872.1		39	*83894* – 91660	3½ – 2½	Cl I	RA69
7768.00	12869.8		4			Cl	RA69
7774.43	12859.2		13	*84132* – 91906	2½ – 2½	Cl I	RA69
7808.50	12803.0		37	*83364* – 91173	½ – 1½	Cl I	RA69
7812.87	12795.9		12			Cl	RA69
7881.95	12683.7		2 B	*94973* – 102855	½ –	Cl I	RA69
7884.60	12679.5		1	90948 – *98833*	1½ – 2½	Cl I	RA69
7895.64	12661.7		47	90487 – *98383*	3½ – 4½	Cl I	RA69
7913.96	12632.4		3	*84688* – 92602	½ – ½	Cl I	RA69
7920.92	12621.3		47	*95180* – 103101	3½ – 2½	Cl I	RA69
7930.86	12605.5		1	90487 – *98418*	3½ – 3½	Cl I	RA69
7938.02	12594.2		142	*83130* – 91069	1½ – ½	Cl I	RA69
7943.74	12585.1		10	90749 – *98693*	2½ – 3½	Cl I	RA69
7957.34	12563.6		38	*95144* – 103102	2½ – 1½	Cl I	RA69
7996.09	12502.7		63	*83130* – 91127	1½ – 2½	Cl I	RA69
8042.77	12430.1		12	*83130* – 91173	1½ – 1½	Cl I	RA69
8069.45	12389.0		4			Cl	RA69
8111.70	12324.5		3			Cl	RA69
8140.73	12280.5		16			Cl	RA69
8170.19	12236.3		5	*82918* – 91089	2½ – 3½	Cl I	RA69
8173.62	12231.1		16	*83364* – 91538	½ – 1½	Cl I	RA69
8174.70	12229.5		4			Cl	RA69
8208.12	12179.7		77	*82918* – 91127	2½ – 2½	Cl I	RA69
8212.69	12173.0		60	*83130* – 91343	1½ – 2½	Cl I	RA69
8254.73	12111.0		60	*82918* – 91173	2½ – 1½	Cl I	RA69
8316.04	12021.7		172	*83364* – 91680	½ – 1½	Cl I	RA69
8424.59	11866.76	0.02	195	*82918* – 91343	2½ – 2½	Cl I	RA69
8529.68	11720.56	0.02	180	*83130* – 91660	1½ – 2½	Cl I	RA69
8550.11	11692.56	0.02	85	*83130* – 91680	1½ – 1½	Cl I	RA69
8591.50	11636.2		4	90193 – *98785*	4½ – 3½	Cl I	RA69
8619.26	11598.7		5	*94482* – 103101	2½ – 2½	Cl I	RA69
8622.88	11593.9		3			Cl	RA69
8632.40	11581.1		3			Cl	RA69
8633.28	11579.9		9	*94468* – 103102	½ – 1½	Cl I	RA69
8635.27	11577.2		11	85678 – *94314*	½ – 1½	Cl I	RA69
8638.08	11573.5		2	91564 – *100202*	½ – ½	Cl I	RA69
8700.53	11490.4		3			Cl	RA69
8729.74	11452.0		2			Cl	RA69
8741.67	11436.33	0.02	1000	*82918* – 91660	2½ – 2½	Cl I	RA69
8753.48	11420.9		3			Cl	RA69
8762.08	11409.69	0.02	269	*82918* – 91680	2½ – 1½	Cl I	RA69
8775.21	11392.62	0.02	231	*83364* – 92140	½ – 1½	Cl I	RA69
8786.44	11378.06	0.02	45	*83364* – 92151	½ – ½	Cl I	RA69
8789.62	11373.9		5	85678 – *94468*	½ – ½	Cl I	RA69
8822.87	11331.1		5	91343 – *100166*	2½ – 3½	Cl I	RA69
8826.41	11326.5		6	91343 – *100169*	2½ – 3½	Cl I	RA69

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8841.90	11306.7		3	91343 – *100185*	2½ – 2½	Cl I	RA69
8857.80	11286.4		9			Cl	RA69
8905.26	11226.2		2	74225 – *83130*	1½ – 1½	Cl I	RA69
8964.74	11151.76	0.03	6	91906 – *100871*	2½ – 3½	Cl I	RA69
8987.88	11123.05	0.02	300	*82918* – 91906	2½ – 2½	Cl I	RA69
9009.23	11096.69	0.02	56	*83130* – 92140	1½ – 1½	Cl I	RA69
9011.61	11093.8		6	91173 – *100185*	1½ – 1½	Cl I	RA69
9012.19	11093.0		6	91173 – *100185*	1½ – 2½	Cl I	RA69
9020.49	11082.84	0.02	206	*83130* – 92151	1½ – ½	Cl I	RA69
9029.23	11072.1		3	91173 – *100202*	1½ – 1½	Cl I	RA69
9036.19	11063.6		2	92140 – *101176*	1½ – 2½	Cl I	RA69
9040.00	11058.9		1			Cl	RA69
9043.02	11055.2		2	91127 – *100170*	2½ – 2½	Cl I	RA69
9076.18	11014.84	0.03	3	91089 – *100165*	3½ – 4½	Cl I	RA69
9099.23	10986.93	0.02	13	91089 – *100188*	3½ – 4½	Cl I	RA69
9125.16	10955.71	0.04	1	*151020* – 160145	2 – 2	Cl II	RA74
9133.73	10945.4		5	91069 – *100202*	½ – 1½	Cl I	RA69
9184.08	10885.42	0.03	5	159490 – *168674*	3 – 2	Cl II	RA74
9208.29	10856.81	0.02	3	159466 – *168674*	2 – 2	Cl II	RA74
9212.5	10851.9	0.30	1	*140741* – 149954	1 – 1	Cl II	RA74
9221.233	10841.567	0.01	100	*82918* – 92140	2½ – 1½	Cl I	RA69
9223.28	10839.16	0.02	3	159451 – *168674*	1 – 2	Cl II	RA74
9229.27	10832.13	0.02	9	91660 – *100889*	2½ – 3½	Cl I	RA69
9237.75	10822.18	0.03	3	*83364* – 92602	½ – ½	Cl I	RA69
9242.93	10816.11	0.02	4	131768 – *141011*	2 – 2	Cl II	RA74
9255.47	10801.47	0.01	9	131756 – *141011*	1 – 2	Cl II	RA74
9269.38	10785.25	0.02	7	91906 – *101176*	2½ – 3½	Cl I	RA69
9279.07	10773.99	0.04	1	*140741* – 150020	1 – 0	Cl II	RA74
9301.66	10747.8		1			Cl	RA69
9327.32	10718.25	0.02	0	91538 – *100865*	1½ – 2½	Cl I	RA69
9337.50	10706.57	0.02	3	161636 – *170974*	2 – 3	Cl II	RA74
9350.25	10691.98	0.04	2	161656 – *171006*	1 – 2	Cl II	RA74
9358.98	10682.0		7			Cl	RA69
9379.94	10658.13	0.04	1	161672 *171052*	0 1	Cl II	RA74
9395.90	10640.03	0.04	1	161656 – *171052*	1 – 1	Cl II	RA74
9404.66	10630.12	0.02	3			Cl	RA74
9413.29	10620.4		7			Cl	RA69
9416.86	10616.34	0.02	2	90749 – *100166*	2½ – 3½	Cl I	RA69
9420.63	10612.10	0.02	1	90749 – *100170*	2½ – 2½	Cl I	RA69
9430.94	10600.50	0.02	18	88272 – *97703*	½ – 1½	Cl I	RA69
9444.59	10585.17	0.02	4			Cl	RA69
9448.37	10580.93	0.04	3	*172743* – 182191	4 – 5	Cl II	RA74
9461.62	10566.12	0.05	4			Cl	RA69
9461.91	10565.79	0.02	5	*150683* – 160145	3 – 2	Cl II	RA74
9464.07	10563.39	0.04	3	*172652* – 182116	3 – 4	Cl II	RA74
9466.31	10560.88	0.02	4	88272 – *97739*	½ – ½	Cl I	RA69
9466.58	10560.58	0.02	2	88272 – *97739*	½ – 1½	Cl I	RA69
9471.79	10554.77	0.02	8	*83130* – 92602	1½ – ½	Cl I	RA69
9482.57	10542.78	0.02	4	*172743* – 182225	4 – 5	Cl II	RA74
9485.785	10539.202	0.01	44	88188 – *97674*	1½ – 2½	Cl I	RA69
9489.57	10535.00	0.04	3	*172743* – 182232	4 – 4	Cl II	RA74
9499.33	10524.18	0.02	3			Cl	RA69
9508.37	10514.17	0.01	25	*154624* – 164133	4 – 5	Cl II	RA74
9508.80	10513.70	0.02	6	*154624* – 164133	4 – 4	Cl II	RA74
9509.92	10512.46	0.01	19	*154623* – 164133	3 – 4	Cl II	RA74
9510.33	10512.01	0.02	7	*154623* – 164133	3 – 3	Cl II	RA74
9512.934	10509.12	0.01	14	*154620* – 164133	2 – 3	Cl II	RA74
9513.31	10508.71	0.01	6	*154620* – 164134	2 – 2	Cl II	RA74
9515.10	10506.73	0.02	33	88188 – *97703*	1½ – 1½	Cl I	RA69
9515.20	10506.62	0.02	10	*154619* – 164134	1 – 2	Cl II	RA74
9515.38	10506.43	0.02	15	88188 – *97703*	1½ – 2½	Cl I	RA69
9515.47	10506.32	0.03	6	*154619* – 164134	1 – 1	Cl II	RA74
9516.53	10505.16	0.02	5	*154618* – 164134	0 – 1	Cl II	RA74
9521.11	10500.10	0.05	2	*172574* – 182095	2 – 3	Cl II	RA74
9546.33	10472.36	0.02	3	91343 – *100889*	2½ – 3½	Cl I	RA69
9550.50	10467.79	0.02	7	88188 – *97739*	1½ – ½	Cl I	RA69

Cl—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9550.76	10467.50	0.03	5	88188 – *97739*	1½ – 1½	Cl I	RA69
9582.50	10432.83	0.01	38	131768 – *141351*	2 – 3	Cl II	RA74
9587.354	10427.549	0.01	44	88080 – *97667*	2½ – 3½	Cl I	RA69
9594.08	10420.24	0.02	105	88080 – *97674*	2½ – 3½	Cl I	RA69
9594.27	10420.04	0.02	80	88080 – *97674*	2½ – 2½	Cl I	RA69
9605.66	10407.68	0.04	1	*172574* – 182180	2 – 2	Cl II	RA74
9619.642	10392.549	0.01	331	74865 – *84485*	½ – 1½	Cl I	RA69
9623.59	10388.29	0.02	10	88080 – *97703*	2½ – 1½	Cl I	RA69
9623.899	10387.952	0.01	34	88080 – *97703*	2½ – 2½	Cl I	RA69
9634.84	10376.16	0.03	0	85678 – *95313*	½ – 1½	Cl I	RA69
9659.27	10349.91	0.02	2	88080 – *97739*	2½ – 1½	Cl I	RA69
9677.76	10330.14	0.02	2	90487 – *100165*	3½ – 4½	Cl I	RA69
9678.35	10329.51	0.02	3	90487 – *100166*	3½ – 3½	Cl I	RA69
9687.160	10320.115	0.01	205	87979 – *97666*	3½ – 4½	Cl I	RA69
9687.89	10319.33	0.02	20	87979 – *97667*	3½ – 3½	Cl I	RA69
9691.70	10315.28	0.03	1			Cl	RA69
9692.28	10314.67	0.02	1	91173 – *100865*	1½ – 2½	Cl I	RA69
9694.602	10312.193	0.01	44	87979 – *97674*	3½ – 3½	Cl I	RA69
9700.81	10305.60	0.02	22	90487 – *100188*	3½ – 4½	Cl I	RA69
9724.45	10280.54	0.02	4	87979 – *97703*	3½ – 2½	Cl I	RA69
9781.74	10220.33	0.02	10	91089 – *100871*	3½ – 4½	Cl I	RA69
9822.96	10177.44	0.02	1	74865 – *84688*	½ – ½	Cl I	RA69
9906.415	10091.703	0.01	150	74225 – *84132*	1½ – 2½	Cl I	RA69
9941.66	10055.93	0.03	1	90948 – *100890*	1½ – 2½	Cl I	RA69
9953.58	10043.88	0.02	2	153258 – *163212*	2 – 1	Cl II	RA74
9995.03	10002.23	0.02	4	90193 – *100188*	4½ – 5½	Cl I	RA69

Cl References

RA69 Radziemski, L. J., Jr., and Kaufman, V., J. Opt. Soc. Amer. **59**, 424–443 (1969).
- Source: Electrodeless discharge tube (2.45 GHz)
- Instrument: 3.4 m Ebert spectrograph
- Detector: Photographic
- Uncertainty in σ: Not given for wavenumbers less than 8400 cm⁻¹

HU71 Humphreys, C. J., Paul, E., Jr., and Minnhagen, L., J. Opt. Soc. Amer. **61**, 110–114 (1971).
- Source: Electrodeless discharge tube (2.45 GHz)
- Instrument: 1 m Littrow spectrometer
- Detector: PbS cooled with liquid nitrogen
- Uncertainty in σ: Not given

HU72 Humphreys, C. J., and Paul, E., Jr., J. Opt. Soc. Amer. **62**, 432–439 (1972).
- Source: Electrodeless discharge tube (2.45 GHz)
- Instrument: 1 m Littrow spectrometer
- Detector: PbS cooled with liquid nitrogen
- Uncertainty in σ: Not given—observed wavenumbers calculated from established energy levels (see RA69)

RA74 Radziemski, J. L., Jr., and Kaufman, V., J. Opt. Soc. Amer. **64**, 366–389 (1974).
- Source: Pulsed r.f. electrodeless ring discharge
- Instrument: 10.7 m Wadsworth spectrograph
- Detector: Photographic

Additional References

Humphreys, C. J., and Paul, E., Jr., J. Opt. Soc. Amer. **49**, 1180 (1959).

Chromium

Cr, Z = 24

Cr I Normal state of valence electrons $3d^5 4s\ ^7S_3$ I.P. = 54570 cm^{-1}

Cr II Normal state of valence electrons $3d^5\ ^6S_{5/2}$ I.P. = 133060 cm^{-1}

Cr

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8610.55	11610.48		15	*26787* – 35398	3 – 4	Cr I	KI53
8705.01	11484.50		15	*26796* – 35501	2 – 3	Cr I	KI53
8713.79	11472.93		10	*26787* – 35501	3 – 3	Cr I	KI53
8771.10	11397.96		12	*26801* – 35572	1 – 2	Cr I	KI53
8776.74	11390.63		15	*26796* – 35572	2 – 2	Cr I	KI53
8785.52	11379.26		5	*26787* – 35572	3 – 2	Cr I	KI53
8816.58	11339.16		15	*26801* – 35618	1 – 1	Cr I	KI53
8822.25	11331.88		10	*26796* – 35618	2 – 1	Cr I	KI53
8838.78	11310.69		12	*26801* – 35640	1 – 0	Cr I	KI53
8960.51	11157.03		25	*27935* – 36895	4 – 3	Cr I	KI53
9051.69	11044.64		5	24286 – *33338*	1 – 0	Cr I	KI53
9075.53	11015.63		30	*27820* – 36895	3 – 3	Cr I	KI53
9123.93	10957.19		12	24299 – *33423*	2 – 1	Cr I	KI53
9146.71	10929.90		10	24277 – *33423*	0 – 1	Cr I	KI53
9166.90	10905.83		25	*27728* – 36895	2 – 3	Cr I	KI53
9169.37	10902.90		2			Cr	KI53
9238.23	10821.62		12	24303 – *33542*	3 – 2	Cr I	KI53
9242.26	10816.91		8	24299 – *33542*	2 – 2	Cr I	KI53
9255.55	10801.37		12	24286 – *33542*	1 – 2	Cr I	KI53
9367.60	10672.17		18	24303 – *33671*	3 – 3	Cr I	KI53
9371.68	10667.53		15	24299 – *33671*	2 – 3	Cr I	KI53
9389.17	10647.66		12	24282 – *33671*	4 – 3	Cr I	KI53
9403.50	10631.42		2	39158 – *48562*	4 – 4	Cr I?	KI53
9403.50	10631.42		2	*47985* – 57389	5 – 6	Cr I?	KI53
9475.97	10550.12		3	24286 – *33762*	1 – 0	Cr I	KI53
9512.18	10509.96		10	24303 – *33816*	3 – 4	Cr I	KI53
9533.70	10486.24		20	24282 – *33816*	4 – 4	Cr I	KI53
9597.30	10416.75		2	24299 – *33897*	2 – 1	Cr I	KI53
9620.08	10392.10		1	24277 – *33897*	0 – 1	Cr I	KI53
9784.87	10217.06		1	35501 – *45286*	3 – 4	Cr I	KI53
9804.07	10197.05		3	24093 – *33897*	2 – 1	Cr I	KI53
9886.63	10111.90		1	24303 – *34190*	3 – 2	Cr I	KI53
9908.48	10089.61		2	35398 – *45306*	4 – 5	Cr I	KI53
9914.80	10083.17		5	28682 – *38597*	2 – 1	Cr I	KI53
9917.60	10080.32		15	28679 – *38597*	1 – 1	Cr I	KI53

Cr Reference

KI53 Kiess, C. C., J. Res. Nat. Bur. Stds. **51**, 247–305 (1953).
Source: D.C. arc
Instrument: 21′ Grating spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Additional References

Kiess, C. C., J. Res. Nat. Bur. Stds. **15**, 79 (1935).

Copper

Cu, Z = 29

Cu I Normal state of valence electrons $3d^{10}4s\ ^2S_{1/2}$ I.P. = 62317 cm^{-1}

Cu II Normal state of valence electrons $3d^{10}\ ^1S_0$ I.P. = 163669 cm^{-1}

Cu

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9828.23	10172.00		2 L	*40113* – 49942	1½ – 2½	Cu I	SH48
9833.14	10166.91		15 L	*136270* – 146103	4 – 5	Cu II	SH36
9837.04	10162.88		1 L	*136270* – 146107	4 – 4	Cu II	SH36
9852.64	10146.78		10 L	*58119* – 67971	2½ – 1½	Cu I	SH48
9905.88	10092.27		0 L	*138261* – 148167	3 – 3	Cu II	SH36
9917.46	10080.47		10 L	*138261* – 148179	3 – 4	Cu II	SH36
9942.56	10055.02		30 L	*136160* – 146103	5 – 6	Cu II	SH36
9946.42	10051.12		3 L	*136160* – 146107	5 – 5	Cu II	SH36
9947.65	10049.88		1 L	*138220* – 148167	4 – 4	Cu II	SH36
9956.91	10040.53		0 L	*138177* – 148133	2 – 2	Cu II	SH36
9959.23	10038.19		15 L	*138220* – 148179	4 – 5	Cu II	SH36
9961.08	10036.32		5 L	*136133* – 146094	4 – 4	Cu II	SH36
9970.41	10026.93		1 L	*136133* – 146103	4 – 5	Cu II	SH36
9974.27	10023.05		30 L	*136133* – 146107	4 – 5	Cu II	SH36
9990.59	10006.68		10 L	*138177* – 148167	2 – 3	Cu II	SH36

Cu References

SH36 Shenstone, A. G., Phil. Trans. Roy. Soc. **A235,** 195–243 (1936).
Source: Schuler tube
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

SH48 Shenstone, A. G., Phil. Trans. Roy. Soc. **A241,** 297–322 (1948).
Source: Globule arc
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Curium

Cm, Z = 96

Cm I Normal state of valence electrons $5f^7(^8S^\circ_{7/2})6d7s^2(7/2, 3/2)^\circ_2$ I.P. = 48554 cm^{-1}

Cm II Normal state of valence electrons $5f^77s^2\ ^8S^\circ_{7/2}$ I.P. = cm^{-1}

Cm

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3774.254	26488.06		6	*16516* – 20290	4 – 3	Cm I	CO76
3928.361	25448.95		5	5136 – *9064*	5 – 5	Cm I	CO76
3939.755	25375.35		6	*15719* – 19658	4 – 3	Cm I	CO76
3997.922	25006.16		3	*19059* – 23057	6 – 5	Cm I	CO76
4061.956	24611.95		6	*815* – 4877	4 – 4	Cm I	CO76
4068.951	24569.64		3	18060 – *22129*	5 – 6	Cm I	CO76
4070.657	24559.35		3	22538 – *26609*	7 – 7	Cm I?	CO76
4070.657	24559.35		3	*33041* – 37112	2 – 2	Cm I?	CO76
4079.997	24503.12		6	*11641* – 15721	5 – 5	Cm I	CO76
4084.158	24478.16		6	*20912* – 24996	5 – 4	Cm I	CO76
4106.515	24344.89		3	*22341* – 26447	4 – 3	Cm I	CO76
4129.734	24208.02		6	*17656* – 21786	6 – 6	Cm I	CO76
4187.270	23875.38		8	*4877* – *9064*	4 – 5	Cm I	CO76
4211.450	23738.30		6	*16516* – 20727	4 – 3	Cm I	CO76
4216.062	23712.33		8	*15924* – 20140	3 – 2	Cm I?	CO76
4216.062	23712.33		8	*10484* – 14700	3 – 4	Cm I?	CO76
4235.116	23605.65		6	*19059* – 23292	6 – 5	Cm I	CO76
4300.525	23246.62		3	*17047* – 21348	6 – 6	Cm I	CO76
4320.865	23137.19		6	*815* – 5136	4 – 5	Cm I	CO76
4327.894	23099.61		3	*22297* – 26625	5 – 6	Cm I	CO76
4337.610	23047.87		6	19296 – *23633*	6 – 6	Cm I	CO76
4349.685	22983.89		5	*20673* – 25023	4 – 3	Cm I	CO76
4357.255	22943.96		3	*17656* – 22013	6 – 5	Cm I	CO76
4365.972	22898.15		4	*15924* – 20290	3 – 3	Cm I	CO76
4414.940	22644.17		4	22013 – *26428*	5 – 6	Cm I	CO76
4424.629	22594.59		3	*23419* – 27843	5 – 5	Cm I	CO76
4432.088	22556.56		4	*16915* – 21348	5 – 6	Cm I	CO76
4445.925	22486.36		7	*15546* – 19992	2 – 1	Cm I	CO76
4461.653	22407.09		7	*15719* – 20180	4 – 4	Cm I	CO76
4493.962	22246.00		7	*16516* – 21010	4 – 4	Cm I	CO76
4529.076	22073.53		8	*18009* – 22538	7 – 7	Cm I	CO76
4542.804	22006.82		4	22806 – *27349*	6 – 6	Cm I	CO76
4550.859	21967.87		8	*17463* – 22013	5 – 5	Cm I	CO76
4561.797	21915.20		3	*25878* – 30439	5 – 4	Cm I	CO76
4575.458	21849.76		7	*302* – 4877	3 – 4	Cm I	CO76
4580.443	21825.98		8	4877 – *9458*	4 – 3	Cm I	CO76
4588.413	21788.07		3	*20435* – 25023	3 – 3	Cm I	CO76
4608.240	21694.33		4	*24951* – 29559	7 – 6	Cm I	CO76
4673.101	21393.22		9	*11641* – 16314	5 – 4	Cm I	CO76
4692.126	21306.48		7	*15300* – 19992	1 – 1	Cm I	CO76
4699.510	21273.00		4	*17047* – 21746	6 – 7	Cm I	CO76
4706.579	21241.05		9	*10971* – 15677	4 – 3	Cm I	CO76
4734.196	21117.14		6	22615 – *27349*	7 – 6	Cm I	CO76
4738.900	21096.18		7	*17047* – 21786	6 – 6	Cm I	CO76
4739.108	21095.25		6	18060 – *22799*	5 – 5	Cm I	CO76
4743.901	21073.94		7	*15546* – 20290	2 – 3	Cm I	CO76
4745.540	21066.66		3	19755 – *24501*	4 – 5	Cm I?	CO76
4745.540	21066.66		3	21786 – *26531*	6 – 6	Cm I?	CO76
4750.508	21044.63		6	*10971* – 15721	4 – 5	Cm I	CO76
4767.845	20968.10		9	*10484* – 15252	3 – 2	Cm I	CO76
4780.748	20911.51		9	*12534* – 17315	6 – 5	Cm I	CO76
4794.052	20853.48		8	*20197* – 24991	6 – 6	Cm I	CO76
4803.168	20813.90		3	*15924* – 20727	3 – 3	Cm I	CO76
4804.023	20810.20		3	*20197* – 25001	6 – 5	Cm I	CO76
4839.255	20658.69		8	*11641* – 16480	5 – 4	Cm I	CO76
4840.192	20654.69		8	*15300* – 20140	1 – 2	Cm I	CO76

Cm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4870.464	20526.31		9	*16915* – 21786	5 – 6	Cm I?	CO76
4870.464	20526.31		9	32317 – *37187*	4 – 5	Cm I?	CO76
4871.568	20521.66		3	22538 – *27410*	7 – 7	Cm I	CO76
4924.803	20299.83		4	20593 – *25518*	7 – 6	Cm I	CO76
4953.820	20180.93		3	*21828* – 26782	5 – 4	Cm I	CO76
4958.771	20160.78		3	*17656* – 22615	6 – 7	Cm I	CO76
5004.645	19975.98		9	17656 – *22660*	8 – 8	Cm I	CO76
5055.059	19776.76		3			Cm	CO76
5067.082	19729.83		4	*22557* – 27624	2 – 3	Cm I	CO76
5075.351	19697.69		3	26388 – *31464*	7 – 7	Cm I	CO76
5085.679	19657.68		8	*15924* – 21010	3 – 4	Cm I	CO76
5107.783	19572.62		9	*10144* – 15252	2 – 2	Cm I?	CO76
5107.783	19572.62		9	*30483* – 35591	6 – 6	Cm I?	CO76
5107.783	19572.62		9	29229 – *34337*	4 – 3	Cm I?	CO76
5113.243	19551.72		6	22615 – *27728*	7 – 7	Cm I	CO76
5134.606	19470.37		7	*15719* – 20853	4 – 5	Cm I?	CO76
5134.606	19470.37		7	*31370* – 36505	4 – 3	Cm I?	CO76
5144.767	19431.92		6	*13720* – 18865	7 – 6	Cm I	CO76
5181.098	19295.65		7	*15546* – 20727	2 – 3	Cm I	CO76
5190.116	19262.13		6	22538 – *27728*	7 – 7	Cm I	CO76
5192.886	19251.85		7	*10484* – 15677	3 – 3	Cm I	CO76
5251.451	19037.15		8	17656 – *22907*	8 – 7	Cm I	CO76
5301.887	18856.06		8	*15719* – 21020	4 – 5	Cm I?	CO76
5301.887	18856.06		8	*23327* – 28629	4 – 3	Cm I?	CO76
5343.612	18708.82		8	*10971* – 16314	4 – 4	Cm I	CO76
5348.056	18693.27		4	16480 – *21828*	4 – 5	Cm I	CO76
5400.651	18511.23		6	*17656* – 23057	6 – 5	Cm I	CO76
5417.738	18452.84		4	*20197* – 25616	6 – 6	Cm I	CO76
5422.551	18436.47		4	22099 – *27522*	3 – 4	Cm I	CO76
5455.115	18326.41		3	21010 – *26465*	4 – 4	Cm I	CO76
5456.148	18322.94		8	*9064* 14521	5 – 4	Cm I	CO76
5497.618	18184.73		8	*16516* – 22013	4 – 5	Cm I	CO76
5509.767	18144.63		6	*10971* – 16480	4 – 4	Cm I	CO76
5519.152	18113.78		7	*33148* – 38667	3 – 2	Cm I	CO76
5532.824	18069.01		9	*10144* – 15677	2 – 3	Cm I	CO76
5562.581	17972.35		8	*8958* – 14521	4 – 4	Cm I	CO76
5573.856	17936.00		3			Cm	CO76
5581.018	17912.98		6	*9671* – 15252	2 – 2	Cm I	CO76
5583.546	17904.87		5	*16516* – 22099	4 – 3	Cm I	CO76
5611.707	17815.02		7	20853 – *26465*	5 – 4	Cm I	CO76
5635.844	17738.72		4	*17656* – 23292	6 – 5	Cm I	CO76
5674.050	17619.28		9	*11641* – 17315	5 – 5	Cm I	CO76
5674.782	17617.01		6	*10971* – 16645	4 – 3	Cm I	CO76
5712.692	17500.10		3	*20912* – 26625	5 – 6	Cm I	CO76
5714.863	17493.45		4	*22129* – 27843	6 – 5	Cm I	CO76
5721.182	17474.13		7	*17656* – 23377	6 – 6	Cm I	CO76
5728.052	17453.17		9	16932 – *22660*	7 – 8	Cm I	CO76
5749.678	17387.53		3	*23136* – 28886	6 – 5	Cm I	CO76
5756.927	17365.63		3			Cm	CO76
5763.037	17347.22		3	17036 – *22799*	6 – 5	Cm I	CO76
5763.729	17345.14		3	*22334* – 28097	3 – 3	Cm I	CO76
5794.658	17252.56		5	*9458* – 15252	3 – 2	Cm I	CO76
5810.064	17206.81		4	*23419* – 29229	5 – 4	Cm I	CO76
5823.819	17166.17		6	*24749* – 30573	6 – 5	Cm I	CO76
5829.447	17149.60		7	*17463* – 23292	5 – 5	Cm I	CO76
5829.918	17148.21		9	*10484* – 16314	3 – 4	Cm I	CO76
5834.851	17133.72		3	20593 – *26428*	7 – 6	Cm I	CO76
5843.929	17107.10		8	*17463* – 23306	5 – 4	Cm I	CO76
5865.720	17043.55		3 W			Cm	CO76
5866.931	17040.03		3 W	25237 – *31104*	4 – 4	Cm I	CO76
5871.408	17027.04		6	17036 – *22907*	6 – 7	Cm I	CO76
5873.947	17019.68		3	*19741* – 25615	5 – 6	Cm I?	CO76
5873.947	17019.68		3	25838 – *31712*	5 – 4	Cm I?	CO76
5934.515	16845.97		7	9784 – *15719*	4 – 4	Cm I?	CO76
5934.515	16845.97		7	*32865* – 38799	4 – 4	Cm I?	CO76
5936.121	16841.42		5	*21688* – 27624	4 – 3	Cm I	CO76

Cm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5937.930	16836.28		6	20593 – *26531*	7 – 6	Cm I	CO76
5974.351	16733.65		4	*20197* – 26171	6 – 5	Cm I	CO76
5974.858	16732.23		7	16932 – *22907*	7 – 7	Cm I	CO76
5996.072	16673.03		8	*10484* – 16480	3 – 4	Cm I	CO76
6006.058	16645.31		8	*9671* – 15677	2 – 3	Cm I	CO76
6009.817	16634.90		3	*17047* – 23057	6 – 5	Cm I	CO76
6012.584	16627.24		6	*20435* – 26447	3 – 3	Cm I	CO76
6015.212	16619.98		5	20593 – *26609*	7 – 7	Cm I	CO76
6053.727	16514.24		3	19824 – *25878*	5 – 5	Cm I	CO76
6053.957	16513.61		6	*17656* – 23710	6 – 7	Cm I	CO76
6072.061	16464.37		3	*17463* – 23535	5 – 4	Cm I	CO76
6100.313	16388.12		4	17036 – *23136*	6 – 6	Cm I	CO76
6121.416	16331.63		3	*24451* – 30573	6 – 5	Cm I	CO76
6130.425	16307.63		5	*22129* – 28259	6 – 7	Cm I	CO76
6141.381	16278.53		3	*16915* – 23057	5 – 5	Cm I	CO76
6145.438	16267.79		3	*22334* – 28479	3 – 2	Cm I	CO76
6155.299	16241.73		3	*21688* – 27843	4 – 5	Cm I	CO76
6161.089	16226.46		7	*10484* – 16645	3 – 3	Cm I	CO76
6167.366	16209.95		3	*24749* – 30916	6 – 5	Cm I	CO76
6168.980	16205.71		8	*19059* – 25228	6 – 5	Cm I	CO76
6174.550	16191.09		8	*19059* – 25233	6 – 6	Cm I	CO76
6175.263	16189.22		4	*15924* – 22099	3 – 3	Cm I	CO76
6176.913	16184.89		4 W			Cm	CO76
6185.009	16163.71		6	*22341* – 28526	4 – 4	Cm I	CO76
6193.346	16141.95		6	3941 – *10134*	5½ – 4½	Cm II	CO76
6203.763	16114.85		5	16932 – *23136*	7 – 6	Cm I	CO76
6219.699	16073.56		5	*9458* – 15677	3 – 3	Cm I	CO76
6245.012	16008.40		9	*17047* – 23292	6 – 5	Cm I	CO76
6246.565	16004.43		3	*22334* – 28580	3 – 4	Cm I	CO76
6247.450	16002.16		3	*22268* – 28515	4 – 4	Cm I	CO76
6257.052	15977.60		3	*19059* – 25316	6 – 5	Cm I	CO76
6330.065	15793.31		9	*12534* – 18865	6 – 6	Cm I	CO76
6330.348	15792.60		7	*17047* – 23377	6 – 6	Cm I	CO76
6344.561	15757.23		9	*10971* – 17315	4 – 5	Cm I	CO76
6347.645	15749.57		5	*20435* – 26782	3 – 4	Cm I?	CO76
6347.645	15749.57		5	*23136* – 29484	6 – 5	Cm I?	CO76
6362.659	15712.41		8	*20762* – 27124	7 – 6	Cm I	CO76
6376.574	15678.12		5	*16915* – 23292	5 – 5	Cm I	CO76
6380.656	15668.09		3	21348 – *27728*	6 – 7	Cm I	CO76
6391.055	15642.59		9	*16915* – 23306	5 – 4	Cm I?	CO76
6391.055	15642.59		9	*32796* – 39187	4 – 5	Cm I?	CO76
6393.172	15637.41		8	*815* – 7208	4 – 3	Cm I	CO76
6409.197	15598.32		4	*21688* – 28097	4 – 3	Cm I	CO76
6418.449	15575.83		7	*11641* – 18060	5 – 5	Cm I	CO76
6427.974	15552.75		6	*20197* – 26625	6 – 6	Cm I?	CO76
6427.974	15552.75		6	*33758* – 40186	4 – 4	Cm I?	CO76
6430.561	15546.49		3	*19741* – 26171	5 – 5	Cm I	CO76
6441.223	15520.76		6	18060 – *24501*	5 – 5	Cm I	CO76
6455.684	15485.99		6	9263 – *15719*	3 – 4	Cm I	CO76
6501.026	15377.99		6	*10144* – 16645	2 – 3	Cm I	CO76
6513.640	15348.21		3	*10484* – 16998	3 – 2	Cm I	CO76
6521.917	15328.73		7	*19059* – 25581	6 – 5	Cm I	CO76
6540.462	15285.26		3	21348 – *27888*	6 – 6	Cm I	CO76
6553.193	15255.57		4	*15546* – 22099	2 – 3	Cm I	CO76
6555.871	15249.34		7	*19059* – 25615	6 – 6	Cm I	CO76
6567.526	15222.27		9	*16516* – 23083	4 – 3	Cm I	CO76
6597.438	15153.26		4	17036 – *23633*	6 – 6	Cm I	CO76
6619.188	15103.47		4	*16915* – 23535	5 – 4	Cm I	CO76
6636.981	15062.98		7	*15110* – 21746	8 – 7	Cm I	CO76
6656.800	15018.13		9	*9064* – 15721	5 – 5	Cm I	CO76
6661.204	15008.20		6	*15924* – 22585	3 – 3	Cm I	CO76
6686.976	14950.36		3	*21828* – 28515	5 – 4	Cm I?	CO76
6686.976	14950.36		3	24079 – *30766*	4 – 4	Cm I?	CO76
6696.244	14929.67		3 W			Cm	CO76
6731.753	14850.91		6	9784 – *16516*	4 – 4	Cm I	CO76
6761.046	14786.57		8	*12534* – 19296	6 – 6	Cm I	CO76

Cm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6763.233	14781.79		7	*8958* – 15721	4 – 5	Cm I	CO76
6778.977	14747.46		6	*19059* – 25838	6 – 5	Cm I	CO76
6786.135	14731.90		5	*17047* – 23833	6 – 6	Cm I	CO76
6790.689	14722.02		8	*16516* – 23306	4 – 4	Cm I	CO76
6834.921	14626.75		5	*23775* – 30610	5 – 6	Cm I	CO76
6853.577	14586.94		7	*10144* – 16998	2 – 2	Cm I	CO76
6856.730	14580.23		9	*9458* – 16314	3 – 4	Cm I	CO76
6864.646	14563.41		9	*10133* – 16998	1 – 2	Cm I	CO76
6867.475	14557.42		8	*15924* – 22792	3 – 2	Cm I	CO76
6873.719	14544.19		7	*13720* – 20593	7 – 7	Cm I	CO76
6884.183	14522.08		3	*19741* – 26625	5 – 6	Cm I	CO76
6906.674	14474.79		7	*302* – 7208	3 – 3	Cm I	CO76
6974.260	14334.52		9	*9671* – 16645	2 – 3	Cm I	CO76
7009.902	14261.64		8	*17463* – 24472	5 – 4	Cm I	CO76
7018.820	14243.52		4	*16516* – 23535	4 – 4	Cm I	CO76
7022.885	14235.27		9	*9458* – 16480	3 – 4	Cm I	CO76
7043.536	14193.54		6	*17656* – 24700	6 – 7	Cm I	CO76
7088.960	14102.59		7	*10971* – 18060	4 – 5	Cm I	CO76
7131.386	14018.69		6	9784 – *16915*	4 – 5	Cm I?	CO76
7131.386	14018.69		6	*25826* – 32957	2 – 3	Cm I?	CO76
7159.244	13964.14		9	*15924* – 23083	3 – 3	Cm I	CO76
7164.000	13954.87		4	*16915* – 24079	3 – 4	Cm I	CO76
7187.901	13908.47		9	*9458* – 16645	3 – 3	Cm I	CO76
7208.827	13868.09		8	*0* – 7208	2 – 3	Cm I	CO76
7223.367	13840.18		9	*11641* – 18865	5 – 6	Cm I	CO76
7224.456	13838.09		3	*18009* – 25233	7 – 6	Cm I	CO76
7240.664	13807.12		4			Cm	CO76
7245.405	13798.08		8	*15546* – 22792	2 – 2	Cm I	CO76
7249.903	13789.52		9	*9064* – 16314	5 – 4	Cm I	CO76
7287.788	13717.84		3	*24951* – 32239	7 – 6	Cm I	CO76
7289.423	13714.76		7	*12534* – 19824	6 – 5	Cm I	CO76
7295.169	13703.96		3	17656 – *24951*	8 – 7	Cm I	CO76
7326.811	13644.77		9	*9671* – 16998	2 – 2	Cm I	CO76
7334.916	13629.70		3	*17656* – 24991	6 – 6	Cm I	CO76
7356.335	13590.01		9	*8958* – 16314	4 – 4	Cm I	CO76
7382.406	13542.02		6	*15924* – 23306	3 – 4	Cm I	CO76
7414.835	13482.79		6	15721 – *23136*	5 – 6	Cm I?	CO76
7414.835	13482.79		6	8144 – *15559*	4½ – 4½	Cm II?	CO76
7416.071	13480.55		9	*9064* – 16480	5 – 4	Cm I	CO76
7437.546	13441.62		7			Cm	CO76
7491.606	13344.63		9	*15300* – 22792	1 – 2	Cm I	CO76
7495.477	13337.74		3	9784 – *17280*	4 – 4	Cm I	CO76
7497.416	13334.29		4	*20762* – 28259	7 – 7	Cm I	CO76
7522.490	13289.84		9	*8958* – 16480	4 – 4	Cm I	CO76
7537.173	13263.95		8	*15546* – 23083	2 – 3	Cm I	CO76
7540.452	13258.18		9	*9458* – 16998	3 – 2	Cm I	CO76
7557.029	13229.10		8	*16915* – 24472	5 – 4	Cm I?	CO76
7557.029	13229.10		8	*25793* – 33350	5 – 4	Cm I?	CO76
7571.709	13203.45		7	*17656* – 25228	6 – 5	Cm I	CO76
7573.445	13200.42		7	*15719* – 23292	4 – 5	Cm I	CO76
7587.926	13175.23		6	*15719* – 23306	4 – 4	Cm I	CO76
7605.777	13144.31		3	*18009* – 25616	7 – 6	Cm I	CO76
7627.735	13106.47		7	*13720* – 21348	7 – 6	Cm I	CO76
7652.704	13063.71		6	*17047* – 24700	6 – 7	Cm I	CO76
7654.347	13060.90		8	*11641* – 19296	5 – 6	Cm I	CO76
7678.512	13019.80		6	9784 – *17463*	4 – 5	Cm I	CO76
7687.506	13004.57		9	*8958* – 16645	4 – 3	Cm I	CO76
7733.749	12926.81		7	*20762* – 28495	7 – 7	Cm I	CO76
7770.882	12865.04		6	*17463* – 25233	5 – 6	Cm I	CO76
7796.716	12822.41		3	*19741* – 27538	5 – 4	Cm I	CO76
7850.677	12734.28		8	1214 – *9064*	6 – 5	Cm I	CO76
7924.646	12615.41		6	*17656* – 25581	5 – 6	Cm I	CO76
7956.661	12564.65		7	*16516* – 24472	4 – 4	Cm I	CO76
7958.600	12561.59		6	*17656* – 25615	6 – 6	Cm I	CO76
8020.275	12465.00		9	*1764* – 9784	5 – 4	Cm I	CO76
8026.720	12454.99		9	*13720* – 21746	7 – 7	Cm I	CO76

Cm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8038.555	12436.65		4			Cm	CO76
8059.017	12405.07		4	*12534* – 20593	6 – 7	Cm I	CO76
8065.359	12395.32		3	*19059* – 27124	6 – 6	Cm I	CO76
8066.110	12394.16		9	*13720* – 21786	7 – 6	Cm I	CO76
8081.032	12371.28		4	*16915* – 24996	5 – 4	Cm I	CO76
8118.250	12314.56		6	*17463* – 25581	5 – 5	Cm I	CO76
8135.785	12288.02		6			Cm	CO76
8145.437	12273.46		3	*24129* – 32275	2 – 3	Cm I	CO76
8152.203	12263.27		5	*17463* – 25615	5 – 6	Cm I	CO76
8165.343	12243.54		3	16480 – *24646*	4 – 5	Cm I	CO76
8180.876	12220.29		4 W	*17047* – 25228	6 – 5	Cm I	CO76
8182.723	12217.53		6	*11641* – 19824	5 – 5	Cm I	CO76
8250.852	12116.65		5	*9064* – 17315	5 – 5	Cm I	CO76
8318.680	12017.86		9	*12534* – 20853	6 – 5	Cm I	CO76
8357.285	11962.34		5	*8958* – 17315	4 – 5	Cm I	CO76
8360.871	11957.21		4	*15719* – 24079	4 – 4	Cm I?	CO76
8360.871	11957.21		4	25001 – *33362*	5 – 6	Cm I?	CO76
8375.310	11936.60		7	*17463* – 25838	5 – 5	Cm I	CO76
8399.848	11901.73		6			Cm	CO76
8447.719	11834.28		9	*815* – 9263	4 – 3	Cm I	CO76
8480.665	11788.31		6	*16516* – 24996	4 – 4	Cm I	CO76
8485.960	11780.95		9	*12534* – 21020	6 – 5	Cm I	CO76
8539.028	11707.74		9	*11641* – 20180	5 – 4	Cm I	CO76
8548.379	11694.93		3	*15924* – 24472	3 – 4	Cm I	CO76
8555.461	11685.25		3	*20673* – 29229	4 – 4	Cm I	CO76
8586.051	11643.62		3	16932 – *25518*	7 – 6	Cm I	CO76
8687.642	11507.46		9	*10971* – 19658	4 – 3	Cm I	CO76
8712.071	11475.19		3	*16516* – 25228	4 – 5	Cm I	CO76
8753.899	11420.36		8	*15719* – 24472	4 – 4	Cm I	CO76
8784.555	11380.51		6	*19059* – 27843	6 – 5	Cm I	CO76
8790.871	11372.33		5	*17047* – 25838	6 – 5	Cm I	CO76
8797.477	11363.79		6	*20762* – 29559	7 – 6	Cm I	CO76
8811.273	11346.00		3			Cm	CO76
8813.034	11343.73		3	*12534* – 21348	6 – 6	Cm I	CO76
8827.198	11325.53		5			Cm	CO76
8853.234	11292.22		3	*10971* – 19824	4 – 5	Cm I	CO76
8895.147	11239.02		6	*13720* – 22615	7 – 7	Cm I	CO76
8961.222	11156.15		9	*302* – 9263	3 – 3	Cm I	CO76
8968.889	11146.61		9	*815* – 9784	4 – 4	Cm I	CO76
8974.032	11140.22		3	17036 – *26010*	6 – 7	Cm I	CO76
9049.392	11047.45		4	25287 – *34337*	2 – 3	Cm I	CO76
9067.976	11024.81		3	*20762* – 29830	7 – 6	Cm I	CO76
9067.976	11024.81		3	*23730* – 32798	4 – 3	Cm I	CO76
9072.383	11019.45		6	*15924* – 24996	3 – 4	Cm I	CO76
9172.271	10899.45		6	*11641* – 20813	5 – 4	Cm I	CO76
9173.947	10897.46		9	*10484* – 19658	3 – 3	Cm I	CO76
9209.538	10855.34		9	*10971* – 20180	4 – 4	Cm I	CO76
9211.233	10853.35		3	6347 – *15559*	5½ – 4½	Cm II	CO76
9211.983	10852.46		3	*11641* – 20853	5 – 4	Cm I	CO76
9212.016	10852.42		9	*12534* – 21746	6 – 7	Cm I	CO76
9233.297	10827.41		3	*24501* – 33734	5 – 6	Cm I	CO76
9246.874	10811.51		3			Cm	CO76
9251.408	10806.21		8	*12534* – 21786	6 – 6	Cm I	CO76
9263.373	10792.26		9	*0* – 9263	2 – 3	Cm I	CO76
9279.345	10773.68		3			Cm	CO76
9304.804	10744.20		3	9784 – *19089*	4 – 5	Cm I	CO76
9319.755	10726.97		3	*17463* – 26782	5 – 4	Cm I	CO76
9322.068	10724.30		4	*16516* – 25838	4 – 5	Cm I	CO76
9368.574	10671.07		3	*11641* – 21010	5 – 4	Cm I	CO76
9379.261	10658.91		9	*11641* – 21020	5 – 5	Cm I	CO76
9426.703	10605.27		3			Cm	CO76
9468.088	10558.91		3	*17656* – 27124	6 – 6	Cm I	CO76
9476.929	10549.06		5	*15546* – 25023	2 – 3	Cm I	CO76
9478.929	10546.83		4	*12534* – 22013	6 – 5	Cm I	CO76
9482.390	10542.99		9	*302* – 9784	3 – 4	Cm I	CO76
9509.309	10513.14		6	*15719* – 25228	4 – 5	Cm I	CO76

Cm—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9513.878	10508.09		9	*10144* – 19658	2 – 3	Cm I	CO76
9590.172	10424.49		8	*15110* – 24700	8 – 7	Cm I	CO76
9615.931	10396.57		7			Cm	CO76
9657.557	10351.76		8	*13720* – 23377	7 – 6	Cm I	CO76
9695.845	10310.88		8	*10484* – 20180	3 – 4	Cm I	CO76
9807.712	10193.27		3	15721 – *25529*	5 – 4	Cm I	CO76
9826.802	10173.47		6	*19059* – 28886	6 – 5	Cm I	CO76
9842.782	10156.96		6	*10971* – 20813	4 – 4	Cm I	CO76
9847.644	10151.94		4	*10144* – 19992	2 – 1	Cm I	CO76
9858.713	10140.54		4	*10133* – 19992	1 – 1	Cm I	CO76
9862.246	10136.91		4	*15719* – 25581	4 – 5	Cm I	CO76
9882.491	10116.14		6	*10971* – 20853	4 – 5	Cm I	CO76
9995.710	10001.56		4	*10144* – 20140	2 – 2	Cm I	CO76

Cm Reference

CO76 Conway, J. G., Blaise, J., and Vergès, J., Spectrochim. Acta **31B,** 31–47 (1976).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given

Dysprosium

Dy, Z = 66

Dy I Normal state of valence electrons $4f^{10}6s^2\ {}^5I_8$ I.P. = 47804 cm^{-1}

Dy II Normal state of valence electrons $4f^{10}({}^5I_8)6s(8, 1/2)_{17/2}$ I.P. = 94124 cm^{-1}

Dy

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8782.73	11382.863	0.02	1	*12007* – 20789	8 – 8	Dy I	CO71
8797.73	11363.454	0.02	1	*23877* – 32675	8 – 8	Dy I	CO71
8843.46	11304.711	0.02	1	*23832* – 32675	8 – 8	Dy I	CO71
8908.83	11221.742	0.02	10	*14625* – 23534	8 – 8	Dy I	CO71
8938.88	11184.020	0.02	30	*23736* – 32675	7 – 8	Dy I	CO71
8965.60	11150.687	0.02	3	*14625* – 23591	8 – 7	Dy I	CO71
9005.33	11101.498	0.02	10	*21616* – 30621	7 – 7	Dy I	CO71
9066.15	11027.020	0.02	1	*19092* – 28158	8 – 9	Dy I	CO71
9071.31	11020.761	0.02	1	29291 – *38362*	8 – 7	Dy I	CO71
9102.97	10982.424	0.02	0	*18857* – 27959	7 – 7	Dy I	CO71
9118.88	10963.260	0.02	0	*28177* – 37295	8 – 7	Dy I	CO71
9119.49	10962.527	0.02	0	*27834* – 36954	7 – 8	Dy I	CO71
9130.88	10948.852	0.02	1	*18857* – 27987	7 – 6	Dy I	CO71
9154.59	10920.489	0.02	1	*14625* – 23780	8 – 9	Dy I	CO71
9160.54	10913.401	0.02	1	*17687* – 26848	7 – 7	Dy I	CO71
9166.68	10906.090	0.02	3	*14367* – 23534	7 – 8	Dy I	CO71
9223.45	10838.967	0.02	10	*14367* – 23591	7 – 7	Dy I	CO71
9266.38	10788.746	0.02	3	*19092* – 28358	8 – 7	Dy I	CO71
9267.96	10786.905	0.02	1	*14512* – 23780	9 – 9	Dy I	CO71
9287.53	10764.178	0.02	3	28358 – *37646*	7 – 8	Dy I	CO71
9301.73	10747.744	0.02	1	*18172* – 27474	6 – 6	Dy I	CO71
9349.62	10692.698	0.02	1	9211 – *18561*	5 – 6	Dy I	CO71
9363.94	10676.337	0.02	10	14952 – *24316*	7½ – 8½	Dy II	CO71
9368.24	10671.444	0.02	0	*18528* – 27896	7 – 8	Dy I	CO71
9426.73	10605.228	0.02	1	*18561* – 27987	6 – 6	Dy I	CO71
9431.44	10599.928	0.02	10	*18528* – 27959	7 – 7	Dy I	CO71
9431.57	10599.790	0.02	10	*14367* – 23799	7 – 7	Dy I	CO71
9500.04	10523.389	0.02	0	15691 – *25192*	6½ – 7½	Dy II	CO71
9526.26	10494.426	0.02	1	*18433* – 27959	7 – 7	Dy I	CO71
9544.83	10474.004	0.02	1	26349 – *35894*	8 – 8	Dy I	CO71
9551.51	10466.683	0.02	100	7485 – *17036*	6½ – 7½	Dy II	CO71
9672.35	10335.911	0.02	3	*15194* – 24867	7 – 6	Dy I	CO71
9704.22	10301.973	0.02	100	*15194* – 24899	7 – 6	Dy I	CO71
9722.57	10282.533	0.02	1	*13495* – 23218	9 – 9	Dy I	CO71
9776.51	10225.793	0.02	3	*19688* – 29465	8 – 9	Dy I	CO71
9797.90	10203.471	0.02	0	*18528* – 28326	7 – 6	Dy I	CO71
9830.14	10170.012	0.02	3	*18528* – 28358	7 – 7	Dy I	CO71
9892.99	10105.396	0.02	3	*27319* – 37212	8 – 7	Dy I	CO71
9928.37	10069.385	0.02	3	*23877* – 33806	8 – 7	Dy I	CO71
9996.87	10000.392	0.02	1			Dy	CO71

Dy Reference

CO71 Conway, D., and Worden, E. F., J. Opt. Soc. Amer. **61**, 704–726 (1971).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 3.4 m Ebert spectrograph
Detector: Photographic

Fluorine

F, Z = 9

F I Normal state of valence electrons $2s^2 2p^5\ ^2P^\circ_{3/2}$ I.P. = 140524 cm^{-1}

F II Normal state of valence electrons $2s^2 2p^4\ ^3P_2$ I.P. = 282059 cm^{-1}

F

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8650.26	11557.17	0.05	50	*116987* – 125637	3½ – 2½	F I	LI49
8659.65	11544.65	0.05	20	*117622* – 126282	2½ – 1½	F I	LI49
8708.25	11480.22	0.05	12	*117872* – 126581	1½ – ½	F I	LI49
8713.19	11473.70	0.05	30	*117164* – 125877	2½ – 1½	F I	LI49
8758.61	11414.20	0.05	15	*117308* – 126067	1½ – ½	F I	LI49
9137.95	10940.37	0.05	40	*119081* – 128219	½ – 1½	F I	LI49
9150.97	10924.81	0.05	25	*118936* – 128087	1½ – 2½	F I	LI49
9185.89	10883.28	0.05	25	*118936* – 128122	1½ – 1½	F I	LI49
9203.62	10862.31	0.05	200	*118936* – 128140	1½ – 2½	F I	LI49
9283.00	10769.43	0.05	40	*118936* – 128219	1½ – 1½	F I	LI49
9438.25	10592.28	0.05	18	*119081* – 128520	½ – ½	F I	LI49
9441.43	10588.71	0.05	45	*119081* – 128523	½ – 1½	F I	LI49
9499.61	10523.86	0.02	2 L	278159 – *287658*	3 – 4	F II	PA68
9530.08	10490.21	0.05	10	*119081* – 128611	½ – 1½	F I	LI49
9537.97	10481.54	0.02	4 L	278159 – *287697*	3 – 4	F II	PA68
9580.35	10435.17	0.02	3 L	246682 – *256262*	2 – 1	F II	PA68
9583.34	10431.92	0.05	12	*118936* – 128520	1½ – ½	F I	LI49
9588.51	10426.29	0.05	60	*118936* – 128525	1½ – 2½	F I	LI49
9596.80	10417.29	0.05	70	*116040* – 125637	1½ – 2½	F I	LI49
9600.45	10413.32	0.02	2 L	246662 – *256262*	1 – 1	F II	PA68
9607.7	10405.5	0.02	1 L	246654 – *256262*	0 – 1	F II	PA68
9630.49	10380.84	0.05	70	*119081* – 128712	½ – 1½	F I	LI49
9675.13	10332.95	0.05	25	*118936* – 128611	1½ – 1½	F I	LI49
9693.90	10312.94	0.02	4 L	*236960* – 246654	1 – 0	F II	PA68
9701.15	10305.23	0.02	5 L	*236960* – 246662	1 – 1	F II	PA68
9712.67	10293.01	0.05	35	*118427* – 128140	1½ – 2½	F I	LI49
9717.44	10287.96	0.05	15	*118405* – 128122	½ – 1½	F I	LI49
9719.81	10285.45	0.05	150	*115917* – 125637	2½ – 2½	F I	LI49
9721.27	10283.90	0.02	6 L	*236960* – 246682	1 – 2	F II	PA68
9733.72	10270.75	0.05	40	*116143* – 125877	½ – 1½	F I	LI49
9757.33	10245.90	0.02	2 L	277902 – *287660*	2 – 3	F II	PA68
9761.06	10241.98	0.05	35	*118936* – 128697	1½ – 2½	F I	LI49
9766.14	10236.65	0.02	3 L	277892 – *287658*	3 – 4	F II	PA68
9767.65	10235.07	0.02	4 L	277881 – *287649*	4 – 5	F II	PA68
9775.53	10226.82	0.05	30	*118936* – 128712	1½ – 1½	F I	LI49
9779.66	10222.50	0.05	20	*118405* – 128184	½ – ½	F I	LI49
9792.05	10209.57	0.05	40	*118427* – 128219	1½ – 1½	F I	LI49
9814.56	10186.15	0.05	50	*118405* – 128219	½ – 1½	F I	LI49
9836.44	10163.50	0.05	30	*116040* – 125877	1½ – 1½	F I	LI49
9910.91	10087.13	0.05	60	*118427* – 128338	1½ – ½	F I	LI49
9923.65	10074.17	0.05	10	*116143* – 126067	½ – ½	F I	LI49
9933.45	10064.25	0.05	40	*118405* – 128338	½ – ½	F I	LI49
9941.6	10056.0	0.02	2 LD	288638 – *298580*		F II?	PA68
9941.6	10056.0	0.02	2 LD	288673 – *298615*		F II?	PA68
9944.73	10052.82	0.02	7 LD	254546 – *264491*		F II?	PA68
9949.52	10047.98	0.02	8 LD	254541 – *264490*		F II?	PA68
9959.39	10038.03	0.05	35	*115917* – 125877	2½ – 1½	F I	LI49

F References

LI49 Linden, K., Ark. Fys. **1**, 229–267 (1949)
Source: Hollow cathode
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

PA68 Palenius, H. P., Ark. Fys. **39**, 15–64 (1968).
Source: Sliding spark
Instrument: 3 m Czerny-Turner spectrograph
Detector: Photographic

Gadolinium

Gd, Z = 64

Gd I Normal state of valence electrons $4f^7 5d6s^2\ ^9D^\circ_2$ I.P. = 49530 cm^{-1}

Gd II Normal state of valence electrons $4f^7 5d6s\ ^{10}D^\circ_{5/2}$ I.P. = 97512 cm^{-1}

Gd III Normal state of valence electrons $4f^7 5d\ ^9D^\circ_2$ I.P. = 166391 cm^{-1}

Gd

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3900.33	25631.86	0.01	2	6334 – *10234*	2 – 2	Gd III	LI73
4181.333	23909.296	0.10	3 L	*15519* – 19700	4 – 5	Gd I	BL71
4224.76	23663.53	0.01	2	5789 – *10014*	3 – 3	Gd III	LI73
4375.570	22847.931	0.08	4 L	*21439* – 25815	5 – 6	Gd I?	BL71
4375.570	22847.931	0.08	4 L	*11685* – 16061	4 – 3	Gd I?	BL71
4444.55	22493.33	0.01	3	5789 – *10234*	3 – 2	Gd III	LI73
4468.321	22373.666	0.10	3 L	*21152* – 25621	4 – 4	Gd I	BL71
4510.312	22165.365	0.06	6 L	*11685* – 16195	4 – 4	Gd I	BL71
4624.629	21617.457	0.06	5 L	*17600* – 22225	5 – 4	Gd I	BL71
4702.51	21259.44	0.01	4	5015 – *9717*	4 – 4	Gd III	LI73
4767.320	20970.421	0.06	6 L	*12057* – 16824	5 – 4	Gd I	BL71
4767.919	20967.786	0.06	6 L	*21152* – 25920	4 – 4	Gd I	BL71
4785.708	20889.849	0.07	5 L	*17439* – 22225	4 – 4	Gd I	BL71
4811.506	20777.841	0.05	7 L	*17906* – 22718	6 – 5	Gd I	BL71
4828.494	20704.738	0.06	6 L	*12057* – 16885	5 – 5	Gd I	BL71
4832.319	20688.351	0.08	4 L	*12486* – 17318	7 – 6	Gd I	BL71
4850.367	20611.368	0.10	3 L			Gd	BL71
4861.510	20564.129	0.07	5 L	*20759* – 25621	3 – 4	Gd I	BL71
4889.248	20447.463	0.05	7 L	*17015* – 21905	6 – 5	Gd I	BL71
4946.085	20212.491	0.05	7 L	*21389* – 26335	6 – 5	Gd I	BL71
4958.131	20163.386	0.10	7 L	*23883* – 28841	7 – 6	Gd I	BL71
4960.879	20152.217	0.07	5 L	*24332* – 29293	8 – 7	Gd I	BL71
4971.650	20108.558	0.09	7 L	*23479* – 28450	6 – 5	Gd I	BL71
4972.220	20106.252	0.10	3 L	*17362* – 22334	3 – 2	Gd I	BL71
4972.887	20103.554	0.08	7 L	*12345* – 17318	6 – 6	Gd I	BL71
4983.383	20061.213	0.10	7 L	*20588* – 25571	5 – 4	Gd I	BL71
4996.029	20010.435	0.10	3 L	*19718* – 24714	4 – 3	Gd I	BL71
4999.55	19996.34	0.01	4	5015 – *10014*	4 – 3	Gd III	LI73
5002.201	19985.744	0.10	3 L	*17332* – 22334	2 – 2	Gd I	BL71
5011.075	19950.351	0.08	4 L	*13377* – 18389	5½ – 6½	Gd II	BL71
5025.604	19892.677	0.08	7 L	*22835* – 27861	4 – 3	Gd I	BL71
5032.907	19863.809	0.10	7 L	*20588* – 25621	5 – 4	Gd I	BL71
5040.387	19834.332	0.10	3 L	*23128* – 28168	5 – 4	Gd I	BL71
5053.240	19783.884	0.10	7 L	*21514* – 26568	7 – 6	Gd I	BL71
5057.810	19766.005	0.06	6 L	*22602* – 27660	3 – 2	Gd I	BL71
5072.642	19708.213	0.08	4 L	*19781* – 24854	7 – 6	Gd I	BL71
5081.529	19673.746	0.10	7 L	*19574* – 24655	3 – 2	Gd I	BL71
5130.707	19485.171	0.06	5 L	*19718* – 24849	4 – 4	Gd I	BL71
5138.910	19454.068	0.05	6 L	*11685* – 16824	4 – 4	Gd I	BL71
5140.133	19449.438	0.06	6 L	*16534* – 21674	5 – 4	Gd I	BL71
5140.729	19447.186	0.06	6 L	*19574* – 24714	3 – 3	Gd I	BL71
5144.483	19432.993	0.07	5 L	*20588* – 25732	5 – 5	Gd I	BL71
5159.448	19376.630	0.06	6 L	13926 – *19085*	4 – 5	Gd I	BL71
5161.119	19370.354	0.07	5 L	*20759* – 25920	3 – 4	Gd I	BL71
5200.062	19225.290	0.08	7 L	*11685* – 16885	4 – 5	Gd I	BL71
5220.244	19150.965	0.08	4 L			Gd	BL71
5225.487	19131.750	0.07	5 L	*21389* – 26615	6 – 5	Gd I	BL71
5231.182	19110.921	0.07	5 L	*22429* – 27660	2 – 2	Gd I	BL71
5231.504	19109.745	0.07	5 L	*17332* – 22563	2 – 3	Gd I	BL71
5234.723	19097.993	0.05	5 L	*11685* – 16920	4 – 3	Gd I	BL71
5246.462	19055.260	0.06	5 L	*16296* – 21543	4 – 3	Gd I	BL71
5261.692	19000.106	0.05	7 L	*12057* – 17318	5 – 6	Gd I?	BL71
5261.692	19000.106	0.05	7 L	*19592* – 24854	5 – 6	Gd I?	BL71
5275.414	18950.684	0.10	3 L	*19574* – 24849	3 – 4	Gd I	BL71

Gd—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5284.070	18919.640	0.07	5 L	*16165* – 21450	3 – 2	Gd I	BL71
5285.005	18916.291	0.08	3 L	*7234* – 12519	4 – 5	Gd I	BL71
5303.402	18850.673	0.08	4 L	*16078* – 21381	2 – 1	Gd I	BL71
5322.705	18782.311	0.08	5 L	*23128* – 28450	5 – 6	Gd I	BL71
5324.865	18774.692	0.08	4 L	*19718* – 25043	4 – 5	Gd I	BL71
5332.545	18747.653	0.08	4 L	*20588* – 25920	5 – 4	Gd I	BL71
5333.605	18743.926	0.08	5 L			Gd	BL71
5335.587	18736.964	0.08	5 L			Gd	BL71
5337.011	18731.963	0.10	3 L			Gd	BL71
5359.62	18652.95	0.01	2	3996 – *9356*	5 – 5	Gd III	LI73
5361.458	18646.550	0.08	4 L	*19682* – 25043	5 – 5	Gd I	BL71
5362.430	18643.172	0.08	4 L	*23479* – 28841	6 – 6	Gd I	BL71
5370.744	18614.312	0.10	7 L	*16534* – 21905	5 – 5	Gd I	BL71
5372.038	18609.827	0.10	7 L	*16078* – 21450	2 – 2	Gd I	BL71
5377.035	18592.533	0.08	4 L	*16165* – 21543	3 – 3	Gd I	BL71
5378.015	18589.147	0.10	7 L	*16296* – 21674	4 – 4	Gd I	BL71
5396.170	18526.603	0.10	5 L			Gd	BL71
5396.678	18524.858	0.08	4 L	*19062* – 24458	1 – 2	Gd I	BL71
5405.887	18493.303	0.10	3 L			Gd	BL71
5406.922	18489.762	0.10	3 L			Gd	BL71
5409.165	18482.095	0.07	5 L	*15972* – 21381	0 – 1	Gd I	BL71
5410.072	18478.996	0.10	7 L	*23883* – 29293	7 – 7	Gd I	BL71
5422.178	18437.740	0.10	4 L	*24332* – 29754	8 – 8	Gd I	BL71
5426.640	18422.577	0.08	4 L	*21439* – 26866	5 – 4	Gd I	BL71
5431.869	18404.843	0.06	5 L	*22429* – 27861	2 – 3	Gd I	BL71
5436.833	18388.040	0.05	6 L	*17015* – 22452	6 – 6	Gd I	BL71
5437.188	18386.839	0.06	6 L	*16012* – 21450	1 – 2	Gd I	BL71
5444.797	18361.144	0.10	3 L	*19014* – 24458	2 – 2	Gd I	BL71
5458.604	18314.701	0.08	4 L	*17362* – 22820	3 – 4	Gd I	BL71
5461.987	18303.357	0.06	5 L	*24332* – 29794	8 – 8	Gd I	BL71
5465.015	18293.215	0.08	4 L	*16078* – 21543	2 – 3	Gd I	BL71
5465.740	18290.791	0.08	4 L	*18993* – 24458	3 – 2	Gd I	BL71
5488.477	18215.017	0.10	3 L	*11830* – 17318	6 – 6	Gd I	BL71
5496.113	18189.711	0.10	3 L	*21544* – 27040	4 – 4	Gd I	BL71
5496.986	18186.821	0.10	3 L	*21544* – 27041	4 – 3	Gd I	BL71
5508.665	18148.262	0.08	4 L	*16165* – 21674	3 – 4	Gd I	BL71
5515.685	18125.165	0.08	4 L			Gd	BL71
5524.906	18094.913	0.08	4 L			Gd	BL71
5566.059	17961.127	0.08	4 L	*21514* – 27081	7 – 6	Gd I	BL71
5583.633	17904.598	0.10	8 L	*12486* – 18070	7 – 6	Gd I	BL71
5601.105	17848.745	0.10	3 L	*21439* – 27040	5 – 4	Gd I	BL71
5607.002	17829.973	0.10	3 L			Gd	BL71
5608.668	17824.678	0.10	3 L	*16296* – 21905	4 – 5	Gd I	BL71
5613.998	17807.755	0.08	4 L	*13076* – 18690	4½ – 5½	Gd II	BL71
5615.526	17802.908	0.08	4 L	*22835* – 28450	4 – 5	Gd I	BL71
5647.706	17701.469	0.08	4 L	13926 – *19574*	4 – 3	Gd I	BL71
5662.161	17656.278	0.10	3 L	*19718* – 25380	4 – 5	Gd I	BL71
5668.379	17636.912	0.08	8 L	*12345* – 18014	6 – 7	Gd I	BL71
5682.518	17593.028	0.08	4 L	*19978* – 25661	5 – 6	Gd I	BL71
5690.963	17566.921	0.15	3 L	*16534* – 22225	5 – 4	Gd I	BL71
5691.439	17565.451	0.15	3 L	*16165* – 21857	3 – 3	Gd I?	BL71
5691.439	17565.451	0.15	3 L	*15758* – 21450	1 – 2	Gd I?	BL71
5691.439	17565.451	0.15	3 L	*21389* – 27081	6 – 6	Gd I?	BL71
5693.854	17558.001	0.08	4 L	*16758* – 22452	7 – 6	Gd I	BL71
5709.289	17510.534	0.10	3 L	*15833* – 21543	4 – 3	Gd I	BL71
5713.433	17497.832	0.08	4 L	*23128* – 28841	5 – 6	Gd I?	BL71
5713.433	17497.832	0.08	4 L	*21152* – 26866	4 – 4	Gd I?	BL71
5720.97	17474.78	0.01	10	3996 – *9717*	5 – 4	Gd III	LI73
5724.216	17464.871	0.10	3 L	*12345* – 18070	6 – 6	Gd I	BL71
5737.612	17424.095	0.07	5 L	*12345* – 18083	6 – 5	Gd I	BL71
5745.784	17399.313	0.08	4 L	*19507* – 25253	4 – 3	Gd I	BL71
5771.382	17322.140	0.10	3 L	*17332* – 23103	2 – 1	Gd I	BL71
5776.797	17305.903	0.06	6 L	*20324* – 26101	4 – 3	Gd I	BL71
5784.800	17281.961	0.08	4 L	*15758* – 21543	3 – 3	Gd I	BL71
5792.417	17259.236	0.08	4 L	13926 – *19718*	4 – 4	Gd I	BL71
5809.239	17209.258	0.15	3 L	17318 – *23128*	6 – 5	Gd I	BL71

Gd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5814.357	17194.110	0.10	3 L	*23479* – 29293	6 – 7	Gd I	BL71
5821.894	17171.851	0.10	3 L	*21514* – 27336	7 – 6	Gd I	BL71
5827.761	17154.563	0.10	3 L	*21647* – 27475	3 – 3	Gd I	BL71
5837.247	17126.687	0.07	5 L	*19022* – 24860	4 – 3	Gd I	BL71
5852.795	17081.188	0.08	4 L	*17362* – 23215	3 – 2	Gd I	BL71
5863.439	17050.180	0.06	6 L	*20588* – 26451	5 – 4	Gd I	BL71
5866.830	17040.325	0.08	4 L	*18993* – 24860	3 – 3	Gd I	BL71
5867.583	17038.140	0.08	4 L	23999 – *29867*	5 – 6	Gd I	BL71
5869.046	17033.891	0.08	4 L	18014 – *23883*	7 – 7	Gd I	BL71
5871.344	17027.225	0.10	3 L	*7562* – 13433	2 – 3	Gd I	BL71
5873.315	17021.511	0.08	5 L	*12057* – 17930	5 – 4	Gd I	BL71
5903.037	16935.808	0.08	4 L	*19085* – 24988	5 – 4	Gd I	BL71
5911.229	16912.337	0.10	3 L	*23883* – 29794	7 – 8	Gd I	BL71
5916.388	16897.588	0.08	4 L	*12057* – 17973	5 – 4	Gd I?	BL71
5916.388	16897.588	0.08	4 L	*15758* – 21674	3 – 4	Gd I?	BL71
5918.289	16892.161	0.08	4 L	*16534* – 22452	5 – 6	Gd I	BL71
5928.860	16862.043	0.07	5 L	*16296* – 22225	4 – 4	Gd I	BL71
5930.993	16855.979	0.07	5 L	*21544* – 27475	4 – 3	Gd I	BL71
5933.442	16849.022	0.10	3 L	7992 – *13925*	6½ – 6½	Gd II	BL71
5934.595	16845.748	0.10	3 L	*19403* – 25337	2 – 2	Gd I	BL71
5942.054	16824.602	0.10	3 L	*19978* – 25920	5 – 4	Gd I	BL71
5949.635	16803.165	0.08	4 L	16885 – *22835*	5 – 4	Gd I	BL71
5972.084	16740.001	0.10	3 L	*23479* – 29451	6 – 5	Gd I?	BL71
5972.084	16740.001	0.10	3 L	*27258* – 33231	5 – 5	Gd I?	BL71
5973.502	16736.026	0.08	4 L	17909 – *23883*	8 – 7	Gd I	BL71
5977.072	16726.032	0.10	3 L	*19375* – 25352	1 – 1	Gd I	BL71
5979.912	16718.088	0.10	3 L	*20588* – 26568	5 – 6	Gd I	BL71
5990.935	16687.328	0.08	4 L	*21745* – 27736	2 – 2	Gd I?	BL71
5990.935	16687.328	0.08	4 L	*19361* – 25352	0 – 1	Gd I?	BL71
6003.925	16651.221	0.10	3 L			Gd	BL71
6007.059	16642.536	0.07	5 L	*7426* – 13433	3 – 3	Gd I	BL71
6013.002	16626.087	0.10	7 L	*12057* – 18070	5 – 6	Gd I?	BL71
6013.002	16626.087	0.10	7 L	*19718* – 25732	4 – 5	Gd I?	BL71
6023.617	16596.788	0.10	3 L	*15833* – 21857	4 – 3	Gd I	BL71
6026.409	16589.099	0.08	4 L	*12057* – 18083	5 – 5	Gd I	BL71
6027.518	16586.046	0.08	4 L	*17362* – 23389	3 – 3	Gd I	BL71
6036.832	16560.457	0.07	5 L	*10883* – 16920	4 – 3	Gd I	BL71
6052.406	16517.842	0.15	3 L	13926 – *19978*	4 – 5	Gd I	BL71
6059.477	16498.568	0.10	3 L	*16165* – 22225	3 – 4	Gd I	BL71
6065.028	16483.468	0.10	3 L	*21815* – 27880	1 – 1	Gd I	BL71
6071.470	16465.977	0.10	3 L	*15833* – 21905	4 – 5	Gd I	BL71
6079.272	16444.845	0.08	4 L	*7426* – 13506	3 – 4	Gd I	BL71
6080.583	16441.301	0.08	4 L			Gd	BL71
6088.669	16419.467	0.06	5 L	*21647* – 27736	3 – 2	Gd I	BL71
6097.630	16395.336	0.06	6 L	*20299* – 26397	3 – 2	Gd I	BL71
6099.138	16391.281	0.08	4 L	*15758* – 21857	3 – 3	Gd I	BL71
6112.488	16355.482	0.08	4 L			Gd	BL71
6126.996	16316.756	0.06	5 L	*20324* – 26451	4 – 4	Gd I	BL71
6127.439	16315.576	0.10	3 L			Gd	BL71
6134.211	16297.562	0.08	4 L	*21815* – 27949	1 – 0	Gd I	BL71
6135.015	16295.426	0.06	5 L	*21745* – 27880	2 – 1	Gd I	BL71
6140.112	16281.899	0.10	3 L	13433 – *19574*	3 – 3	Gd I	BL71
6151.850	16250.834	0.08	4 L	*20299* – 26451	3 – 4	Gd I	BL71
6160.255	16228.661	0.07	5 L	17318 – *23479*	6 – 6	Gd I	BL71
6180.399	16175.766	0.07	5 L	*17015* – 23196	6 – 5	Gd I	BL71
6182.120	16171.264	0.08	4 L	*21389* – 27571	6 – 5	Gd I	BL71
6183.754	16166.989	0.08	4 L	*16534* – 22718	5 – 5	Gd I	BL71
6198.881	16127.538	0.05	7 L	*7234* – 13433	4 – 2	Gd I	BL71
6204.346	16113.333	0.08	4 L	*17439* – 23644	4 – 4	Gd I	BL71
6204.994	16111.649	0.10	3 L	*27026* – 33231	4 – 5	Gd I	BL71
6213.300	16090.111	0.07	5 L	*17015* – 23229	6 – 6	Gd I	BL71
6219.998	16072.786	0.08	4 L			Gd	BL71
6228.236	16051.526	0.08	4 L	*19592* – 25820	5 – 4	Gd I	BL71
6236.012	16031.509	0.08	4 L	*15989* – 22225	5 – 4	Gd I	BL71
6239.815	16021.739	0.07	5 L	*19014* – 25253	2 – 3	Gd I?	BL71
6239.815	16021.739	0.07	5 L	*11830* – 18070	6 – 6	Gd I?	BL71

Gd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6242.437	16015.010	0.10	3 L	16885 – *23128*	5 – 5	Gd I	BL71
6244.864	16008.786	0.10	3 L	*11685* – 17930	4 – 4	Gd I	BL71
6253.180	15987.496	0.10	7 L	*11830* – 18083	6 – 5	Gd I	BL71
6267.161	15951.830	0.10	3 L	*16296* – 22563	4 – 3	Gd I	BL71
6271.081	15941.858	0.10	3 L	*7234* – 13506	4 – 4	Gd I	BL71
6284.867	15906.889	0.08	4 L	13433 – *19718*	3 – 4	Gd I	BL71
6286.325	15903.201	0.08	4 L	*16534* – 22820	5 – 4	Gd I	BL71
6295.674	15879.584	0.07	5 L	*19850* – 26145	8 – 7	Gd I	BL71
6312.476	15837.316	0.08	4 L	*20303* – 26616	2 – 1	Gd I	BL71
6318.242	15822.863	0.08	4 L	18014 – *24332*	7 – 8	Gd I	BL71
6338.246	15772.926	0.05	7 L	*15519* – 21857	4 – 3	Gd I	BL71
6341.653	15764.452	0.08	4 L	*21389* – 27731	5 – 5	Gd I	BL71
6343.928	15758.799	0.08	4 L	*10576* – 16920	3 – 3	Gd I	BL71
6346.912	15751.390	0.08	4 L	*10576* – 16923	3 – 2	Gd I	BL71
6364.246	15708.488	0.10	3 L	*19781* – 26145	7 – 7	Gd I	BL71
6367.901	15699.473	0.07	5 L	16061 – *22429*	3 – 2	Gd I	BL71
6369.446	15695.663	0.08	4 L	*15173* – 21543	3 – 3	Gd I	BL71
6386.126	15654.667	0.08	4 L	*15519* – 21905	4 – 5	Gd I	BL71
6391.704	15641.006	0.08	4 L	*15833* – 22225	4 – 4	Gd I	BL71
6398.002	15625.611	0.06	7 L	*11685* – 18083	4 – 5	Gd I	BL71
6399.039	15623.078	0.08	4 L	*17600* – 23999	5 – 5	Gd I	BL71
6406.001	15606.100	0.06	5 L	*20324* – 26730	4 – 3	Gd I	BL71
6406.542	15604.781	0.08	4 L	16195 – *22602*	4 – 3	Gd I	BL71
6422.740	15565.427	0.06	6 L	17909 – *24332*	8 – 8	Gd I	BL71
6426.914	15555.316	0.10	3 L	*20303* – 26730	2 – 3	Gd I	BL71
6430.825	15545.857	0.08	4 L	*20299* – 26730	3 – 3	Gd I	BL71
6435.335	15534.961	0.08	4 L	*20306* – 26742	1 – 0	Gd I	BL71
6470.308	15450.992	0.05	7 L	*16758* – 23229	7 – 6	Gd I	BL71
6473.239	15443.996	0.10	3 L			Gd	BL71
6480.776	15426.036	0.10	3 L			Gd	BL71
6485.279	15415.326	0.08	4 L	*12691* – 19876	3½ – 4½	Gd II	BL71
6489.452	15405.412	0.06	6 L	*16228* – 22718	6 – 5	Gd I	BL71
6492.979	15397.043	0.10	3 L			Gd	BL71
6499.556	15381.464	0.08	4 L	*7426* – 13926	3 – 4	Gd I	BL71
6501.043	15377.944	0.08	4 L	*15173* – 21674	3 – 4	Gd I	BL71
6504.779	15369.113	0.06	6 L	*15720* – 22225	5 – 4	Gd I	BL71
6541.270	15283.375	0.15	3 L	16061 – *22602*	3 – 3	Gd I	BL71
6563.428	15231.778	0.05	7 L	*10359* – 16923	2 – 2	Gd I	BL71
6564.518	15229.250	0.10	3 L	17318 – *23883*	6 – 7	Gd I	BL71
6575.808	15203.103	0.08	4 L	*20306* – 26882	1 – 2	Gd I?	BL71
6575.808	15203.103	0.08	4 L	*15758* – 22334	1 – 2	Gd I?	BL71
6576.177	15202.249	0.10	3 L	*15758* – 22334	3 – 2	Gd I	BL71
6579.013	15195.696	0.08	4 L	*20303* – 26882	2 – 2	Gd I	BL71
6589.565	15171.363	0.08	4 L	*19978* – 26568	5 – 6	Gd I	BL71
6593.478	15162.358	0.10	3 L	16885 – *23479*	5 – 6	Gd I	BL71
6633.990	15069.766	0.10	7 L	*11296* – 17930	5 – 4	Gd I	BL71
6647.016	15040.235	0.10	3 L	*19085* – 25732	5 – 5	Gd I	BL71
6647.626	15038.854	0.06	6 L	*6786* – 13433	4 – 3	Gd I	BL71
6648.266	15037.406	0.10	3 L	*20306* – 26955	1 – 1	Gd I	BL71
6678.729	14968.817	0.06	6 L	*11830* – 18509	6 – 5	Gd I	BL71
6683.792	14957.478	0.07	7 L	*15173* – 21857	3 – 3	Gd I	BL71
6691.362	14940.557	0.07	7 L	*7234* – 13926	4 – 4	Gd I?	BL71
6691.362	14940.557	0.07	7 L	*7562* – 14253	2 – 3	Gd I?	BL71
6701.099	14918.849	0.08	4 L	*10222* – 16923	1 – 2	Gd I	BL71
6704.190	14911.970	0.10	3 L	16775 – *23479*	7 – 6	Gd I	BL71
6728.815	14857.398	0.08	4 L	*15989* – 22718	5 – 5	Gd I	BL71
6729.972	14854.843	0.10	3 L	*15833* – 22563	4 – 3	Gd I	BL71
6734.206	14845.504	0.10	7 L	*10883* – 17617	4 – 3	Gd I	BL71
6739.575	14833.677	0.08	4 L	*19507* – 26247	4 – 3	Gd I	BL71
6748.416	14814.244	0.08	4 L	*23128* – 29876	5 – 5	Gd I	BL71
6753.550	14802.982	0.10	3 L	*17906* – 24660	6 – 5	Gd I	BL71
6763.041	14782.207	0.07	5 L	*23479* – 30242	6 – 5	Gd I	BL71
6768.494	14770.298	0.07	5 L	*23883* – 30652	7 – 6	Gd I	BL71
6787.14	14729.705	0.06	7 L	*11296* – 18083	5 – 5	Gd I	BL71
6795.778	14710.997	0.10	3 L	*22835* – 29631	4 – 3	Gd I	BL71
6802.034	14697.469	0.10	3 L	*19445* – 26247	3 – 3	Gd I	BL71

Gd—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6804.358	14692.447	0.10	7 L	*10576* – 17380	3 – 2	Gd I	BL71
6805.500	14689.983	0.07	6 L	*15758* – 22563	3 – 3	Gd I	BL71
6813.755	14672.186	0.08	4 L	*24332* – 31146	8 – 7	Gd I	BL71
6818.958	14660.991	0.07	5 L	*15744* – 22563	2 – 3	Gd I	BL71
6822.836	14652.657	0.05	7 L	*7103* – 13926	5 – 4	Gd I	BL71
6829.508	14638.343	0.10	3 L	*17600* – 24430	5 – 6	Gd I	BL71
6831.374	14634.343	0.10	3 L	*15989* – 22820	5 – 4	Gd I	BL71
6835.059	14626.455	0.08	4 L	*19085* – 25920	5 – 5	Gd I	BL71
6838.910	14618.218	0.10	3 L	*24332* – 31171	8 – 8	Gd I	BL71
6868.001	14556.299	0.07	7 L	*10359* – 17227	2 – 1	Gd I	BL71
6883.384	14523.768	0.10	7 L	*6550* – 13433	3 – 3	Gd I	BL71
6896.280	14496.609	0.10	3 L	*19718* – 26615	4 – 5	Gd I	BL71
6911.670	14464.330	0.10	7 L	*10883* – 17795	4 – 3	Gd I	BL71
6932.885	14420.067	0.10	3 L	*19682* – 26615	6 – 5	Gd I	BL71
6949.749	14385.078	0.06	6 L	*6976* – 13926	5 – 4	Gd I	BL71
6967.562	14348.300	0.06	5 L	*16228* – 23196	6 – 5	Gd I	BL71
6975.06	14332.88	0.01	25	2381 – *9356*	6 – 5	Gd III	LI73
6987.062	14308.256	0.06	6 L	*15833* – 22820	4 – 4	Gd I	BL71
6993.429	14295.230	0.06	6 L	*12486* – 19480	7 – 6	Gd I	BL71
6997.537	14286.837	0.05	7 L	*15720* – 22718	5 – 5	Gd I	BL71
7000.403	14280.988	0.08	4 L	*16228* – 23229	6 – 6	Gd I	BL71
7005.689	14270.213	0.10	7 L	*10222* – 17227	1 – 1	Gd I	BL71
7022.533	14235.984	0.10	3 L	*19592* – 26615	5 – 5	Gd I	BL71
7028.699	14223.495	0.06	4 L	*22602* – 29631	3 – 3	Gd I	BL71
7041.266	14198.110	0.06	5 L	*10576* – 17617	3 – 3	Gd I	BL71
7044.671	14191.247	0.06	6 L	*15519* – 22563	4 – 3	Gd I	BL71
7046.967	14186.624	0.08	7 L	*10883* – 17930	4 – 4	Gd I	BL71
7051.870	14176.760	0.08	7 L	*15173* – 22225	3 – 4	Gd I	BL71
7055.672	14169.120	0.08	7 L	*6378* – 13433	2 – 3	Gd I	BL71
7062.577	14155.268	0.10	3 L	*15758* – 22820	3 – 4	Gd I	BL71
7074.368	14131.675	0.10	3 L	*19850* – 26924	8 – 7	Gd I	BL71
7090.051	14100.416	0.05	7 L	*10883* – 17973	4 – 4	Gd I	BL71
7100.154	14080.353	0.10	3 L	*15720* – 22820	5 – 4	Gd I	BL71
7107.577	14065.646	0.08	7 L	*12057* – 19164	5 – 4	Gd I	BL71
7108.348	14064.122	0.08	4 L	*18993* – 26101	3 – 3	Gd I	BL71
7134.064	14013.425	0.08	4 L	*12345* – 19480	6 – 6	Gd I	BL71
7140.095	14001.588	0.05	7 L	*6786* – 13926	4 – 4	Gd I	BL71
7158.590	13965.413	0.06	6 L	*10222* – 17380	1 – 2	Gd I	BL71
7173.573	13936.244	0.06	6 L	*10576* – 17749	3 – 2	Gd I	BL71
7179.414	13924.907	0.06	6 L	*12345* – 19525	6 – 5	Gd I	BL71
7199.115	13886.800	0.07	5 L	*15519* – 22718	4 – 5	Gd I	BL71
7200.130	13884.842	0.06	5 L	*10883* – 18083	4 – 5	Gd I	BL71
7206.944	13871.715	0.08	4 L	*15989* – 23196	5 – 5	Gd I	BL71
7212.692	13860.660	0.05	7 L	*11296* – 18509	5 – 5	Gd I?	BL71
7212.692	13860.660	0.05	7 L	*19375* – 26588	1 – 2	Gd I?	BL71
7218.822	13848.889	0.05	7 L	*10576* – 17795	3 – 3	Gd I	BL71
7257.889	13774.344	0.08	6 L	*10359* – 17617	2 – 3	Gd I	BL71
7273.983	13743.868	0.08	4 L	*19592* – 26866	5 – 4	Gd I?	BL71
7273.983	13743.868	0.08	4 L	*22602* – 29876	3 – 4	Gd I?	BL71
7275.979	13740.098	0.08	4 L	*22602* – 29878	3 – 3	Gd I	BL71
7354.072	13594.191	0.08	4 L	*10576* – 17930	3 – 4	Gd I	BL71
7354.587	13593.240	0.10	3 L	*12345* – 19700	6 – 5	Gd I	BL71
7358.393	13586.209	0.10	3 L	*19507* – 26866	4 – 4	Gd I	BL71
7362.604	13578.439	0.10	3 L	*15833* – 23196	4 – 5	Gd I	BL71
7365.976	13572.223	0.08	4 L	*19085* – 26451	5 – 4	Gd I	BL71
7375.850	13554.052	0.07	5 L	*6550* – 13926	3 – 4	Gd I	BL71
7390.058	13527.995	0.06	6 L	*10359* – 17749	3 – 2	Gd I	BL71
7397.171	13514.985	0.06	6 L	*10576* – 17973	3 – 4	Gd I	BL71
7416.942	13478.959	0.07	5 L	*19718* – 27135	4 – 3	Gd I	BL71
7422.831	13468.267	0.10	3 L	*12057* – 19480	5 – 6	Gd I	BL71
7429.015	13457.055	0.10	3 L	*19022* – 26451	4 – 4	Gd I	BL71
7435.340	13445.607	0.05	7 L	*10359* – 17795	3 – 3	Gd I	BL71
7446.475	13425.501	0.10	3 L	*19978* – 27425	5 – 4	Gd I	BL71
7469.557	13384.015	0.10	3 L	*17906* – 25376	6 – 7	Gd I	BL71
7475.691	13373.033	0.07	6 L	*15720* – 23196	5 – 5	Gd I	BL71
7479.173	13366.806	0.08	7 L	*11685* – 19164	4 – 4	Gd I	BL71

Gd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7485.566	13355.392	0.05	7 L	*6550* – 14036	3 – 2	Gd I	BL71
7512.102	13308.213	0.05	7 L	*6786* – 14298	4 – 3	Gd I	BL71
7527.720	13280.603	0.05	7 L	*10222* – 17749	1 – 2	Gd I?	BL71
7527.720	13280.603	0.05	7 L	*17332* – 24860	2 – 3	Gd I?	BL71
7533.730	13270.008	0.10	3 L	*19507* – 27041	4 – 3	Gd I	BL71
7555.308	13232.109	0.08	4 L	*19781* – 27336	7 – 6	Gd I	BL71
7565.706	13213.923	0.08	7 L	*7103* – 14669	5 – 4	Gd I	BL71
7596.200	13160.877	0.10	3 L	*19445* – 27041	3 – 3	Gd I	BL71
7625.664	13110.027	0.06	6 L	*10883* – 18509	4 – 5	Gd I	BL71
7633.665	13096.286	0.10	3 L	*19682* – 27315	6 – 5	Gd I	BL71
7644.353	13077.975	0.05	7 L	*17015* – 24660	6 – 5	Gd I	BL71
7647.225	13073.064	0.10	3 L	*15173* – 22820	3 – 4	Gd I	BL71
7649.582	13069.036	0.06	6 L	*20565* – 28215	2 – 3	Gd I?	BL71
7649.582	13069.036	0.06	6 L	*11830* – 19480	6 – 6	Gd I?	BL71
7657.837	13054.940	0.06	8 L	*6378* – 14036	2 – 2	Gd I	BL71
7661.446	13048.797	0.10	3 L	15174 – *22835*	5 – 4	Gd I	BL71
7673.556	13028.204	0.06	6 L	*12486* – 20160	7 – 6	Gd I	BL71
7677.192	13022.035	0.08	4 L	*15519* – 23196	4 – 5	Gd I	BL71
7692.606	12995.941	0.08	4 L	*6976* – 14669	5 – 4	Gd I	BL71
7693.612	12994.242	0.07	8 L	*7480* – 15174	6 – 5	Gd I	BL71
7694.970	12991.948	0.05	7 L	*11830* – 19525	6 – 5	Gd I	BL71
7715.607	12957.199	0.10	3 L	*19403* – 27118	2 – 2	Gd I	BL71
7723.311	12944.275	0.10	3 L	*19592* – 27315	5 – 5	Gd I	BL71
7747.880	12903.228	0.06	5 L	*6550* – 14298	3 – 4	Gd I	BL71
7814.158	12793.785	0.06	6 L	*12345* – 20160	6 – 6	Gd I	BL71
7833.224	12762.645	0.10	3 L			Gd	BL71
7839.744	12752.030	0.07	5 L	*11685* – 19525	4 – 5	Gd I	BL71
7851.218	12733.393	0.10	3 L	*19574* – 27425	3 – 4	Gd I	BL71
7868.288	12705.770	0.08	4 L	*11296* – 19164	5 – 4	Gd I	BL71
7882.944	12682.147	0.06	6 L	*6786* – 14669	4 – 4	Gd I	BL71
7904.936	12646.864	0.06	6 L	*7947* – 15852	7 – 6	Gd I	BL71
7920.132	12622.600	0.05	7 L	*6378* – 14298	2 – 3	Gd I	BL71
7933.400	12601.488	0.10	3 L	14669 – *22602*	4 – 3	Gd I	BL71
7947.544	12579.063	0.06	7 L	*12486* – 20434	7 – 7	Gd I	BL71
8010.440	12480.295	0.08	4 L	*15989* – 23999	5 – 5	Gd I	BL71
8014.956	12473.262	0.06	7 L	*11685* – 19700	4 – 5	Gd I	BL71
8031.222	12447.999	0.05	7 L	15852 – *23883*	6 – 7	Gd I	BL71
8049.049	12420.430	0.06	7 L	*19682* – 27731	6 – 5	Gd I	BL71
8070.552	12387.338	0.07	5 L	*7103* – 15174	5 – 5	Gd I	BL71
8094.195	12351.153	0.08	4 L			Gd	BL71
8102.914	12337.863	0.06	6 L	*12057* – 20160	5 – 6	Gd I	BL71
8112.455	12323.353	0.10	3 L	*19592* – 27704	5 – 4	Gd I	BL71
8118.686	12313.894	0.06	6 L	*6550* – 14669	3 – 4	Gd I	BL71
8130.891	12295.411	0.10	3 L	*19574* – 27704	3 – 4	Gd I?	BL71
8130.891	12295.411	0.10	3 L	14298 – *22429*	3 – 2	Gd I?	BL71
8138.680	12283.643	0.10	3 L	*19592* – 27731	5 – 5	Gd I	BL71
8183.525	12216.330	0.10	5 L	*11296* – 19480	5 – 6	Gd I	BL71
8185.058	12214.041	0.06	6 L	*7480* – 15665	6 – 5	Gd I	BL71
8197.452	12195.575	0.08	4 L	*6976* – 15174	5 – 5	Gd I	BL71
8201.552	12189.479	0.10	3 L	*16228* – 24430	6 – 6	Gd I	BL71
8228.882	12148.994	0.10	3 L	*11296* – 19525	5 – 5	Gd I	BL71
8276.571	12078.993	0.10	3 L	*8498* – 16775	8 – 7	Gd I	BL71
8281.259	12072.155	0.08	4 L	*10883* – 19164	4 – 4	Gd I	BL71
8305.193	12037.365	0.08	4 L	15174 – *23479*	5 – 6	Gd I	BL71
8329.747	12001.881	0.06	6 L	*11830* – 20160	6 – 6	Gd I	BL71
8371.824	11941.560	0.10	7 L	*7480* – 15852	6 – 6	Gd I	BL71
8387.780	11918.844	0.10	7 L	*6786* – 15174	4 – 5	Gd I	BL71
8393.178	11911.179	0.10	3 L	14036 – *22429*	2 – 2	Gd I	BL71
8404.148	11895.631	0.06	6 L	*11296* – 19700	5 – 5	Gd I	BL71
8454.372	11824.963	0.06	5 L	*16534* – 24988	5 – 4	Gd I	BL71
8459.092	11818.365	0.06	6 L	14669 – *23128*	4 – 5	Gd I	BL71
8498.825	11763.112	0.10	3 L	*7562* – 16061	2 – 3	Gd I	BL71
8516.340	11738.921	0.08	4 L			Gd	BL71
8537.160	11710.291	0.08	4 L	14298 – *22835*	3 – 4	Gd I	BL71
8562.011	11676.302	0.06	6 L	*7103* – 15665	5 – 5	Gd I	BL71
8566.604	11670.042	0.10	3 L			Gd	BL71

Gd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8603.733	11619.681	0.08	4 L	*11830* – 20434	6 – 7	Gd I	BL71
8623.886	11592.527	0.06	6 L	*10883* – 19507	4 – 4	Gd I	BL71
8634.569	11578.184	0.06	5 L	*7426* – 16061	3 – 3	Gd I	BL71
8654.339	11551.735	0.05	7 L	*19850* – 28504	8 – 7	Gd I	BL71
8689.023	11505.624	0.10	3 L	*6976* – 15665	5 – 5	Gd I	BL71
8692.297	11501.290	0.08	4 L	*16296* – 24988	4 – 4	Gd I	BL71
8716.913	11468.811	0.10	3 L	*17015* – 25732	5 – 5	Gd I	BL71
8748.843	11426.955	0.07	7 L	*7103* – 15852	5 – 6	Gd I	BL71
8754.217	11419.940	0.08	4 L	*10576* – 19330	3 – 2	Gd I	BL71
8817.097	11338.497	0.06	6 L	*10883* – 19700	4 – 5	Gd I	BL71
8826.362	11326.595	0.08	4 L	*7234* – 16061	4 – 3	Gd I	BL71
8827.731	11324.839	0.06	7 L	*7947* – 16775	7 – 7	Gd I	BL71
8869.567	11271.421	0.10	3 L	12519 – *21389*	5 – 6	Gd I	BL71
8875.780	11263.531	0.06	5 L	*6976* – 15852	5 – 6	Gd I	BL71
8879.252	11259.126	0.06	5 L	*6786* – 15665	4 – 5	Gd I	BL71
8925.619	11200.637	0.10	3 L	*10359* – 19285	2 – 1	Gd I	BL71
8930.957	11193.943	0.06	5 L	*10576* – 19507	3 – 4	Gd I	BL71
8957.227	11161.113	0.10	3 L	*16296* – 25253	4 – 3	Gd I	BL71
8961.067	11156.330	0.08	4 L	*7234* – 16195	4 – 4	Gd I	BL71
8963.105	11153.793		0	11084 – *20047*	3½ – 3½	Gd II	SP70
9039.952	11058.977	0.07	5 L	*10359* – 19399	2 – 3	Gd I	BL71
9086.688	11002.096	0.15	3 L	*16078* – 25164	2 – 2	Gd I	BL71
9087.779	11000.776	0.20	3 L	*16165* – 25253	3 – 3	Gd I	BL71
9092.570	10994.979	0.06	7 L	*7103* – 16195	5 – 4	Gd I	BL71
9108.399	10975.871	0.08	4 L	*10222* – 19330	1 – 2	Gd I	BL71
9109.435	10974.624		0	10292 – *19401*	4½ – 4½	Gd II	SP70
9171.764	10900.042	0.10	3 L	*16165* – 25337	3 – 2	Gd I	BL71
9219.470	10843.640	0.05	7 L	*6976* – 16195	5 – 4	Gd I	BL71
9259.773	10796.444	0.15	3 L	*16078* – 25337	2 – 2	Gd I	BL71
9269.430	10785.195	0.06	6 L	*7653* – 16923	1 – 2	Gd I?	BL71
9269.430	10785.195	0.06	6 L	*20565* – 29835	2 – 2	Gd I?	BL71
9275.045	10778.669	0.06	6 L	*16296* – 25571	4 – 4	Gd I?	BL71
9275.045	10778.669	0.06	6 L	*6786* – 16061	4 – 3	Gd I?	BL71
9294.685	10755.890	0.06	6 L	*7480* – 16775	6 – 7	Gd I	BL71
9330.357	10714.768	0.08	4 L	*15519* – 24849	4 – 4	Gd I	BL71
9339.869	10703.856	0.08	4 L	*16012* – 25352	1 – 1	Gd I	BL71
9357.950	10683.175	0.06	5 L	*7562* – 16920	2 – 3	Gd I	BL71
9360.984	10679.719	0.06	6 L	*7562* – 16923	2 – 2	Gd I	BL71
9371.645	10667.565	0.06	6 L	*7947* – 17318	7 – 6	Gd I	BL71
9397.924	10637.733	0.15	3 L	*7426* – 16824	3 – 4	Gd I	BL71
9405.323	10629.367	0.06	6 L	*7480* – 16885	6 – 5	Gd I	BL71
9407.145	10627.306		2	23270 – *32677*	7½ – 6½	Gd II	SP70
9409.803	10624.304	0.06	6 L	*6786* – 16195	4 – 4	Gd I	BL71
9411.517	10622.370	0.06	6 L	*8498* – 17909	8 – 8	Gd I	BL71
9456.917	10571.374		3	*13076* – 22533	4½ – 5½	Gd II	SP70
9493.708	10530.407	0.06	6 L	*7426* – 16920	3 – 3	Gd I	BL71
9496.680	10527.111	0.06	6 L	*7426* – 16923	3 – 2	Gd I	BL71
9510.864	10511.412	0.06	6 L	*6550* – 16061	3 – 3	Gd I	BL71
9515.930	10505.817	0.06	7 L	*8498* – 18014	8 – 7	Gd I	BL71
9548.891	10469.552		1	9092 – *18641*	5½ – 5½	Gd II	SP70
9574.094	10441.991	0.08	4 L	*7653* – 17227	1 – 1	Gd I	BL71
9589.680	10425.020	0.06	6 L	*7234* – 16824	4 – 4	Gd I	BL71
9645.598	10364.577	0.06	6 L	*6550* – 16195	3 – 4	Gd I	BL71
9665.520	10343.220	0.10	3 L	*7562* – 17227	2 – 1	Gd I	BL71
9683.045	10324.500	0.07	7 L	*6378* – 16061	2 – 3	Gd I	BL71
9685.510	10321.873	0.06	6 L	*7234* – 16920	4 – 3	Gd I	BL71
9701.253	10305.122	0.06	6 L	*19507* – 29209	4 – 4	Gd I	BL71
9721.121	10284.061	0.08	4 L	*7103* – 16824	5 – 4	Gd I	BL71
9732.793	10271.728		0	7992 – *17725*	6½ – 5½	Gd II	SP70
9736.025	10268.318		2	25668 – *35404*	3½ – 2½	Gd II	SP70
9736.939	10267.354	0.10	4 L			Gd	BL71
9782.265	10219.780	0.06	6 L	*7103* – 16885	5 – 5	Gd I	BL71
9805.327	10195.743		1	*8884* – 18690	4½ – 5½	Gd II	SP70
9838.123	10161.755		0	*8551* – 18389	5½ – 6½	Gd II	SP70
9838.532	10161.333	0.06	6 L	*7480* – 17318	6 – 6	Gd I	BL71
9848.025	10151.537	0.05	6 L	*6976* – 16824	5 – 4	Gd I	BL71

Gd—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9949.227	10048.278		0	*13076* – 23025	4½ – 4½	Gd II	SP70
9962.603	10034.786	0.05	5 L	*7947* – 17909	7 – 8	Gd I	BL71

Gd References

SP70 Spector, N., J. Opt. Soc. Amer. **60**, 763–776 (1970).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 3.4 m Ebert spectrograph
Detector: Photographic
Uncertainty in σ: Not given

BL71 Blaise, J., Chevillard, J., Vergès, J., Wyart, J. F., and Van Kleef, Th. A.M., Spectrochim. Acta **26B**, 1–34 (1971).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS

LI73 Litzén, U., Physica Scripta **8**, 43–44 (1973).
Source: Pulsed hollow cathode (Gd III)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Spector, N., and Held, S., Astrophys. J. **159**, 1079 (1970).

Gallium

Ga, Z = 31

Ga I Normal state of valence electrons $4s^24p\ ^2P^o_{1/2}$ I.P. = 48388 cm^{-1}

Ga II Normal state of valence electrons $4s^2\ ^1S_0$ I.P. = 165458 cm^{-1}

Ga

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4429.71	22568.71	0.02	7 L	*33155* – 37584	1½ – ½	Ga I	JO67
4540.75	22016.81	0.02	6 L	*33044* – 37584	½ – ½	Ga I	JO67
5594.77	17868.96	0.02	1 L	34781 – *40376*	1½ – ½	Ga I	JO67
5629.76	17757.91	0.02	2 L	34787 – *40417*	2½ – 1½	Ga I	JO67
6666.34	14996.64	0.02	6 LB	34787 – *41454*	2½ –	Ga I	JO67
6672.52	14982.75	0.02	5 L	34781 – *41454*	1½ – 2½	Ga I	JO67
7656.34	13057.50	0.02	5 L	*33155* – 40811	1½ – 2½	Ga I	JO67
7758.81	12885.05	0.02	4 L	*33044* – 40802	½ – 1½	Ga I	JO67
8255.53	12109.78	0.02	9 L	24788 – *33044*	½ – ½	Ga I	JO67
8366.53	11949.12	0.02	10 L	24788 – *33155*	½ – 1½	Ga I	JO67
9003.70	11103.51	0.02	3 L	*33155* – 42158	1½ – ½	Ga I	JO67
9114.72	10968.27	0.02	1 L	*33044* – 42158	½ – ½	Ga I	JO67
9167.20	10905.47	0.02	5 LB	34787 – *43955*	2½ –	Ga I	JO67
9173.40	10898.10	0.02	4 L	34781 – *43955*	1½ – 2½	Ga I	JO67

Ga Reference

JO67 Johansson, I., and Litzén, U., Ark. Fys. **34**, 573–587 (1967).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer for wavelengths above 11300 Å
b) Czerny-Turner spectrograph for wavelengths below 11300 Å
Detector: a) PbS
b) Photographic

Germanium

Ge, $Z = 32$

Ge I Normal state of valence electrons $4s^24p^2\ ^3P_0$ I.P. = 63715 cm^{-1}

Ge II Normal state of valence electrons $4s^24p\ ^2P^\circ_{1/2}$ I.P. = 128521 cm^{-1}

Ge

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4179.12	23921.92		50	*52592* – 56771	3 – 4	Ge I	HU64
4525.32	22091.84		90	49649 – *54174*	2 – 1	Ge I	HU64
4603.46	21716.83		25	46834 – *51437*	2 – 2	Ge I	HU64
4645.94	21518.30		42	47502 – *52148*	0 – 1	Ge I	HU64
4673.44	21391.66		18			Ge	HU64
4835.75	20673.64		275	49075 – *53911*	1 – 2	Ge I	HU64
4942.69	20226.38		12	*50323* – 55266	3 – 2	Ge I	HU64
5067.79	19727.07		55	*51705* – 56772	1 – 2	Ge I	HU64
5185.509	19279.245		625	48726 – *53911*	2 – 2	Ge I	HU64
5314.344	18811.863		700	46834 – *52148*	2 – 1	Ge I	HU64
5327.87	18764.11		100	*51437* – 56765	2 – 3	Ge I	HU64
5405.233	18495.541		350	46765 – *52170*	1 – 0	Ge I	HU64
5424.95	18428.30		160			Ge	HU64
5629.50	17758.73		15 B	56947 – *62577*	2 – 1	Ge I?	HU64
5629.50	17758.73		15 B	*55372* – 61002	2 – 3	Ge I?	HU64
5669.63	17633.01		20			Ge	HU64
5673.55	17620.84		45	*52847* – 58520	1 – 2	Ge I	HU64
5686.94	17579.36		12			Ge	HU64
5713.70	17497.02		50	*52847* – 58560	1 – 1	Ge I	HU64
5757.89	17362.73		45	46834 – *52592*	2 – 3	Ge I	HU64
5797.85	17243.06		60	*52847* – 58645	1 – 2	Ge I	HU64
5807.525	17214.337		1350	48104 – *53911*	3 – 2	Ge I	HU64
5823.35	17167.56		22	48088 – *53911*	1 – 2	Ge I	HU64
5867.96	17037.05		55	*52592* – 58460	3 – 4	Ge I	HU64
5965.033	16759.789		1500	*40020* – 45985	1 – 1	Ge I	HU64
5986.643	16699.291		700	*52592* – 58578	3 – 4	Ge I	HU64
6006.56	16643.92		70	*50786* – 56793	4 – 3	Ge I	HU64
6012.80	16626.64		120	46834 – *52847*	2 – 1	Ge I?	HU64
6012.80	16626.64		120	*54174* – 60187	1 – 1	Ge I?	HU64
6037.14	16559.60		35	49649 – *55686*	2 – 2	Ge I	HU64
6053.63	16514.50		14	*48882* – 54935	2 – 1	Ge I	HU64
6068.98	16472.74		55	49649 – *55718*	2 – 3	Ge I	HU64
6086.70	16424.77		140	48088 – *54174*	1 – 1	Ge I?	HU64
6086.70	16424.77		140	57250 – *63337*	2 – 2	Ge I?	HU64
6121.68	16330.92		70	*49144* – 55266	3 – 2	Ge I	HU64
6168.51	16206.95		90	51011 – *57180*	0 – 1	Ge I?	HU64
6168.51	16206.95		90	57083 – *63251*	1 – 1	Ge I?	HU64
6186.75	16159.15		90			Ge	HU64
6296.75	15876.87		45	49075 – *55372*	1 – 2	Ge I	HU64
6353.52	15735.00		50	*48882* – 55235	2 – 1	Ge I	HU64
6405.71	15606.81		48			Ge	HU64
6442.47	15517.75		44	*50323* – 56765	3 – 3	Ge I	HU64
6448.05	15504.34		200	*50323* – 56771	3 – 4	Ge I	HU64
6455.78	15485.77		60	*48480* – 54935	2 – 1	Ge I	HU64
6496.54	15388.61		40	*52148* – 58645	1 – 2	Ge I	HU64
6501.96	15375.77		48			Ge	HU64
6540.54	15285.07		17	*48962* – 55503	1 – 0	Ge I	HU64
6618.19	15105.74		45	*50068* – 56687	2 – 1	Ge I	HU64
6624.42	15091.54		42	*50323* – 56947	3 – 2	Ge I	HU64
6646.59	15041.21		130	48726 – *55372*	2 – 2	Ge I	HU64
6664.07	15001.75		150	*55718* – 62381	3 – 4	Ge I	HU64
6672.31	14983.22		65	47502 – *54174*	0 – 1	Ge I	HU64
6699.70	14921.97		160	*50068* – 56768	2 – 3	Ge I	HU64
6703.81	14912.81		18	*50068* – 56772	2 – 2	Ge I	HU64
6723.33	14869.51		21	*53911* – 60635	2 – 2	Ge I	HU64
6733.12	14847.90		60			Ge	HU64

Ge—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6744.714	14822.375		4700	*40020* – 46765	1 – 1	Ge I	HU64
6813.87	14671.94		55	*40020* – 46834	1 – 2	Ge I	HU64
6815.92	14667.52		125	*51705* – 58520	1 – 2	Ge I	HU64
6861.618	14569.840		400	45985 – *52847*	1 – 1	Ge I?	HU64
6861.618	14569.840		400	*54174* – 61036	1 – 2	Ge I?	HU64
6937.20	14411.11		39	*51705* – 58642	1 – 1	Ge I	HU64
6940.05	14405.18		38	*51705* – 58645	1 – 2	Ge I	HU64
6992.489	14297.151		425	48726 – *55718*	2 – 3	Ge I	HU64
7046.56	14187.45		20	51011 – *58058*	0 – 1	Ge I	HU64
7081.874	14116.697		425	*51437* – 58519	2 – 3	Ge I	HU64
7207.27	13871.09		55	*51437* – 58645	2 – 2	Ge I	HU64
7268.61	13754.02		9	48104 – *55372*	3 – 2	Ge I	HU64
7271.71	13748.17		18	49649 – *56921*	2 – 2	Ge I	HU64
7284.260	13724.477		275	48088 – *55372*	1 – 2	Ge I	HU64
7340.49	13619.35		22 B	46834 – *54174*	2 – 1	Ge I?	HU64
7340.49	13619.35		22 B	*52847* – 60187	1 – 1	Ge I?	HU64
7386.317	13534.847		425	48088 – *55474*	1 – 1	Ge I	HU64
7409.62	13492.28		200	*46765* – *54174*	1 – 1	Ge I	HU64
7482.03	13361.70		85	*40020* – 47502	1 – 0	Ge I	HU64
7621.34	13117.47		42	*49144* – 56765	3 – 3	Ge I	HU64
7624.37	13112.25		30	*49144* – 56768	3 – 3	Ge I	HU64
7627.069	13107.612		2350	*49144* – 56771	3 – 4	Ge I	HU64
7648.98	13070.06		15	*49144* – 56793	3 – 3	Ge I	HU64
7673.30	13028.64		150	*50786* – 58460	4 – 4	Ge I	HU64
7716.480	12955.734		1200	*39117* – 46834	2 – 2	Ge I	HU64
7781.23	12847.92		125	49649 – *57430*	2 – 2	Ge I	HU64
7788.227	12836.381		1750	*50786* – 58575	4 – 5	Ge I	HU64
7791.86	12830.40		15	*50786* – 58578	4 – 4	Ge I	HU64
7809.964	12800.655		1150	*48962* – 56772	1 – 2	Ge I	HU64
7845.24	12743.09		90 B	*51437* – 59282	2 – 3	Ge I?	HU64
7845.24	12743.09		90 B	49075 – *56921*	1 – 2	Ge I?	HU64
7883.484	12681.278		400	*48882* – 56765	2 – 3	Ge I	HU64
7886.403	12676.584		1500	*48882* – 56768	2 – 3	Ge I	HU64
7911.23	12636.80		150	*48882* – 56793	2 – 3	Ge I	HU64
7972.043	12540.406		475	47502 – *55474*	0 – 1	Ge I	HU64
8067.791	12391.575		10500	*40020* – 48088	1 – 1	Ge I	HU64
8102.324	12338.762		550	48726 – *56828*	2 – 3	Ge I	HU64
8134.39	12290.12		65	*50323* – 58458	3 – 3	Ge I	HU64
8136.625	12286.746		600	*50323* – 58460	3 – 4	Ge I	HU64
8189.29	12207.73		200	45985 – *54174*	1 – 1	Ge I	HU64
8195.231	12198.881		300	48726 – *56921*	2 – 2	Ge I	HU64
8255.38	12110.00		55	*50323* – 58578	3 – 4	Ge I	HU64
8272.29	12085.24		27			Ge	HU64
8283.286	12069.201		13000	*37702* – 45985	1 – 1	Ge I	HU64
8285.65	12065.76		450	*48480* – 56765	2 – 4	Ge I	HU64
8288.63	12061.41		300	*48480* – 56768	2 – 3	Ge I	HU64
8292.70	12055.49		100	*48480* – 56772	2 – 2	Ge I	HU64
8313.29	12025.64		100	*48480* – 56793	2 – 3	Ge I	HU64
8322.95	12011.68		70	49075 – *57398*	1 – 1	Ge I	HU64
8354.91	11965.74		60	49075 – *57430*	1 – 2	Ge I	HU64
8389.071	11917.009		550	*50068* – 58458	2 – 3	Ge I	HU64
8443.80	11839.77		100 B	*52592* – 61035	3 – 3	Ge I	HU64
8451.72	11828.67		75	*50068* – 58520	2 – 2	Ge I	HU64
8471.38	11801.22		20	*52592* – 61063	3 – 4	Ge I	HU64
8522.42	11730.55		10			Ge	HU64
8533.902	11714.763		6000	*37451* – 45985	0 – 1	Ge I	HU64
8538.20	11708.87		90	46834 – *55372*	2 – 2	Ge I	HU64
8545.20	11699.27		10			Ge	HU64
8607.338	11614.814		1750	46765 – *55372*	1 – 2	Ge I	HU64
8632.71	11580.68		8			Ge	HU64
8640.02	11570.88		20	46834 – *55474*	2 – 1	Ge I	HU64
8672.64	11527.36		45	48726 – *57398*	2 – 1	Ge I	HU64
8705.555	11483.774		1500	*40020* – 48726	1 – 2	Ge I	HU64
8724.338	11459.050		550	48104 – *56828*	3 – 3	Ge I	HU64
8817.07	11338.53		25	48104 – *56921*	3 – 2	Ge I	HU64
8832.96	11318.13		330	48088 – *56921*	1 – 2	Ge I	HU64

Ge—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8852.31	11293.40		240	46834 – *55686*	2 – 2	Ge I	HU64
8884.220	11252.830		2300	46834 – *55718*	2 – 3	Ge I	HU64
8970.45	11144.66	0.01	1 L	*39117* – 48088	2 – 1	Ge I	AN59
8986.202	11125.125	0.01	4 L	*39117* – 48104	2 – 3	Ge I	AN59
9055.33	11040.20	0.01	0 L	*40020* – 49075	1 – 1	Ge I	AN59
9062.98	11030.88	0.01	0 L	*37702* – 46765	1 – 1	Ge I	AN59
9132.078	10947.412	0.01	4 L	*37702* – 46834	1 – 2	Ge I	AN59
9207.09	10858.22		0 V	*50068* – 59275	2 – 3	Ge I	HU64
9313.589	10734.059	0.01	4 L	*37451* – 46765	0 – 1	Ge I	AN59
9315.55	10731.80	0.01	1 L	*49144* – 58459	3 – 4	Ge I	AN59
9315.74	10731.58		6 V	*49144* – 58460	3 – 4	Ge I	HU64
9342.60	10700.73		4 V	48088 – *57430*	1 – 2	Ge I	HU64
9375.30	10663.40		2 V	*49144* – 58519	3 – 3	Ge I	HU64
9434.48	10596.51		5 V	*49144* – 58578	3 – 4	Ge I	HU64
9452.07	10576.79	0.01	1 L	48104 – *57556*	3 – 4	Ge I	AN59
9465.20	10562.13		0 V	49649 – *59114*	2 – 1	Ge I	HU64
9489.10	10535.52		5 V	45985 – *55474*	1 – 1	Ge I	HU64
9557.89	10459.70	0.01	1 L	*48962* – 58520	1 – 2	Ge I	AN59
9557.99	10459.59		5 V	*48962* – 58520	1 – 2	Ge I	HU64
9608.228	10404.895	0.01	10 L	*39117* – 48726	2 – 2	Ge I	AN59
9629.027	10382.420	0.01	10 L	*40020* – 49649	1 – 2	Ge I	AN59
9637.47	10373.33		3 V	*48882* – 58519	2 – 3	Ge I	HU64
9701.15	10305.24	0.01	1 L	45985 – *55686*	1 – 2	Ge I	AN59
9740.62	10263.48	0.01	0 L	48088 – *57828*	1 – 0	Ge I	AN59
9800.326	10200.946	0.01	1 L	*37702* – 47502	1 – 0	Ge I	AN59
9855.67	10143.67		0 V	49075 – *58931*	1 – 2	Ge I	HU64
9957.998	10039.427	0.01	3 L	*39117* – 49075	2 – 1	Ge I	AN59
9977.99	10019.31		6 V	*48480* – 58458	2 – 3	Ge I	HU64
9994.06	10003.20		6 V	46834 – *56828*	2 – 3	Ge I	HU64

Ge References

AN59 Andrew, K. L., and Meissner, K. W., J. Opt. Soc. Amer. **49**, 146–161 (1959).
Source: Low pressure arc
Instrument: 30′ Paschen-Runge spectrograph
Detector: Photographic

HU64 Humphreys, C. J., and Andrew, K. L., J. Opt. Soc. Amer. **54**, 1134–1140 (1964).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: a) 1 m Littrow spectrometer
b) 10 m Paschen-Runge spectrograph
Detector: a) PbS
b) Photographic
Uncertainty in λ: a) Given as better than 0.003 Å for wavelengths given to three decimal places (interferometric measurement)
b) Given as 0.05 Å for photographic measurements (wavelengths below 11253 Å)

Hafnium

Hf, Z = 72

Hf I Normal state of valence electrons $5d^26s^2\ ^3F_2$ I.P. = 53600 cm^{-1}

Hf II Normal state of valence electrons $5d6s^2\ ^2D_{3/2}$ I.P. = 120000 cm^{-1}

Hf

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3960.12	25244.88	0.10	4	*19292* – 23252	3 – 4	Hf I	GO70
3974.10	25156.09	0.05	2	*18224* – 22199	4 – 3	Hf I	GO70
3980.28	25116.98	0.50	1 W			Hf	GO70
4009.29	24935.29	0.05	200 U			Hf	GO70
4017.82	24882.31	0.02	2	26715 – *30733*	3 – 4	Hf I	GO70
4033.04	24788.43	0.02	2			Hf	GO70
4042.61	24729.77	0.05	1			Hf	GO70
4051.08	24678.01	0.10	6	14092 – *18143*	1 – 1	Hf I	GO70
4083.34	24483.10	0.10	1			Hf	GO70
4106.71	24343.75	0.05	6	22199 – *26305*	3 – 3	Hf I	GO70
4117.42	24280.45	0.02	1			Hf	GO70
4117.95	24277.32	0.05	2 W	15673 – *19791*	3 – 2	Hf I	GO70
4119.63	24267.43	0.10	1	25281 – *29401*	3 – 2	Hf I	GO70
4121.06	24259.0	0.50	1			Hf	GO70
4181.98	23905.60	0.05	10	20784 – *24966*	1 – 0	Hf I	GO70
4206.01	23769.00	0.05	2	*37269* – 41475	4 – 3	Hf I	GO70
4231.75	23624.47	0.10	4	39286 – *43517*	1 – 2	Hf I	GO70
4267.93	23424.20	0.10	1	27074 – *31342*	4 – 3	Hf I	GO70
4286.07	23325.03	0.02	10	20908 – *25194*	2 – 1	Hf I	GO70
4312.34	23182.92	0.05	2			Hf	GO70
4316.98	23158.0	0.50	1			Hf	GO70
4318.25	23151.20	0.05	2			Hf	GO70
4319.78	23143.0	0.50	2			Hf	GO70
4319.87	23142.52	0.05	1 U	35115 – *39435*	2 – 2	Hf I	GO70
4321.80	23132.19	0.10	1	*20960* – 25281	4 – 3	Hf I	GO70
4326.64	23106.32	0.05	7	23327 – *27654*	2 – 3	Hf I	GO70
4334.62	23063.79	0.02	3	31119 – *35453*	2 – 3	Hf I	GO70
4336.94	23051.46	0.10	1 W			Hf	GO70
4375.99	22845.76	0.10	2			Hf	GO70
4401.55	22713.08	0.05	8	23252 – *27654*	4 – 3	Hf I	GO70
4406.64	22686.85	0.05	1			Hf	GO70
4409.70	22671.11	0.05	30	20784 – *25194*	1 – 1	Hf I	GO70
4411.74	22660.63	0.20	1			Hf	GO70
4418.07	22628.12	0.10	1			Hf	GO70
4438.16	22525.72	0.10	2	*36772* – 41211	2 – 2	Hf I	GO70
4470.85	22361.0	0.50	2			Hf	GO70
4471.17	22359.41	0.10	1			Hf	GO70
4472.25	22354.0	0.50	1			Hf	GO70
4480.07	22315.0	0.50	1			Hf	GO70
4499.31	22219.56	0.20	1			Hf	GO70
4499.63	22217.98	0.50	1			Hf	GO70
4500.04	22212.0	0.50	1			Hf	GO70
4552.01	21962.33	0.02	140	14740 – *19292*	2 – 3	Hf I	GO70
4574.17	21855.92	0.10	1			Hf	GO70
4589.14	21784.64	0.02	3	35115 – *39704*	2 – 1	Hf I	GO70
4609.37	21689.0	0.50	1			Hf	GO70
4610.18	21685.20	0.05	2			Hf	GO70
4614.36	21665.56	0.02	1			Hf	GO70
4617.29	21651.82	0.10	1 W	31619 – *36237*	2 – 3	Hf I	GO70
4621.51	21632.05	0.05	2	*16163* – 20784	2 – 1	Hf I	GO70
4625.99	21611.11	0.02	8			Hf	GO70
4636.22	21563.39	0.05	1	22880 – *27516*	3 – 4	Hf I	GO70
4651.59	21492.16	0.10	1			Hf	GO70
4655.32	21471.94	0.20	2	*18224* – 22880	4 – 3	Hf I	GO70
4655.97	21471.94	0.10	1 U			Hf	GO70
4662.04	21444.0	0.50	1			Hf	GO70

Hf—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4668.75	21413.18	0.05	1	25084 – *29752*	2 – 2	Hf I	GO70
4708.80	21231.0	0.50	2			*Hf*	GO70
4713.91	21208.0	0.50	1			Hf	GO70
4714.97	21203.24	0.05	4	25281 – *29996*	3 – 3	Hf I	GO70
4725.77	21154.80	0.02	40	20908 – *25634*	2 – 2	Hf I	GO70
4729.86	21136.51	0.02	3			Hf	GO70
4745.09	21068.64	0.02	2 U	*16163* – 20908	2 – 2	Hf I	GO70
4774.11	20940.61	0.05	50	22880 – *27654*	3 – 3	Hf I	GO70
4796.46	20843.0	0.50	2			Hf	GO70
4843.64	20640.0	0.50	2			Hf	GO70
4849.37	20615.62	0.05	30	20784 – *25634*	1 – 2	Hf I	GO70
4868.26	20535.61	0.10	20			Hf	GO70
4869.18	20531.72	0.02	2	*18011* – 22880	2 – 3	Hf I	GO70
4870.32	20526.93	0.02	170			Hf	GO70
4884.86	20465.84	0.10	1			Hf	GO70
4887.59	20454.42	0.10	6 U			Hf	GO70
4895.50	20421.33	0.10	1	26715 – *31610*	3 – 2	Hf I	GO70
4896.78	20416.0	0.05	1			Hf	GO70
4898.64	20408.25	0.05	2	36523 – *41422*	3 – 3	Hf I	GO70
4912.66	20350.02	0.10	20			Hf	GO70
4915.59	20337.89	0.02	6			Hf	GO70
4921.52	20313.40	0.10	1 U			Hf	GO70
4942.12	20228.71	0.05	10 U			Hf	GO70
4965.83	20132.11	0.05	2	37336 – *42302*	1 – 2	Hf I	GO70
4997.18	20005.84	0.20	1			Hf	GO70
5000.06	19994.32	0.02	1	17901 – *22901*	5 – 5	Hf I	GO70
5004.56	19976.31	0.05	1 W			Hf	GO70
5011.91	19947.02	0.02	1 U			Hf	GO70
5027.92	19883.52	0.05	6	*18224* – 23252	4 – 4	Hf I	GO70
5034.13	19859.00	0.02	6	26918 – *31952*	1 – 1	Hf I	GO70
5036.90	19848.04	0.02	1			Hf	GO70
5050.67	19793.95	0.02	20	14740 – *19791*	2 – 2	Hf I	GO70
5054.61	19778.52	0.02	3	25678 – *30733*	3 – 4	Hf I	GO70
5111.88	19556.92	0.02	5			Hf	GO70
5118.51	19531.59	0.02	1	*29996* – 35115	3 – 2	Hf I	GO70
5119.01	19529.69	0.02	1			Hf	GO70
5137.98	19457.60	0.10	1	30146 – *35284*	2 – 1	Hf I	GO70
5139.20	19452.98	0.50	2			Hf	GO70
5142.80	19439.37	0.10	1			Hf	GO70
5144.22	19434.0	0.50	2			Hf	GO70
5146.32	19426.0	0.50	1			Hf	GO70
5149.03	19415.82	0.02	2 W			Hf	GO70
5159.48	19376.50	0.10	1			Hf	GO70
5161.47	19369.03	0.05	30	24085 – *29246*	5 – 4	Hf I	GO70
5173.06	19325.65					Hf	GO70
5213.93	19174.17					Hf	GO70
5217.85	19159.77					Hf	GO70
5218.14	19158.70					Hf	GO70
5227.10	19125.83			*40767* – 45994	3 – 3	Hf I	GO70
5227.83	19123.16					Hf	GO70
5228.25	19121.63					Hf	GO70
5235.94	19093.55					Hf	GO70
5254.34	19026.71					Hf	GO70
5255.98	19020.74			23327 – *28583*	2 – 3	Hf I	GO70
5263.15	18994.83					Hf	GO70
5265.41	18986.68					Hf	GO70
5279.59	18935.70					Hf	GO70
5286.84	18909.74			15673 – *20960*	3 – 4	Hf I	GO70
5295.32	18879.43					Hf	GO70
5296.03	18876.90					Hf	GO70
5300.71	18860.24			36523 – *41824*	3 – 3	Hf I	GO70
5316.66	18803.67			*18011* – 23327	2 – 2	Hf I	GO70
5317.43	18800.95			22199 – *27516*	3 – 4	Hf I	GO70
5330.85	18753.60			23252 – *28583*	4 – 3	Hf I	GO70
5340.08	18721.19					Hf	GO70
5349.99	18686.52					Hf	GO70

Hf—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5356.85	18662.60					Hf	GO70
5371.22	18612.65					Hf	GO70
5387.13	18557.70			22880 – *28267*	3 – 2	Hf I	GO70
5397.36	18522.53			20908 – *26305*	2 – 3	Hf I	GO70
5399.12	18516.50					Hf	GO70
5412.41	18471.01					Hf	GO70
5420.40	18443.79			*25634* – 31054	2 – 3	Hf I	GO70
5451.39	18338.93			8983 – *14435*	2 – 2	Hf I	GO70
5452.01	18336.85					Hf	GO70
5455.26	18325.93			22199 – *27654*	3 – 3	Hf I	GO70
5462.53	18301.54			23327 – *28790*	2 – 1	Hf I	GO70
5477.50	18251.51					Hf	GO70
5482.87	18233.63					Hf	GO70
5497.97	18183.57					Hf	GO70
5531.74	18072.56					Hf	GO70
5539.63	18046.83			*41422* – 46961	3 – 2	Hf I	GO70
5539.63	18045.26					Hf	GO70
5551.89	18006.95					Hf	GO70
5554.81	17997.49	0.50	1 U			Hf	GO70
5557.91	17987.46	0.05	130	8983 – *14541*	2 – 3	Hf I	GO70
5573.92	17935.80	0.02	3			Hf	GO70
5583.49	17905.07	0.05	2			Hf	GO70
5588.84	17887.90	0.20	2	35115 – *40704*	2 – 1	Hf I	GO70
5592.49	17876.23	0.05	2			Hf	GO70
5599.85	17852.74	0.05	2 U			Hf	GO70
5609.67	17821.50	0.02	1			Hf	GO70
5619.08	17791.66	0.05	1			Hf	GO70
5622.86	17779.67	0.10	1			Hf	GO70
5626.53	17768.08	0.10	1			Hf	GO70
5627.77	17764.17	0.10	1			Hf	GO70
5628.77	17761.0	0.50	1			Hf	GO70
5630.33	17756.09	0.02	1			Hf	GO70
5636.51	17736.63	0.02	1	*34877* – 40513	3 – 2	Hf I	GO70
5652.24	17687.28	0.02	9	35115 – *40767*	2 – 3	Hf I	GO70
5653.70	17682.72	0.05	1	31119 – *36772*	2 – 2	Hf I	GO70
5656.52	17673.90	0.05	1 U	40513 – *46170*	2 – 2	Hf I	GO70
5666.25	17643.53	0.05	3	39788 – *45455*	2 – 3	Hf I	GO70
5679.16	17603.43	0.10	2	20784 – *26463*	1 – 1	Hf I	GO70
5682.75	17592.32	0.10	2	41298 – *46981*	2 – 2	Hf I	GO70
5694.17	17557.01	0.05	2			Hf	GO70
5699.05	17541.98	0.02	10	14092 – *19791*	1 – 2	Hf I	GO70
5703.47	17528.39	0.02	70	22880 – *28583*	3 – 3	Hf I	GO70
5712.56	17500.51	0.05	2	34991 – *40704*	1 – 1	Hf I	GO70
5718.18	17483.31	0.20	1 U	31054 – *36772*	3 – 2	Hf I	GO70
5736.30	17428.07	0.10	3			Hf	GO70
5741.62	17411.93	0.02	2			Hf	GO70
5759.90	17356.63	0.02	10			Hf	GO70
5764.93	17341.54	0.05	3			Hf	GO70
5778.35	17301.25	0.05	1	36523 – *42302*	3 – 2	Hf I	GO70
5795.60	17249.77	0.02	1			Hf	GO70
5815.21	17191.58	0.10	2 W			Hf	GO70
5818.36	17182.28	0.10	2 W			Hf	GO70
5823.61	17166.79	0.20	1 U			Hf	GO70
5825.27	17161.90	0.10	1			Hf	GO70
5830.23	17147.31	0.05	2			Hf	GO70
5839.70	17119.51	0.05	3 U	*33949* – 39788	3 – 2	Hf I	GO70
5842.33	17111.77	0.05	5	35115 – *40957*	2 – 3	Hf I	GO70
5844.56	17105.25	0.02	2	*35453* – 41298	3 – 2	Hf I	GO70
5853.04	17080.47	0.20	4 W			Hf	GO70
5870.99	17028.26	0.05	8 W			Hf	GO70
5875.36	17015.60	0.05	1			Hf	GO70
5901.47	16940.31	0.05	1			Hf	GO70
5903.21	16935.32	0.05	1	*40957* – 46860	3 – 2	Hf I	GO70
5918.25	16892.26	0.10	2			Hf	GO70
5932.07	16852.92	0.20	1 U	*38845* – 44777	5 – 4	Hf I	GO70
5965.93	16757.27	0.05	10	34991 – *40957*	1 – 2	Hf I	GO70

Hf—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5968.22	16750.84	0.05	3	38289 – *44257*	2 – 1	Hf I	GO70
5976.06	16728.87	0.02	2			Hf	GO70
5978.47	16722.13	0.02	4 U			Hf	GO70
5984.78	16704.50	0.02	7			Hf	GO70
5987.45	16697.03	0.02	3			Hf	GO70
5989.21	16692.12	0.02	1 W	*19292* – 25281	3 – 3	Hf I	GO70
5993.90	16679.06	0.02	1 U	23252 – *29246*	4 – 4	Hf I	GO70
6009.11	16636.86	0.20	2	*40957* – 46966	3 – 3	Hf I	GO70
6010.68	16632.51	0.02	3 U	39788 – *45799*	2 – 1	Hf I	GO70
6058.88	16500.18	0.02	3			Hf	GO70
6060.86	16494.79	0.05	6	*36609* – 42670	3 – 4	Hf I	GO70
6067.28	16477.34	0.05	1			Hf	GO70
6068.31	16474.55	0.02	3			Hf	GO70
6073.96	16459.23	0.10	1			Hf	GO70
6078.71	16446.37	0.10	10	35115 – *41193*	2 – 1	Hf I	GO70
6087.96	16421.39	0.10	1 U			Hf	GO70
6111.60	16357.86	0.05	1			Hf	GO70
6114.44	16350.26	0.10	1 U	*20960* – 27074	4 – 4	Hf I	GO70
6134.83	16295.91	0.05	220 W	16766 – *22901*	4 – 5	Hf I	GO70
6142.28	16276.15	0.02	5			Hf	GO70
6157.47	16236.01	0.05	1			Hf	GO70
6188.79	16153.84	0.10	3			Hf	GO70
6194.03	16140.17	0.10	8			Hf	GO70
6201.39	16121.00	0.02	3	*28790* – 34991	1 – 1	Hf I	GO70
6202.41	16118.37	0.05	2	34991 – *41193*	1 – 1	Hf I	GO70
6215.29	16084.95	0.02	1			Hf	GO70
6219.98	16072.83	0.10	1			Hf	GO70
6222.37	16066.66	0.10	1			Hf	GO70
6234.16	16036.28	0.20	1			Hf	GO70
6236.37	16030.60	0.20	3			Hf	GO70
6241.38	16017.71	0.10	4			Hf	GO70
6258.41	15974.17	0.05	2	25084 – *31342*	2 – 3	Hf I	GO70
6260.45	15968.93	0.10	1			Hf	GO70
6262.53	15963.63	0.10	1			Hf	GO70
6283.50	15910.34	0.02	3			Hf	GO70
6287.42	15900.43	0.10	1			Hf	GO70
6290.41	15892.87	0.05	2			Hf	GO70
6310.79	15841.56	0.10	2			Hf	GO70
6327.72	15799.16	0.10	1			Hf	GO70
6329.22	15795.42	0.10	2			Hf	GO70
6339.42	15770.01	0.05	2			Hf	GO70
6364.21	15708.57	0.05	1			Hf	GO70
6364.74	15707.35	0.05	9			Hf	GO70
6366.41	15703.15	0.20	30 U			Hf	GO70
6386.33	15654.18	0.02	2			Hf	GO70
6395.01	15632.91	0.20	1 W			Hf	GO70
6396.76	15628.64	0.20	6			Hf	GO70
6399.97	15620.80	0.10	1			Hf	GO70
6401.92	15616.05	0.10	1			Hf	GO70
6406.11	15605.83	0.20	1	26715 – *33121*	3 – 2	Hf I	GO70
6421.36	15568.78	0.10	2	*34877* – 41298	3 – 2	Hf I	GO70
6423.96	15562.46	0.05	8			Hf	GO70
6425.22	15559.40	0.20	20	23327 – *29752*	2 – 2	Hf I	GO70
6425.45	15558.85	0.20	20	*25194* – 31619	1 – 2	Hf I	GO70
6429.48	15549.10	0.20	8 U			Hf	GO70
6447.19	15506.40	0.10	20			Hf	GO70
6456.92	15483.04	0.10	2			Hf	GO70
6463.39	15467.51	0.10	2	30146 – *36609*	2 – 3	Hf I	GO70
6472.22	15446.42	0.10	1			Hf	GO70
6473.54	15443.28	0.05	7			Hf	GO70
6479.08	15430.07	0.20	3			Hf	GO70
6493.40	15396.06	0.05	2			Hf	GO70
6508.27	15360.87	0.10	2			Hf	GO70
6512.59	15350.68	0.02	4			Hf	GO70
6526.89	15317.06	0.05	8			Hf	GO70
6532.25	15304.49	0.05	1	*41824* – 48356	3 – 4	Hf I	GO70

Hf—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6580.92	15191.29	0.05	1	36523 – *43104*	3 – 3	Hf I	GO70
6626.75	15086.23	0.10	1			Hf	GO70
6635.19	15067.05	0.05	1			Hf	GO70
6639.64	15056.95	0.20	3			Hf	GO70
6648.41	15037.07	0.50	10			Hf	GO70
6653.65	15025.23	0.20	7			Hf	GO70
6657.62	15016.28	0.10	2			Hf	GO70
6660.36	15010.10	0.20	2 W			Hf	GO70
6661.62	15007.26	0.02	6	*38987* – 45649	4 – 3	Hf I	GO70
6665.58	14998.35	0.05	1			Hf	GO70
6667.44	14994.17	0.02	1	*33121* – 39788	2 – 2	Hf I	GO70
6669.38	14989.81	0.05	20	*33949* – 40618	3 – 1	Hf I	GO70
6682.00	14961.48	0.05	140	16766 – *23448*	4 – 3	Hf I	GO70
6703.03	14914.35	0.20	3			Hf	GO70
6705.90	14908.17	0.02	3			Hf	GO70
6708.82	14903.02	0.02	4			Hf	GO70
6709.54	14900.09	0.10	8			Hf	GO70
6713.55	14891.19	0.02	2			Hf	GO70
6716.56	14884.50	0.05	1 W			Hf	GO70
6721.12	14874.40	0.20	3			Hf	GO70
6724.53	14866.86	0.10	1			Hf	GO70
6744.31	14823.27	0.02	20			Hf	GO70
6747.67	14815.89	0.20	3			Hf	GO70
6748.96	14813.06	0.10	20	20784 – *27533*	1 – 1	Hf I	GO70
6767.13	14773.27	0.05	2	*14017* – 20784	1 – 1	Hf I	GO70
6777.33	14751.05	0.02	80	15673 – *22450*	3 – 2	Hf I	GO70
6783.18	14738.33	0.02	2			Hf	GO70
6806.01	14688.88	0.02	4			Hf	GO70
6823.11	14652.08	0.50	2			Hf	GO70
6849.76	14595.07	0.05	3			Hf	GO70
6854.77	14584.40	0.05	8	25678 – *32533*	3 – 3	Hf I	GO70
6856.74	14580.21	0.05	7			Hf	GO70
6859.98	14573.31	0.10	2			Hf	GO70
6872.67	14546.41	0.10	5	22880 – *29752*	3 – 2	Hf I	GO70
6875.05	14541.37	0.10	9			Hf	GO70
6877.49	14536.21	0.10	120			Hf	GO70
6883.95	14522.58	0.20	130	17901 – *24785*	5 – 4	Hf I	GO70
6892.03	14505.56	0.20	110			Hf	GO70
6892.35	14504.88	0.50	1			Hf	GO70
6900.66	14487.40	0.05	4			Hf	GO70
6910.00	14467.82	0.05	1 W			Hf	GO70
6921.54	14443.71					Hf	GO70
6924.48	14437.58					Hf	GO70
6940.97	14403.27					Hf	GO70
6960.68	14362.49					Hf	GO70
6975.99	14330.96					Hf	GO70
6998.25	14285.39			*40704* – 47702	1 – 2	Hf I	GO70
7010.68	14260.05					Hf	GO70
7044.88	14190.82			*41824* – 48869	3 – 3	Hf I	GO70
7058.31	14163.82					Hf	GO70
7064.15	14152.12					Hf	GO70
7073.33	14133.76					Hf	GO70
7084.31	14111.84					Hf	GO70
7098.98	14082.68					Hf	GO70
7127.13	14027.04					Hf	GO70
7139.51	14002.74			20908 – *28047*	2 – 1	Hf I	GO70
7155.48	13971.48					Hf	GO70
7158.58	13965.43					Hf	GO70
7164.42	13954.05			*16163* – 23327	2 – 2	Hf I	GO70
7179.68	13924.40			8983 – *16163*	2 – 2	Hf I	GO70
7202.45	13880.37			22199 – *29401*	3 – 2	Hf I	GO70
7249.96	13789.41					Hf	GO70
7271.04	13749.43					Hf	GO70
7280.55	13731.47					Hf	GO70
7301.20	13692.63					Hf	GO70
7310.44	13675.33					Hf	GO70

Hf—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7445.62	13427.04	0.05	430			Hf	GO70
7453.89	13412.14	0.05	2			Hf	GO70
7460.84	13399.65	0.20	2			Hf	GO70
7484.79	13356.77	0.05	5			Hf	GO70
7493.78	13340.75	0.05	2			Hf	GO70
7493.95	13340.45	0.02	10	34991 – *42485*	1 – 1	Hf I	GO70
7507.90	13315.67	0.05	1	*40194* – 47702	2 – 2	Hf I	GO70
7553.84	13234.67	0.10	3	22199 – *29752*	3 – 2	Hf I	GO70
7560.85	13222.42	0.10	190			Hf	GO70
7602.93	13149.23	0.05	80			Hf	GO70
7617.78	13123.60	0.10	9			Hf	GO70
7646.50	13074.31	0.05	570	14092 – *21738*	1 – 1	Hf I	GO70
7678.04	13020.60	0.20	1			Hf	GO70
7692.13	12996.75	0.10	70			Hf	GO70
7709.86	12966.86	0.02	580	14740 – *22450*	2 – 2	Hf I	GO70
7724.15	12942.87	0.02	30	23252 – *30976*	4 – 5	Hf I	GO70
7759.97	12883.13	0.02	3			Hf	GO70
7775.28	12857.75	0.05	580	15673 – *23448*	3 – 3	Hf I	GO70
7786.47	12839.28	0.50	10			Hf	GO70
7801.86	12813.96	0.02	3			Hf	GO70
7815.86	12791.0	0.50	1			Hf	GO70
7841.97	12748.40	0.10	2 W	*27149* – 34991	2 – 1	Hf I	GO70
7848.84	12737.25	0.20	180 U	10532 – *18381*	4 – 3	Hf I	GO70
7858.13	12722.19	0.20	70	24085 – *31943*	5 – 4	Hf I	GO70
7862.30	12715.45	0.20	210	*40267* – 48129	2 – 1	Hf I	GO70
7881.55	12684.38	0.10	1			Hf	GO70
7939.47	12591.86	0.02	4			Hf	GO70
7971.25	12541.65	0.02	270	15673 – *23644*	3 – 3	Hf I	GO70
7980.25	12527.51	0.02	3	*32533* – 40513	3 – 2	Hf I	GO70
7986.27	12518.07	0.10	2			Hf	GO70
8005.38	12488.18	0.02	20	20784 – *28790*	1 – 1	Hf I	GO70
8014.77	12473.56	0.05	1	23327 – *31342*	2 – 3	Hf I	GO70
8018.66	12467.51	0.02	660			Hf	GO70
8027.82	12453.27	0.10	2			Hf	GO70
8037.33	12438.54	0.02	20	25084 – *33121*	2 – 2	Hf I	GO70
8053.73	12413.22	0.02	9	25084 – *33137*	2 – 1	Hf I	GO70
8055.00	12411.26	0.05	2	25084 – *33139*	2 – 3	Hf I	GO70
8066.84	12393.03	0.20	1	*33994* – 42061	4 – 3	Hf I	GO70
8074.74	12380.91	0.05	3	31119 – *39193*	2 – 3	Hf I	GO70
8080.05	12372.78	0.02	2			Hf	GO70
8084.49	12365.98	0.10	3	31619 – *39704*	2 – 1	Hf I	GO70
8089.66	12358.08	0.05	20 U	23252 – *31342*	4 – 3	Hf I	GO70
8091.11	12355.87	0.10	3			Hf	GO70
8099.96	12342.36	0.05	3			Hf	GO70
8151.89	12263.74	0.20	60			Hf	GO70
8159.19	12252.77	0.05	3	*33139* – 41298	3 – 2	Hf I	GO70
8161.68	12249.03	0.10	3	26715 – *34877*	3 – 3	Hf I	GO70
8178.00	12224.58	0.10	2	*31952* – 40130	1 – 2	Hf I	GO70
8192.54	12202.89	0.10	3			Hf	GO70
8199.60	12192.39	0.05	3			Hf	GO70
8211.11	12175.29	0.02	5			Hf	GO70
8232.57	12143.56	0.10	7	26715 – *34947*	3 – 2	Hf I	GO70
8244.83	12125.49	0.05	3	28527 – *36772*	1 – 2	Hf I	GO70
8256.32	12108.62	0.02	4	25281 – *33538*	3 – 2	Hf I	GO70
8261.34	12101.26	0.05	4 U	30146 – *38407*	2 – 3	Hf I	GO70
8283.06	12069.53	0.05	7	23327 – *31610*	2 – 2	Hf I	GO70
8301.28	12043.04	0.02	680	17901 – *26202*	5 – 5	Hf I	GO70
8302.44	12041.36	0.10	20			Hf	GO70
8307.03	12034.71	0.02	7			Hf	GO70
8310.77	12029.29	0.02	20			Hf	GO70
8316.00	12021.72	0.02	40	31119 – *39435*	2 – 2	Hf I	GO70
8334.24	11995.41	0.10	2	*33949* – 42283	3 – 4	Hf I	GO70
8338.57	11989.19	0.02	30	*14541* – 22880	3 – 3	Hf I	GO70
8358.28	11960.91	0.05	390			Hf	GO70
8366.24	11949.53	0.10	8 W			Hf	GO70
8367.35	11947.95	0.05	8			Hf	GO70

Hf—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8379.19	11931.07	0.20	10	5638 – *14017*	2 – 1	Hf I	GO70
8380.57	11929.10	0.02	2	31054 – *39435*	3 – 2	Hf I	GO70
8394.47	11909.34	0.10	3	*30733* – 39127	4 – 3	Hf I	GO70
8402.65	11897.75	0.05	3	35115 – *43517*	2 – 2	Hf I	GO70
8409.21	11888.47	0.10	10	*19791* – 28200	2 – 2	Hf I	GO70
8421.34	11871.35	0.05	2	28527 – *36949*	1 – 1	Hf I	GO70
8438.43	11847.30	0.05	4	40513 – *48951*	2 – 2	Hf I	GO70
8445.04	11838.03	0.10	6	*14435* – 22880	2 – 3	Hf I	GO70
8446.49	11836.00	0.05	6 W			Hf	GO70
8454.02	11825.46	0.02	2	25084 – *33538*	2 – 2	Hf I	GO70
8454.94	11824.17	0.10	1			Hf	GO70
8462.23	11813.98	0.20	6	22880 – *31342*	3 – 3	Hf I	GO70
8474.25	11797.22	0.10	1			Hf	GO70
8486.66	11779.98	0.05	7	38289 – *46775*	2 – 3	Hf I	GO70
8490.36	11774.85	0.05	4	*18224* – 26715	4 – 3	Hf I	GO70
8493.01	11771.17	0.05	70	20908 – *29401*	2 – 2	Hf I	GO70
8496.10	11766.88	0.05	150	5521 – *14017*	0 – 1	Hf I	GO70
8528.46	11729.12	0.05	4	*33538* – 42061	2 – 3	Hf I	GO70
8526.32	11725.19	0.10	4 W	34991 – *43517*	1 – 2	Hf I	GO70
8534.08	11714.51	0.05	4	22199 – *30733*	3 – 4	Hf I	GO70
8541.31	11704.60	0.20	4	*34947* – 43489	2 – 3	Hf I	GO70
8574.91	11658.73	0.10	10			Hf	GO70
8585.14	11644.85	0.10	7	31119 – *39704*	2 – 1	Hf I	GO70
8588.40	11640.43	0.05	2	36523 – *45112*	3 – 3	Hf I	GO70
8609.42	11612.0	0.50	1			Hf	GO70
8612.07	11608.43	0.20	1			Hf	GO70
8616.57	11602.38	0.10	130	20784 – *29401*	1 – 2	Hf I	GO70
8624.47	11591.74	0.10	3	23327 – *31952*	2 – 1	Hf I	GO70
8645.76	11563.19	0.10	5 U			Hf	GO70
8647.67	11560.64	0.10	5			Hf	GO70
8651.30	11555.79	0.05	4	*26463* – 35115	1 – 2	Hf I	GO70
8667.53	11534.16	0.10	10	25281 – *33949*	3 – 3	Hf I	GO70
8690.52	11503.64	0.20	6	23252 – *31943*	4 – 4	Hf I	GO70
8692.57	11500.53	0.20	7			Hf	GO70
8707.93	11480.65	0.02	200	14740 – *23448*	2 – 3	Hf I	GO70
8711.14	11476.42	0.05	10	*14541* – 23252	3 – 4	Hf I	GO70
8713.08	11473.85	0.05	30	25281 – *33994*	3 – 2	Hf I	GO70
8729.36	11452.46	0.02	3	35115 – *43844*	2 – 1	Hf I	GO70
8730.53	11450.92	0.20	60	22880 – *31610*	3 – 2	Hf I	GO70
8738.48	11440.51	0.02	3	26715 – *35453*	3 – 3	Hf I	GO70
8759.77	11412.70	0.10	30			Hf	GO70
8774.79	11393.17	0.02	10	*18143* – 26918	1 – 1	Hf I	GO70
8783.80	11381.48	0.05	3	*35993* – 44777	5 – 4	Hf I	GO70
8794.07	11368.18	0.20	610			Hf	GO70
8796.55	11364.98	0.20	610	5638 – *14435*	2 – 2	Hf I	GO70
8809.51	11348.26	0.05	3 U	*26305* – 35115	3 – 2	Hf I	GO70
8844.38	11303.52	0.10	100	20908 – *29752*	2 – 2	Hf I	GO70
8849.52	11296.96	0.20	9	*18224* – 27074	4 – 4	Hf I	GO70
8892.56	11242.28	0.05	40	*14435* – 23327	2 – 2	Hf I	GO70
8897.15	11236.47	0.05	40	*38407* – 47304	3 – 2	Hf I	GO70
8903.08	11228.99	0.20	460	5638 – *14541*	2 – 3	Hf I	GO70
8904.08	11227.73	0.02	230			Hf	GO70
8910.97	11219.05	0.20	10			Hf	GO70
8920.83	11206.65	0.10	6	*16163* – 25084	2 – 2	Hf I	GO70
8931.29	11193.52	0.05	1	36523 – *45455*	3 – 3	Hf I	GO70
8934.03	11190.09	0.20	2			Hf	GO70
8968.04	11147.65	0.10	60	20784 – *29752*	1 – 2	Hf I	GO70
8968.56	11147.0	0.50	4			Hf	GO70
8974.95	11139.07	0.10	80			Hf	GO70
9012.59	11092.55	0.10	3			Hf	GO70
9027.29	11074.49	0.05	40	8983 – *18011*	2 – 2	Hf I	GO70
9049.75	11047.00	0.20	80			Hf	GO70
9056.29	11039.03	0.20	20			Hf	GO70
9063.57	11030.16	0.02	50	22880 – *31943*	3 – 2	Hf I	GO70
9088.39	11000.04	0.02	7	20908 – *29996*	2 – 3	Hf I	GO70
9111.96	10971.58	0.10	380	15673 – *24785*	3 – 4	Hf I	GO70

Hf—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9127.20	10953.26	0.10	8	25678 – *34805*	3 – 4	Hf I	GO70
9139.79	10938.18	0.05	20	31054 – *40194*	3 – 2	Hf I	GO70
9143.45	10933.80	0.02	20	22199 – *31342*	3 – 3	Hf I	GO70
9152.15	10923.40	0.05	6 W			Hf	GO70
9159.58	10914.54	0.05	20	8983 – *18143*	2 – 1	Hf I	GO70
9170.99	10900.96	0.05	2	*31342* – 40513	3 – 2	Hf I	GO70
9196.90	10870.25	0.10	2			Hf	GO70
9198.50	10868.36	0.10	40			Hf	GO70
9212.66	10851.66	0.05	10 U	31054 – *40267*	3 – 2	Hf I	GO70
9217.22	10846.29	0.02	4			Hf	GO70
9280.47	10772.37	0.02	30	23252 – *32533*	4 – 3	Hf I	GO70
9288.82	10762.69	0.50	3			Hf	GO70
9309.98	10738.22	0.10	7	*14017* – 23327	1 – 2	Hf I	GO70
9311.91	10736.00	0.10	7			Hf	GO70
9346.11	10696.71	0.05	5	*31952* – 41298	1 – 2	Hf I	GO70
9361.95	10678.62	0.02	8			Hf	GO70
9383.41	10654.19	0.02	4			Hf	GO70
9397.65	10638.05	0.05	330	8983 – *18381*	2 – 3	Hf I	GO70
9400.48	10634.84	0.02	5			Hf	GO70
9411.68	10622.18	0.02	6	22199 – *31610*	3 – 2	Hf I	GO70
9413.23	10620.44	0.05	680 U			Hf	GO70
9427.25	10604.65	0.02	30			Hf	GO70
9431.33	10550.83	0.05	10			Hf	GO70
9435.94	10594.87	0.05	50	16766 – *26202*	4 – 5	Hf I	GO70
9451.47	10577.47	0.02	340			Hf	GO70
9490.64	10533.81	0.02	130 U			Hf	GO70
9495.34	10528.60	0.20	20			Hf	GO70
9496.50	10527.31	0.05	20			Hf	GO70
9512.21	10509.92	0.10	40	25084 – *34596*	2 – 1	Hf I	GO70
9524.17	10496.73	0.02	1	25281 – *34805*	3 – 4	Hf I	GO70
9535.37	10484.40	0.05	2	27074 – *36609*	4 – 3	Hf I	GO70
9539.24	10480.15	0.02	200	16766 – *26305*	4 – 3	Hf I	GO70
9551.49	10466.70	0.02	1			Hf	GO70
9554.73	10463.15	0.02	540 U			Hf	GO70
9571.18	10445.17	0.50	4			Hf	GO70
9590.89	10423.70	0.10	230	6572 – *16163*	1 – 2	Hf I	GO70
9595.22	10419.00	0.20	4	25281 – *34877*	3 – 3	Hf I	GO70
9599.78	10414.05	0.10	1			Hf	GO70
9606.43	10406.85	0.10	760			Hf	GO70
9610.73	10402.19	0.10	10			Hf	GO70
9615.16	10397.41	0.05	230	17901 – *27516*	5 – 4	Hf I	GO70
9623.70	10388.16	0.20	10	28527 – *38151*	1 – 1	Hf I	GO70
9630.59	10380.73	0.05	570			Hf	GO70
9639.30	10371.36	0.05	30 U			Hf	GO70
9666.09	10342.61	0.10	3	25281 – *34947*	3 – 2	Hf I	GO70
9680.70	10327.0	0.50	3			Hf	GO70
9744.32	10259.58	0.05	30	22199 – *31943*	3 – 4	Hf I	GO70
9759.90	10243.20	0.02	60			Hf	GO70
9775.20	10227.17	0.05	20	25678 – *35453*	3 – 3	Hf I	GO70
9790.48	10211.21	0.05	50			Hf	GO70
9792.80	10208.79	0.10	3			Hf	GO70
9793.73	10207.82	0.02	7	23327 – *33121*	2 – 2	Hf I	GO70
9802.97	10152.62	0.20	20			Hf	GO70
9808.08	10192.88	0.02	10 W			Hf	GO70
9831.25	10168.86	0.10	110			Hf	GO70
9863.78	10135.33	0.20	3	25084 – *34947*	2 – 2	Hf I	GO70
9877.07	10121.68	0.05	3			Hf	GO70
9886.34	10112.19	0.02	4	23252 – *33139*	4 – 3	Hf I	GO70
9892.87	10105.52	0.10	4			Hf	GO70
9894.50	10103.86	0.10	4	26715 – *36609*	3 – 3	Hf I	GO70
9901.24	10096.98	0.05	3			Hf	GO70
9905.26	10092.87	0.10	3			Hf	GO70
9909.51	10088.55	0.10	23	24085 – *33994*	5 – 4	Hf I	GO70
9913.03	10084.97	0.10	3			Hf	GO70
9915.13	10082.83	0.10	3			Hf	GO70
9924.94	10072.87	0.05	20			Hf	GO70

Hf—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9960.89	10036.51	0.02	90	15673 – *25634*	3 – 2	Hf I	GO70
9974.01	10023.31	0.05	3	4567 – *14541*	4 – 3	Hf I	GO70
9976.18	10021.13	0.10	60			Hf	GO70

Hf Reference

GO70 Gondhalekar, P., Ph.D. Thesis, University of London (1970).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1 m Czerny-Turner spectrometer
Detector: PbS cooled with a mixture of solid carbon dioxide and acetone

Helium

He, Z = 2

He I Normal state of valence electrons $1s^2\ ^1S_0$ I.P. = 198311 cm^{-1}

He II Normal state of valence electrons $1s\ ^2S_{1/2}$ I.P. = 438909 cm^{-1}

He

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2469.749	40478.90	0.01	4	*191451* – 193921		He I	LT70
4730.862	21132.03	0.01	20	*186209* – 190940	1 – 0	He I	LT70
4733.24	21121.43	0.01	10	*185564* – 190298	0 – 1	He I	LT70
4733.541	21120.07	0.01	80	*185564* – 190298		He I	LT70
5115.505	19543.08	0.01	20	186101 – *191217*		He I	LT70
5237.084	19089.38	0.01	110	*186209* – 191446	1 – 2	He I	LT70
5346.925	18697.23	0.01	230	186105 – *191451*	2 – 3	He I	LT70
5350.328	18685.34	0.01	530	186101 – *191451*		He I	LT70
5879.894	17002.47	0.01	230	*185564* – 191444		He I	LT70
6627.888	15083.64	0.01	12	184864 – *191492*	0 – 1	He I	LT70
7699.154	12984.89	0.01	2	186101 – *193800*		He I	LT70
7708.916	12968.45	0.01	10	*186209* – 193918	1 – 2	He I	LT70
7782.417	12845.96	0.01	7	*185564* – 193347		He I	LT70
7816.124	12790.57	0.01	20	186105 – *193921*	2 – 3	He I	LT70
7819.530	12784.99	0.01	50	186101 – *193921*		He I	LT70
7980.245	12527.52	0.01	20	183236 – *191217*		He I	LT70
8352.550	11969.12	0.01	30	*185564* – 193917		He I	LT70
9157.432	10917.10	0.01	3	186105 – *195262*	2 – 3	He I	LT70
9160.833	10913.05	0.01	9	186101 – *195262*		He I	LT70

He Reference

LT70 Litzén, U., Physica Scripta **2**, 103–105 (1970).
Source: Electrodeless discharge (18 MHz)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Martin, W. C., J. Phys. Chem. Ref. Data **2**, 257–265 (1973).

Indium

In, Z = 49

In I Normal state of valence electrons $5s^2 5p\ ^2P^\circ_{1/2}$ I.P. = 46670 cm^{-1}

In II Normal state of valence electrons $5s^2\ ^1S_0$ I.P. = 152159 cm^{-1}

In

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4186.62	23879.13	0.02	7 L	*32115* – 36301	1½ – ½	In I	JO67
4484.88	22291.06	0.02	6 L	*31816* – 36301	½ – ½	In I	JO67
5969.21	16748.07	0.02	1 L	32892 – *38861*	1½ – ½	In I	JO67
6057.37	16504.31	0.02	2 L	32915 – *38972*	2½ – 1½	In I	JO67
6792.05	14719.08	0.02	7 LB	32915 – *39707*	2½ –	In I	JO67
6815.39	14668.66	0.02	6 L	32892 – *39707*	1½ – 2½	In I	JO67
6933.30	14419.20	0.02	3 L	*32115* – 39048	1½ – 1½	In I	JO67
6983.16	14316.25	0.02	6 L	*32115* – 39098	1½ – 2½	In I	JO67
7231.57	13824.48	0.02	5 L	*31816* – 39048	½ – 1½	In I	JO67
7444.00	13429.96	0.02	9 L	24372 – *31816*	½ – ½	In I	JO67
7742.26	12912.59	0.02	10 L	24372 – *32115*	½ – 1½	In I	JO67
8521.74	11731.48	0.02	3 L	*32115* – 40636	1½ – ½	In I	JO67
8820.04	11334.72	0.02	2 L	*31816* – 40636	½ – ½	In I	JO67
9304.71	10744.31	0.02	6 LB	32915 – *42220*	2½ –	In I	JO67
9328.05	10717.42	0.02	5 L	32892 – *42220*	1½ – 2½	In I	JO67
9721.20	10283.98	0.02	0 L	*32115* – 41836	1½ – 1½	In I	JO67
9746.74	10257.03	0.02	2 L	*32115* – 41861	1½ – 2½	In I	JO67

In Reference

JO67 Johansson, I., and Litzén, U., Ark. Fys. **34**, 573–587 (1967).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer for wavelengths above 11300 Å
b) 3 m Czerny-Turner spectrograph for wavelengths below 11300 Å
Detector: a) PbS
b) Photographic

Iodine

I, Z = 53

I I Normal state of valence electrons $5s^25p^5\ ^2P^\circ_{3/2}$ I.P. = 84295 cm^{-1}

I II Normal state of valence electrons $5s^25p^4\ ^3P_2$ I.P. = 154304 cm^{-1}

I

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2401.24	41633.80		40	*75049* – 77450	1½ – 2½	I I	HU72
2485.12	40228.54		80	*74965* – 77450	2½ – 2½	I I	HU72
2498.06	40020.12		20	*77406* – 79904	1½ – 2½	I I	HU71
2500.42	39982.46		10	*77404* – 79904	½ – 1½	I I	HU71
2506.26	39889.18		7			I	HU71
2506.30	39888.58		5	*75049* – 77555	1½ – 1½	I I	HU72
2525.18	39587.14		6 B	*77362* – 79887	4½ – 4½	I I?	HU71
2525.87	39577.08		6 B	*77362* – 79887	5½ – 5½	I I?	HU71
2535.82	39424.16		40	*77359* – 79895	2½ – 3½	I I	HU71
2536.96	39406.47		125	*77362* – 79899	4½ – 5½	I I	HU71
2537.66	39395.70		140	*77362* – 79899	5½ – 6½	I I	HU71
2538.94	39375.85		25	*77356* – 79895	1½ – 2½	I I	HU71
2545.32	39277.09		7	*77359* – 79904	2½ – 2½	I I	HU71
2548.06	39234.88		5	*77356* – 79904	1½ – 1½	I I	HU71
2574.57	38830.82		90	*77313* – 79888	3½ – 4½	I I	HU71
2580.65	38739.40		210	*77307* – 79887	3½ – 4½	I I?	HU71
2580.65	38739.40		210	*77307* – 79888	2½ – 3½	I I?	HU71
2581.43	38727.61		190	*77306* – 79887	4½ – 5½	I I	HU71
2588.32	38624.60		3	*77307* – 79895	2½ – 2½	I I	HU71
2610.70	38293.46		6	*71976* – 74587	1½ – 1½	I I	HU72
2648.08	37752.91		3	*72529* – 75177	2½ – 2½	I I	HU72
2670.21	37440.03		20	63186 – *65856*	½ – ½	I I	HU72
2692.79	37126.08		4	*65856* – 68549	½ – 1½	I I	HU72
2719.94	36755.49		8	74587 – *77307*	1½ – 2½	I I	HU72
2737.81	36515.58		2	76106 – *78844*	2½ – 3½	I I	HU72
2749.26	36363.51		40	*73387* – 76136	½ – 1½	I I	HU72
2754.80	36290.38		85	72294 – *75049*	1½ – 1½	I I	HU72
2758.79	36237.89		160	*65856* – 68615	½ – ½	I I	HU72
2769.39	36099.19		3	*73054* – 75823	1½ – 1½	I I	HU72
2773.52	36045.44		55	*71813* – 74587	½ – 1½	I I	HU72
2844.37	35147.58		7	*73054* – 75898	1½ – 2½	I I	HU72
2850.00	35078.15		5	76004 – *78854*	3½ – 2½	I I	HU72
2885.72	34643.95		4	68615 – *71501*	½ – ½	I I	HU72
2889.52	34598.39		90	*65669* – 68559	3½ – 3½	I I	HU72
2896.66	34513.11		900	72294 – *75191*	1½ – 2½	I I	HU72
2905.26	34410.94		4	*65644* – 68549	2½ – 1½	I I	HU72
2915.02	34295.73		10000	*65644* – 68559	2½ – 3½	I I	HU72
2917.88	34262.11		3	*65669* – 68587	3½ – 2½	I I	HU72
2929.68	34124.11		6	76903 – *79832*	2½ – 3½	I I	HU72
2936.89	34040.34		3	76903 – *79840*	2½ – 2½	I I	HU72
2943.38	33965.28		7	*65644* – 68587	2½ – 2½	I I	HU72
2944.42	33953.29		9	76903 – *79847*	2½ – 3½	I I	HU72
2981.93	33526.18		5	*72529* – 75511	2½ – 3½	I I	HU72
2991.51	33418.82		2	75823 – *78815*	1½ – 1½	I I	HU72
3008.31	33232.19		400	72294 – *75303*	1½ – ½	I I	HU72
3016.80	33138.67		6	*72807* – 75823	1½ – 1½	I I	HU72
3030.61	32987.66		3	*73387* – 76417	½ – ½	I I	HU72
3051.98	32756.62		1	*73054* – 76106	1½ – 2½	I I	LU75
3061.899	32650.57		2	71903 – *74965*	2½ – 2½	I I	LU75
3081.87	32438.98		8	*73054* – 76136	1½ – 1½	I I	HU72
3086.50	32390.32		1	61819 – *64906*	1½ – 2½	I I	LU75
3089.08	32363.27		5	*67062* – 70151	1½ – 2½	I I	LU75
3091.76	32335.22		1	*72807* – 75898	1½ – 2½	I I	LU75
3093.18	32320.37		8	76746 – *79840*	1½ – 2½	I I	HU72
3116.95	32073.90		1			I	LU75
3125.75	31983.60		1			I	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
3134.53	31894.01		5 B	76746 – *79881*	1½ – 1½	I 1?	HU72
3134.83	31890.96		5 B	76746 – *79881*	1½ – ½	I 1?	HU72
3140.28	31835.61		12	75704 – *78844*	4½ – 3½	I 1	HU72
3145.75	31780.25		3	71903 – *75049*	2½ – 1½	I 1?	LU75
3145.75	31780.25		3	79285 – *82431*	½ – 1½	I 1?	LU75
3170.24	31534.75		12	61819 – *64990*	1½ – 1½	I 1	HU72
3182.97	31408.63		30	79030 – *82213*	1½ – 2½	I 1	HU72
3189.18	31347.47		5	78415 – *81604*	½ – ½	I 1	HU72
3200.52	31236.40		8	*71976* – 75177	1½ – 2½	I 1	HU72
3221.13	31036.54		8	75511 – *78732*	3½ – 2½	I 1	HU72
3222.21	31026.14		5	76903 – *80125*	2½ – 2½	I 1	HU72
3264.15	30627.49		7	68549 – *71813*	1½ – ½	I 1	HU72
3269.74	30575.13		8	*75621* – 78891	1½ – 1½	I 1	HU72
3287.60	30409.03		1	71903 – *75191*	2½ – 2½	I 1	LU75
3290.321	30383.88		8	71903 – *75194*	2½ – 3½	I 1	LU75
3292.70	30361.93		10	*67062* – 70354	1½ – 1½	I 1	LU75
3299.43	30300.00		1	*72807* – 76106	1½ – 2½	I 1?	LU75
3299.43	30300.00		1	75704 – *79003*	4½ – 3½	I 1?	LU75
3307.25	30228.36		6	78415 – *81722*	½ – 1½	I 1	HU72
3321.93	30094.77		4	*75621* – 78943	1½ – 2½	I 1	HU72
3322.79	30086.98		8	78891 – *82213*	1½ – 2½	I 1	HU72
3326.546	30053.01		3	72294 – *75621*	1½ – 1½	I 1	LU75
3328.844	30032.27		1	73977 – *77306*	3½ – 4½	I 1	LU75
3329.28	30028.33		120	*72807* – 76136	1½ – 1½	I 1	HU72
3329.60	30025.45		1	73977 – *77307*	3½ – 3½	I 1?	LU75
3329.60	30025.45		1	73977 – *77307*	3½ – 2½	I 1?	LU75
3333.27	29992.39		5	75511 – *78844*	3½ – 3½	I 1	HU72
3335.76	29970.00		7	73977 – *77313*	3½ – 3½	I 1	HU72
3359.77	29755.83		1	*73387* – 76746	½ – 1½	I 1	LU75
3361.00	29744.94		1	68615 – *71976*	½ – 1½	I 1	LU75
3363.22	29725.30		4	*73054* – 76417	1½ – ½	I 1	HU72
3369.75	29667.70		1	*72529* – 75898	2½ – 2½	I 1	LU75
3381.88	29561.29		4	73977 – *77359*	3½ – 2½	I 1	HU72
3385.08	29533.34		10	73977 – *77362*	3½ – 4½	I 1	HU72
3385.10	29533.17		1	73977 – *77362*	3½ – 4½	I 1	LU75
3400.18	29402.19		1	79030 – *82431*	1½ – 1½	I 1	HU72
3409.56	29321.30		2	*75621* – 79030	1½ – 1½	I 1	HU72
3426.97	29172.34		3	68549 – *71976*	1½ – 1½	I 1	HU72
3463.60	28863.82		1	76417 – *79881*	½ – 1½	I 1	LU75
3463.95	28860.90		1	76417 – *79881*	½ – ½	I 1	LU75
3475.61	28764.08		2	*72529* – 76004	2½ – 3½	I 1	HU72
3511.937	28466.55		2	73795 – *77307*	2½ – 3½	I 1	LU75
3512.006	28465.99		2	73795 – *77307*	2½ – 2½	I 1	LU75
3540.00	28240.88		3	78891 – *82431*	1½ – 1½	I 1	HU72
3559.70	28084.59		2	*64989* – 68549	1½ – 1½	I 1	LU75
3561.31	28071.90		1	73795 – *77356*	2½ – 1½	I 1	LU75
3564.264	28048.71		1	73795 – *77359*	2½ – 2½	I 1	LU75
3577.39	27945.72		1	*72529* – 76106	2½ – 2½	I 1	LU75
3597.55	27789.11		1	*64989* – 68587	1½ – 2½	I 1	LU75
3611.44	27682.23		1	73795 – *77406*	2½ – 1½	I 1	HU72
3625.74	27573.05		9	*64989* – 68615	1½ – ½	I 1	LU75
3643.50	27438.65		5	*64906* – 68549	2½ – 1½	I 1	LU75
3653.250	27365.42		12	*64906* – 68559	2½ – 3½	I 1	LU75
3663.82	27286.47		3	*75621* – 79285	1½ – ½	I 1	HU72
3668.03	27255.16		1	73639 – *77307*	1½ – 2½	I 1	LU75
3681.569	27154.92		5	*64906* – 68587	2½ – 2½	I 1	LU75
3703.75	26992.30		1	76136 – *79840*	1½ – 2½	I 1	LU75
3709.99	26946.90		8	*75194* – 78904	3½ – 3½	I 1	HU72
3717.337	26893.64		1	73639 – *77356*	1½ – 1½	I 1	LU75
3717.692	26891.07		4	71903 – *75621*	2½ – 1½	I 1	LU75
3727.95	26817.08		1	*75303* – 79030	½ – 1½	I 1	LU75
3737.92	26745.55		1	76106 – *79844*	2½ – 2½	I 1	HU72
3764.98	26553.32		1	73639 – *77404*	1½ – ½	I 1	LU75
3771.01	26510.86		1			I	LU75
3774.48	26486.49		1	*75621* – 79395	1½ – 1½	I 1	LU75
3797.08	26328.84		1	*75621* – 79418	1½ – 2½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
3804.94	26274.45		3	*78592* – 82397	2½ – 2½	I 1	HU72
3824.697	26138.73		5	61819 – *65644*	1½ – 2½	I 1	LU75
3827.83	26117.34		2 B	74587 – *78415*	1½ – 1½	I 1?	HU72
3828.15	26115.15		2 B	76004 – *79832*	3½ – 3½	I 1?	HU72
3841.65	26023.38		2	*75049* – 78891	1½ – 1½	I 1	HU72
3847.15	25986.10		2	*71976* – 75823	1½ – 1½	I 1	LU75
3848.70	25975.71		1	*73054* – 76903	1½ – 2½	I 1	LU75
3860.93	25893.43		4	*75194* – 79054	3½ – 4½	I 1	LU75
3875.40	25796.75		1	63186 – *67062*	½ – 1½	I 1	LU75
3878.20	25778.12		1			I	LU75
3893.83	25674.65		1	*75049* – 78943	1½ – 2½	I 1	LU75
3922.15	25489.27		1	*71976* – 75898	1½ – 2½	I 1	LU75
3922.54	25486.73		1			I	LU75
3923.18	25482.57		1			I	LU75
3925.60	25466.86		1	*74965* – 78891	2½ – 1½	I 1	LU75
3926.60	25460.38		3	73477 – *77404*	½ – ½	I 1	LU75
3929.00	25444.83		6	73477 – *77406*	½ – 1½	I 1	LU75
3938.41	25384.03		3	*74965* – 78904	2½ – 3½	I 1	LU75
3939.78	25375.20		1	*72807* – 76746	1½ – 1½	I 1	LU75
3940.76	25368.89		1			I	LU75
3941.25	25365.74		1	75898 – *79840*	2½ – 2½	I 1?	LU75
3941.25	25365.74		1	68587 – *72529*	2½ – 2½	I 1?	LU75
3941.58	25363.62		1			I	LU75
3945.55	25338.10		1	75898 – *79844*	2½ – 2½	I 1	LU75
3948.80	25317.24		1	75898 – *79847*	2½ – 3½	I 1	LU75
3959.20	25250.74		7	*75191* – 79150	2½ – 3½	I 1	LU75
3977.706	25133.26		4	*74965* – 78943	2½ – 2½	I 1	LU75
3981.478	25109.45		2	*75049* – 79030	1½ – 1½	I 1	LU75
3982.20	25104.90		1	*75303* – 79285	½ – ½	I 1	LU75
4005.20	24960.73		1	74587 – *78592*	1½ – 2½	I 1	LU75
4011.00	24924.64		1	75823 – *79834*	1½ – 1½	I 1	LU75
4020.58	24865.25		1	75823 – *79844*	1½ – 2½	I 1	LU75
4037.18	24763.01		1	61819 – *65856*	1½ – ½	I 1	LU75
4065.40	24591.12		1	*74965* – 79030	2½ – 1½	I 1	LU75
4092.86	24426.13		1	*75303* – 79395	½ – 1½	I 1	LU75
4093.75	24420.82		32	60896 – *64989*	½ – 1½	I 1	LU75
4096.12	24406.69		7	*72807* – 76903	1½ – 2½	I 1	LU75
4120.48	24262.40		1	75714 – *79834*	½ – 1½	I 1	LU75
4120.68	24261.22		2	76004 – *80125*	3½ – 2½	I 1	HU72
4125.48	24232.99		1	75704 – *79829*	4½ – 4½	I 1	LU75
4129.83	24207.47		1	*71976* – 76106	1½ – 2½	I 1	LU75
4154.87	24061.58		5	75704 – *79858*	4½ – 5½	I 1	LU75
4168.640	23982.09		1	*73387* – 77555	½ – 1½	I 1	LU75
4184.93	23888.74		1	*74965* – 79150	2½ – 3½	I 1	LU75
4191.44	23851.64		2	68615 – *72807*	½ – 1½	I 1	LU75
4212.97	23729.75		1	*71501* – 75714	½ – ½	I 1	LU75
4217.77	23702.74		1	*72529* – 76746	2½ – 1½	I 1	LU75
4219.299	23694.15		2	68587 – *72807*	2½ – 1½	I 1	LU75
4227.152	23650.14		1	*75191* – 79418	2½ – 2½	I 1	LU75
4235.77	23602.02		1	*75049* – 79285	1½ – ½	I 1	LU75
4241.82	23568.35		5	73114 – *77356*	½ – 1½	I 1	LU75
4289.55	23306.11		2	73114 – *77404*	½ – ½	I 1	LU75
4292.00	23292.80		1	73114 – *77406*	½ – 1½	I 1	LU75
4303.98	23227.97		1	76903 – *81207*	2½ – 3½	I 1	LU75
4318.45	23150.14		3	75511 – *79829*	3½ – 4½	I 1	LU75
4321.83	23132.03		1	75511 – *79832*	3½ – 3½	I 1	LU75
4322.45	23128.72		2	*71501* – 75823	½ – 1½	I 1?	LU75
4322.45	23128.72		2	*71813* – 76136	½ – 1½	I 1?	LU75
4325.72	23111.23		1	*75621* – 79947	1½ – 1½	I 1	LU75
4336.55	23053.51		1	75511 – *79847*	3½ – 3½	I 1	LU75
4343.70	23015.57		1	*75049* – 79393	1½ – ½	I 1	LU75
4369.00	22882.29		1	*75049* – 79418	1½ – 2½	I 1	LU75
4372.25	22865.28		1			I	LU75
4374.10	22855.61		1	*72529* – 76903	2½ – 2½	I 1	LU75
4396.15	22740.97		1	*73054* – 77450	1½ – 2½	I 1	LU75
4438.860	22522.16		2	68615 – *73054*	½ – 1½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
4441.03	22511.16		1	*71976* – 76417	1½ – ½	I 1	LU75
4466.70	22381.78		1	68587 – *73054*	2½ – 1½	I 1	LU75
4470.18	22364.36	0.25	1 L	77555 – *82026*	1½ – 1½	I 1	VE69
4481.23	22309.21		30	*65669* – 70151	3½ – 2½	I 1	LU75
4497.90	22226.53		150	*65856* – 70354	½ – 1½	I 1	LU75
4506.72	22183.03		220	*65644* – 70151	2½ – 2½	I 1	LU75
4515.64	22139.21		3	67298 – *71813*	½ – ½	I 1	LU75
4603.825	21715.14		1	*71813* – 76417	½ – ½	I 1	LU75
4610.82	21682.20		2	70354 – *74965*	1½ – 2½	I 1	LU75
4644.08	21526.91		1	*75303* – 79947	½ – 1½	I 1	LU75
4654.33	21479.51		1	76004 – *80659*	3½ – 2½	I 1	LU75
4655.72	21473.09		1	75177 – *79832*	2½ – 3½	I 1	LU75
4667.24	21420.09		1	75177 – *79844*	2½ – 2½	I 1	LU75
4678.43	21368.86		5	67298 – *71976*	½ – 1½	I 1	LU75
4689.97	21316.28		1			I	LU75
4690.68	21313.05		1			I	LU75
4694.68	21294.89		2	70354 – *75049*	1½ – 1½	I 1	LU75
4710.37	21223.96		1	*65644* – *70354*	2½ – 1½	I 1	LU75
4720.61	21177.92		1	*75194* – 79914	3½ – 2½	I 1	LU75
4741.55	21084.40		1			I	LU75
4741.90	21082.84		1			I	LU75
4754.52	21026.88		1	73977 – *78732*	3½ – 2½	I 1	HU72
4755.786	21021.28		1	*75191* – 79947	2½ – 1½	I 1	LU75
4770.20	20957.76		1	*71976* – 76746	1½ – 1½	I 1	LU75
4771.43	20952.36		1	68615 – *73387*	½ – ½	I 1	LU75
4808.10	20792.56		1	76417 – *81225*	½ – ½	I 1	LU75
4809.45	20786.72		1	76417 – *81227*	½ – 1½	I 1	LU75
4814.46	20765.09		4	70151 – *74965*	2½ – 2½	I 1	LU75
4836.53	20670.34		2	70354 – *75191*	1½ – 2½	I 1	LU75
4837.45	20666.41		6	68549 – *73387*	1½ – ½	I 1	LU75
4841.60	20648.69		10	*67062* – 71903	1½ – 2½	I 1	LU75
4847.28	20624.50		1			I	LU75
4865.19	20548.57		1	*75049* – 79914	1½ – 2½	I 1	LU75
4897.62	20412.51		1	*75049* – 79947	1½ – 1½	I 1	LU75
4898.33	20409.55		1	70151 – *75049*	2½ – 1½	I 1	LU75
4921.527	20313.35		1	*72529* – 77450	2½ – 2½	I 1	LU75
4933.94	20262.25		2			I	LU75
4937.40	20248.05		2	73477 – *78415*	½ – 1½	I 1	LU75
4948.231	20203.73		3	70354 – *75303*	1½ – ½	I 1	LU75
4949.05	20200.38		2	*74965* – 79914	2½ – 2½	I 1	LU75
4953.33	20182.93		1	73639 – *78592*	1½ – 2½	I 1	LU75
4957.20	20167.17		1	75704 – *80661*	4½ – 3½	I 1	LU75
4960.717	20152.87		9	60896 – *65856*	½ – ½	I 1	LU75
5012.446	19944.89		1	72294 – *77307*	1½ – 2½	I 1	LU75
5025.90	19891.50		1	73977 – *79003*	3½ – 3½	I 1	LU75
5026.624	19888.64		1	*72529* – 77555	2½ – 1½	I 1	LU75
5040.136	19835.32		7	70151 – *75191*	2½ – 2½	I 1	LU75
5042.855	19824.62		6	70151 – *75194*	2½ – 3½	I 1	LU75
5060.57	19755.23		1			I	LU75
5064.704	19739.10		3	72294 – *77359*	1½ – 2½	I 1	LU75
5066.14	19733.51		I			I	LU75
5069.00	19722.37		1	76136 – *81205*	1½ – 2½	I 1	LU75
5080.28	19678.58		1	76136 – *81216*	1½ – 1½	I 1	LU75
5082.78	19668.90		1	76136 – *81219*	1½ – 2½	I 1	LU75
5089.05	19644.67		1	76417 – *81506*	½ – ½	I 1	LU75
5095.15	19621.15		1	76106 – *81201*	2½ – 3½	I 1	LU75
5098.85	19606.91		1	76106 – *81205*	2½ – 2½	I 1	LU75
5111.90	19556.86		1	72294 – *77406*	1½ – 1½	I 1	LU75
5114.20	19548.06		1	74587 – *79701*	1½ – ½	I 1	LU75
5126.05	19502.84		1	76903 – *82029*	2½ – 3½	I 1	LU75
5146.40	19425.76		6	66355 – *71501*	1½ – ½	I 1	LU75
5161.207	19370.02		52	*64989* – 70151	1½ – 2½	I 1	LU75
5204.20	19210.00		1	*75621* – 80825	1½ – ½	I 1	LU75
5212.82	19178.24		1	76004 – *81217*	3½ – 4½	I 1	LU75
5232.77	19105.12		108	*67062* – 72294	1½ – 1½	I 1	LU75
5242.36	19070.17		35	61819 – *67062*	1½ – 1½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5244.95	19060.75		3	*64906* – 70151	2½ – 2½	I 1	LU75
5260.89	19003.00		1	*75621* 80882	1½ – 2½	I 1	LU75
5266.597	18982.41		13	70354 – *75621*	1½ – 1½	I 1	LU75
5302.30	18854.59		1	73477 – *78780*	½ – ½	I 1	LU75
5308.33	18833.17		1	75898 – *81207*	2½ – 3½	I 1	LU75
5331.60	18750.98		1			I	LU75
5364.84	18634.80		2	*64989* – 70354	1½ – 1½	I 1	LU75
5380.57	18580.32		1			I	LU75
5384.10	18568.14		1			I	LU75
5387.88	18555.11		1	*75303* – 80690	½ – 1½	I 1	LU75
5390.93	18544.61		1	*75303* – 80693	½ – ½	I 1	LU75
5409.721	18480.20		2	71903 – *77313*	2½ – 3½	I 1	LU75
5448.544	18348.52		22	*64906* – 70354	2½ – 1½	I 1	LU75
5452.40	18335.54		1	74587 – *80039*	1½ – 1½	I 1	LU75
5455.83	18324.01		1	71903 – *77359*	2½ – 2½	I 1	LU75
5458.91	18313.67		1	66355 – *71813*	1½ – ½	I 1	LU75
5470.25	18275.71		17	70151 – *75621*	2½ – 1½	I 1	LU75
5474.01	18263.16		1	*71976* – 77450	1½ – 2½	I 1	LU75
5479.40	18245.19		1	*75303* – 80782	½ – 1½	I 1	LU75
5482.10	18236.21		1	*75194* – 80676	3½ – 3½	I 1	LU75
5484.85	18227.06		1	*75191* – 80676	2½ – 3½	I 1	LU75
5486.00	18223.24		1	*75194* – 80680	3½ – 2½	I 1	LU75
5495.60	18191.41		1	75704 – *81199*	4½ – 4½	I 1	LU75
5502.35	18169.09		2	*73387* – 78889	½ – ½	I 1	LU75
5508.85	18147.65		2	67298 – *72807*	½ – 1½	I 1	LU75
5513.02	18133.93		2	75704 – *81217*	4½ – 5½	I 1	LU75
5578.31	17921.68		3	*75194* – 80772	3½ – 4½	I 1	LU75
5608.506	17825.19		4	*72807* – 78415	1½ – ½	I 1	LU75
5630.60	17755.25		1	*75049* – 80680	1½ – 2½	I 1	LU75
5641.45	17721.10		1	*75049* – 80690	1½ – 1½	I 1	LU75
5677.79	17607.68		1	*75191* – 80869	2½ – 3½	I 1	LU75
5688.63	17574.13		1	75511 – *81199*	3½ – 4½	I 1	LU75
5690.60	17568.04		1	75511 – *81201*	3½ – 3½	I 1	LU75
5690.95	17566.96		1	*75191* – 80882	2½ – 2½	I 1	LU75
5710.53	17506.73		1	*74965* – 80676	2½ – 3½	I 1	LU75
5714.50	17494.57		1	*74965* – 80680	2½ – 2½	I 1	LU75
5725.30	17461.56		1	*74965* – 80690	2½ – 1½	I 1	LU75
5746.90	17395.93		1	73477 – *79224*	½ – 1½	I 1	LU75
5756.28	17367.59		2	67298 – *73054*	½ – 1½	I 1	LU75
5834.92	17133.52		2	*73054* – 78889	1½ – ½	I 1	LU75
5836.59	17128.61		2	*73054* – 78891	1½ – 1½	I 1	LU75
5888.80	16976.75		1	*73054* – 78943	1½ – 2½	I 1	LU75
5898.08	16950.04		1	*73387* – 79285	½ – ½	I 1	LU75
5956.26	16784.47		1	66020 *71976*	2½ – 1½	I 1	LU75
6006.03	16645.39		3	*73387* – 79393	1½ – ½	I 1	LU75
6082.352	16436.52		1	*72807* – 78889	1½ – ½	I 1	LU75
6084.01	16432.04	0.25	1 L	*72807* – 78891	1½ – 1½	I 1	VE69
6088.87	16418.92		3	67298 – *73387*	½ – ½	I 1	LU75
6165.90	16213.80		5	60896 – *67062*	½ – 1½	I 1	LU75
6174.089	16192.30		2	66355 – *72529*	1½ – 2½	I 1	LU75
6230.67	16045.25		1	*73054* – 79285	1½ – ½	I 1	LU75
6233.75	16037.33		150	*65669* – 71903	3½ – 2½	I 1	LU75
6259.30	15971.86		5	*65644* – 71903	2½ – 2½	I 1	LU75
6299.57	15869.76		1			I	LU75
6331.74	15789.13		1	75704 – *82035*	4½ – 5½	I 1?	LU75
6331.74	15789.13		1	75704 – *82036*	4½ – 4½	I 1?	LU75
6338.60	15772.05		5	*73054* – 79393	1½ – ½	I 1	LU75
6341.32	15765.28		1	*73054* – 79395	1½ – 1½	I 1	LU75
6362.006	15714.02		7	*72529* – 78891	2½ – 1½	I 1	LU75
6374.90	15682.24		1	*72529* – 78904	2½ – 3½	I 1	LU75
6377.75	15675.23		1	68587 – *74965*	2½ – 2½	I 1	LU75
6403.50	15612.19		1	73477 – *79881*	½ – 1½	I 1	LU75
6406.10	15605.86		2	68559 – *74965*	3½ – 2½	I 1	LU75
6415.702	15582.50		40	*67062* – 73477	1½ – ½	I 1	LU75
6415.92	15581.97	0.20	2 L	68549 – *74965*	1½ – 2½	I 1	VE69
6433.80	15538.67		1	68615 – *75049*	½ – 1½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6437.95	15528.65		106	*65856* – 72294	½ – 1½	I 1	LU75
6438.92	15526.31		22	*71976* – 78415	1½ – ½	I 1	LU75
6461.65	15471.70		2	68587 – *75049*	2½ – 1½	I 1	LU75
6478.12	15432.36		2	*72807* – 79285	1½ – ½	I 1	LU75
6485.20	15415.51		1	72294 – *78780*	1½ – ½	I 1	LU75
6499.80	15380.89		1	68549 – *75049*	1½ – 1½	I 1	LU75
6501.85	15376.04		2	*72529* – 79030	2½ – 1½	I 1	LU75
6508.713	15359.82		1	66020 – *72529*	2½ – 2½	I 1	LU75
6514.15	15347.00		1	66015 – *72529*	3½ – 2½	I 1	LU75
6559.87	15240.04		1	72294 – *78854*	1½ – 2½	I 1	LU75
6566.50	15224.65		1	*75194* – 81760	3½ – 4½	I 1	LU75
6577.172	15199.95		5	*67062* – 73639	1½ – 1½	I 1	LU75
6586.04	15179.48		5	*72807* – 79393	1½ – ½	I 1	LU75
6588.75	15173.24		1	*72807* – 79395	1½ – 1½	I 1	LU75
6598.85	15150.02		1	*75191* – 81790	2½ – 3½	I 1	LU75
6601.73	15143.41		1	*71813* – 78415	½ – ½	I 1	LU75
6611.35	15121.37		1	*72807* – 79418	1½ – 2½	I 1	LU75
6631.82	15074.70		18	68559 – *75191*	3½ – 2½	I 1	LU75
6634.50	15068.61		10	68559 – *75194*	3½ – 3½	I 1	LU75
6641.60	15052.50		1	68549 – *75191*	1½ – 2½	I 1	LU75
6645.10	15044.57		1			I	LU75
6650.407	15032.57		225	*65644* – 72294	2½ – 1½	I 1	LU75
6652.45	15027.95		1			I	LU75
6687.30	14949.63		1	68615 – *75303*	½ – ½	I 1	LU75
6697.50	14926.86		1			I	LU75
6699.505	14922.40		1	66355 – *73054*	1½ – 1½	I 1	LU75
6733.18	14847.77	0.25	1 L	*67062* – 73795	1½ – 2½	I 1	VE69
6753.30	14803.53		1	68549 – *75303*	1½ – ½	I 1	LU75
6754.15	14801.67		1			I	LU75
6758.30	14792.58		2			I	LU75
6786.70	14730.68		1	66020 – *72807*	2½ – 1½	I 1	LU75
6828.50	14640.50		1	71903 – *78732*	2½ – 2½	I 1	LU75
6866.70	14559.06		1	*72529* – 79395	2½ – 1½	I 1	LU75
6913.741	14460.00		100	*64989* – 71903	1½ – 2½	I 1	LU75
6914.190	14459.06		5	*71501* – 78415	½ – ½	I 1	LU75
6914.43	14458.56		1	*71976* – 78891	1½ – 1½	I 1	LU75
6929.770	14426.55		1	72294 – *79224*	1½ – 1½	I 1	LU75
6940.567	14404.11		1	71903 – *78844*	2½ – 3½	I 1	LU75
6952.46	14379.47		6	70354 – *77307*	1½ – 2½	I 1	LU75
6966.60	14350.28		1	*71976* – 78943	1½ – 2½	I 1	LU75
6997.448	14287.02		200	*64906* – 71903	2½ – 2½	I 1	LU75
7004.80	14272.02		36	70354 – *77359*	1½ – 2½	I 1	LU75
7033.50	14213.79		1	68587 – *75621*	2½ – 1½	I 1	LU75
7049.50	14181.53		1	70354 – *77404*	1½ – ½	I 1	LU75
7051.95	14176.60		15	70354 – *77406*	1½ – 1½	I 1	LU75
7071.80	14136.81		1	68549 – *75621*	1½ – 1½	I 1	LU75
7077.229	14125.96		6	*71813* – 78891	½ – 1½	I 1	LU75
7086.94	14106.61	0.25	1 L	84295 – 91382	2 – 1	I II	VE69
7110.60	14059.67		1			I	LU75
7156.10	13970.27	0.20	1 L	70151 – *77307*	2½ – 3½	I 1?	VE69
7156.10	13970.27	0.20	1 L	70151 – *77307*	2½ – 2½	I 1?	VE69
7162.255	13958.27		140	70151 – *77313*	2½ – 3½	I 1	LU75
7208.40	13868.91		26	70151 – *77359*	2½ – 2½	I 1	LU75
7217.034	13852.32		1	*71813* – 79030	½ – 1½	I 1	LU75
7255.60	13778.69		1	70151 – *77406*	2½ – 1½	I 1	LU75
7257.85	13774.42		22	*65856* – 73114	½ – ½	I 1	LU75
7304.887	13685.72		46	*64989* – 72294	1½ – 1½	I 1	LU75
7308.50	13678.96		1	*71976* – 79285	1½ – ½	I 1	LU75
7389.70	13528.65		1	*71501* – 78891	½ – 1½	I 1	LU75
7406.75	13497.51		1	72294 – *79701*	1½ – ½	I 1	LU75
7416.45	13479.85		5	*71976* – 79393	1½ – ½	I 1	LU75
7467.642	13387.45		15	67726 – *75194*	4½ – 3½	I 1	LU75
7529.512	13277.44		1	*71501* – 79030	½ – 1½	I 1	LU75
7579.20	13190.40		1	*71813* – 79393	½ – ½	I 1	LU75
7581.95	13185.61		2	*71813* – 79395	½ – 1½	I 1	LU75
7602.970	13149.16		60	0 – *7602*	1½ – ½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7620.34	13119.19	0.25	1 L			I	VE69
7620.875	13118.27		40	*65856* – 73477	½ – ½	I 1	LU75
7621.30	13117.53	0.25	1 L			I	VE69
7685.431	13008.07		1	*73387* – 81072	½ – 1½	I 1	LU75
7700.85	12982.03		1			I	LU75
7709.65	12967.21		1			I	LU75
7751.20	12897.70		1	67298 – *75049*	½ – 1½	I 1	LU75
7782.34	12846.09		4	*65856* – 73639	½ – 1½	I 1	LU75
7783.80	12843.68		1	*71501* – 79285	½ – ½	I 1	LU75
7867.50	12707.04		1	73639 – *81506*	1½ – ½	I 1	LU75
7891.72	12668.04		1	*71501* – 79393	½ – ½	I 1	LU75
7894.41	12663.73		1	*71501* – 79395	½ – 1½	I 1	LU75
8004.75	12489.17		1	67298 – *75303*	½ – ½	I 1	LU75
8060.50	12402.78		15	70354 – *78415*	1½ – 1½	I 1	LU75
8124.83	12304.58		150	*64989* – 73114	1½ – ½	I 1	LU75
8125.34	12303.81		23	*65669* – 73795	3½ – 2½	I 1	LU75
8150.85	12265.30		11	*65644* – 73795	2½ – 2½	I 1	LU75
8237.737	12135.94		106	70354 – *78592*	1½ – 2½	I 1	LU75
8264.12	12097.19		13	70151 – *78415*	2½ – 1½	I 1	LU75
8307.727	12033.69		300	*65669* – 73977	3½ – 3½	I 1	LU75
8314.73	12023.56		34	63186 – *71501*	½ – ½	I 1	LU75
8333.237	11996.86		450	*65644* – 73977	2½ – 3½	I 1	LU75
8425.14	11866.00		2	70354 – *78780*	1½ – ½	I 1	MI62
8487.840	11778.34		320	*64989* – 73477	1½ – ½	I 1	LU75
8488.08	11778.01		45			I	MI62
8499.82	11761.74		2	70354 – *78854*	1½ – 2½	I 1	MI62
8581.05	11650.40		1 W	70151 – *78732*	2½ – 2½	I 1	MI62
8610.47	11610.60		5	66355 – *74965*	1½ – 2½	I 1	MI62
8627.20	11588.07		37	63186 – *71813*	½ – ½	I 1	LU75
8649.305	11558.46		350	*64989* – 73639	1½ – 1½	I 1	LU75
8664.22	11538.57		2	70151 – *78815*	2½ – 1½	I 1	MI62
8694.46	11498.43		18	66355 – *75049*	1½ – 1½	I 1	LU75
8703.27	11486.80		8	*71976* – 80680	1½ – 2½	I 1?	MI62
8703.27	11486.80		8	70151 – *78854*	2½ – 2½	I 1?	MI62
8719.45	11465.47		13	68587 – *77307*	2½ – 3½	I 1?	LU75
8719.45	11465.47		13	68587 – *77307*	2½ – 2½	I 1?	LU75
8725.09	11458.07		6			I	MI62
8725.50	11457.52		13	68587 – *77313*	2½ – 3½	I 1	LU75
8725.84	11457.08		8	68587 – *77313*	2½ – 3½	I 1	MI62
8730.453	11451.02		51	*65856* – 74587	½ – 1½	I 1	LU75
8733.012	11447.67		160	*64906* – 73639	2½ – 1½	I 1	LU75
8746.86	11429.56		15	68559 – *77306*	3½ – 4½	I 1	MI62
8747.74	11428.40		50	68559 – *77307*	3½ – 3½	I 1?	MI62
8747.74	11428.40		50	68559 – *77307*	3½ – 2½	I 1?	MI62
8753.923	11420.32		154	68559 – *77313*	3½ – 3½	I 1	LU75
8757.50	11415.66		3	68549 – *77307*	1½ – 2½	I 1?	MI62
8757.50	11415.66		3	71903 – *80661*	2½ – 3½	I 1?	MI62
8761.779	11410.08		137	*67062* – 75823	1½ – 1½	I 1	LU75
8768.42	11401.46		2	68587 – *77356*	2½ – 1½	I 1	MI62
8771.09	11397.98		10			I	MI62
8771.70	11397.18		16	68587 – *77359*	2½ – 2½	I 1	LU75
8772.23	11396.50		10			I	MI62
8788.633	11375.22		108	68615 – *77404*	½ – ½	I 1	LU75
8789.75	11373.78		1	63186 – *71976*	½ – 1½	I 1	MI62
8791.054	11372.09		250	68615 – *77406*	½ – 1½	I 1	LU75
8795.07	11366.90		1			I	MI62
8803.262	11356.32		2400	68559 – *77362*	3½ – 4½	I 1	LU75
8805.32	11353.67		75	*64989* – 73795	1½ – 2½	I 1	MI62
8806.85	11351.69		15	68549 – *77356*	1½ – 1½	I 1	LU75
8809.849	11347.83		160	68549 – *77359*	1½ – 2½	I 1	LU75
8813.42	11343.23		75	56092 – *64906*	1½ – 2½	I 1	MI62
8836.763	11313.26		500	*67062* – 75898	1½ – 2½	I 1	LU75
8848.19	11298.66		4	*73387* – 82235	½ – 1½	I 1	MI62
8852.45	11293.22		54	70151 – *79003*	2½ – 3½	I 1	LU75
8854.62	11290.45		17	68549 – *77404*	1½ – ½	I 1	LU75
8857.041	11287.36		63	68549 – *77406*	1½ – 1½	I 1	LU75

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8869.88	11271.03		1	70354 – *79224*	1½ – 1½	I I	MI62
8889.05	11246.72		200	*64906* – 73795	2½ – 2½	I I	LU75
8897.113	11236.52		6700	56092 – *64989*	1½ – 1½	I I	LU75
8936.34	11187.21		5			I	MI62
8942.82	11179.11		10	*65644* – 74587	2½ – 1½	I I	MI62
8945.17	11176.16		33	66020 – *74965*	2½ – 2½	I I	LU75
8947.87	11172.79		8	66355 – *75303*	1½ – ½	I I	MI62
8950.613	11169.36		71	66015 – *74965*	3½ – 2½	I I	LU75
8968.46	11147.15		10	*71813* – 80782	½ – 1½	I I	MI62
8974.05	11140.20		6	*73054* – 82028	1½ – ½	I I	MI62
8975.74	11138.10		2			I	MI62
8993.09	11116.62		7			I	MI62
9011.66	11093.70		4 B	*71813* – 80825	½ –	I I	MI62
9018.99	11084.68		1	125483 – *134502*	3 – 4	I II	MA60
9019.42	11084.16		2	*73054* – 82074	1½ – 2½	I I	MI62
9029.045	11072.34		42	66020 – *75049*	2½ – 1½	I I	LU75
9039.48	11059.56		4	*73387* – 82426	½ – 1½	I I	MI62
9044.20	11053.79		15	*67062* – 76106	1½ – 2½	I I	MI62
9047.27	11050.04		2			I	MI62
9052.55	11043.59		12			I	LU75
9071.44	11020.60		250	*64906* – 73977	2½ – 3½	I I	MI62
9074.29	11017.14		100	*67062* – 76136	1½ – 1½	I I	MI62
9095.71	10991.19		4	*71976* – 81072	1½ – 1½	I I	MI62
9105.23	10979.70		6	*73054* – 82159	1½ – 1½	I I	MI62
9112.95	10970.39		4	*72529* – 81642	2½ – 2½	I I	MI62
9159.77	10914.32		15	*72529* – 81689	2½ – 3½	I I	MI62
9173.60	10897.87		65	66020 – *75194*	2½ – 3½	I I	MI62
9176.30	10894.66		70	66015 – *75191*	3½ – 2½	I I	MI62
9178.99	10891.47		75 D	66015 – *75194*	3½ – 3½	I I	MI62
9180.88	10889.23		18	*73054* – 82235	1½ – 1½	I I	MI62
9208.31	10856.80		2	*72529* – 81737	2½ – 1½	I I	MI62
9221.43	10841.34		4	*72807* – 82028	1½ – ½	I I	MI62
9266.87	10788.18		10	*72807* – 82074	1½ – 2½	I I	MI62
9275.65	10777.97		4	*71976* – 81252	1½ – 2½	I I	MI62
9280.98	10771.79		20	*71501* – 80782	½ – 1½	I I	MI62
9324.01	10722.07		2 B	*71501* – 80825	½ –	I I	MI62
9337.31	10706.79		15	*72807* – 82144	1½ – 2½	I I	MI62
9346.72	10696.02		100	70354 – *79701*	1½ – ½	I I	MI62
9351.00	10691.12		1			I	MA60
9355.64	10685.82		100	*67062* – 76417	1½ – ½	I I	MI62
9428.15	10603.64		4	72294 – *81722*	1½ – 1½	I I?	MI62
9428.15	10603.64		4	*72807* – 82235	1½ – 1½	I I?	MI62
9441.55	10588.59		6	*73054* – 82496	1½ – 1½	I I	MI62
9450.80	10578.22		20			I	MI62
9480.02	10545.62		15	70354 – *79834*	1½ – 1½	I I	MI62
9485.33	10539.72		50	70354 – *79840*	1½ – 2½	I I	MI62
9489.62	10534.95		10	70354 – *79844*	1½ – 2½	I I	MI62
9507.27	10515.40		100	*65669* – 75177	3½ – 2½	I I	MI62
9526.58	10494.08		30 W	70354 – *79881*	1½ – 1½	I I	MI62
9532.80	10487.23		10	*65644* – 75177	2½ – 2½	I I	MI62
9549.19	10469.23		3			I	MI62
9551.65	10466.54		5000	56092 – *65644*	1½ – 2½	I I	MI62
9558.03	10459.55		1			I	MI62
9561.77	10455.45		2			I	MI62
9571.03	10445.35		5	*71501* – 81072	½ – 1½	I I	MI62
9577.02	10438.81		3			I	MI62
9580.20	10435.34		100 D	67726 – *77306*	4½ – 4½	I I	MI62
9586.60	10428.39		6 B	*73054* – 82641	1½ –	I I	MI62
9596.00	10418.15		1	124950 – *134546*	1 – 1	I II	MA60
9597.44	10416.61		75	*64989* – 74587	1½ – 1½	I I	MI62
9600.95	10412.80		10	66020 – *75621*	2½ – 1½	I I	MI62
9607.68	10405.49		6	*93005* – 102613	3 – 2	I II	MA60
9620.40	10391.74		400	63186 – *72807*	½ – 1½	I I	MI62
9635.74	10375.20		400	67726 – *77362*	4½ – 5½	I I	MI62
9654.60	10354.93		8			I	MI62
9661.04	10348.02		7			I	MI62

I—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9665.54	10343.20		3	*71976* – 81642	1½ – 2½	I I	MI62
9681.15	10326.53		75	*64906* – 74587	2½ – 1½	I I	MI62
9681.74	10325.90		100	61819 – *71501*	1½ – ½	I I?	MI62
9681.74	10325.90		100	70151 – *79832*	2½ – 3½	I I?	MI62
9684.87	10322.56		100	*67062* – 76746	1½ – 1½	I I?	MI62
9684.87	10322.56		100	70354 – *80039*	1½ – 1½	I I?	MI62
9684.87	10322.56		100	*72807* – 82491	1½ – 2½	I I?	MI62
9688.96	10318.20		35	70151 – *79840*	2½ – 2½	I I?	MI62
9688.96	10318.20		35	*72807* – 82496	1½ – 1½	I I?	MI62
9693.17	10313.72		4	70151 – *79844*	2½ – 2½	I I	MI62
9696.48	10310.20		50	70151 – *79847*	2½ – 3½	I I	MI62
9719.23	10286.07		8	*71976* – 81696	1½ – 2½	I I	MI62
9730.32	10274.34		4 W	70151 – *79881*	2½ – 1½	I I	MI62
9738.19	10266.04		5	*73054* – 82792	1½ – 2½	I I	MI62
9760.26	10242.83		10	*72529* – 82289	2½ – 3½	I I	MI62
9761.73	10241.29		20			I	MI62
9764.08	10238.82		1000	56092 – *65856*	1½ – ½	I I	MI62
9770.53	10232.06		35	70354 – *80125*	1½ – 2½	I I	MI62
9790.11	10211.60		5			I	MI62
9799.49	10201.82		7	68615 – *78415*	½ – 1½	I I	MI62
9827.34	10172.91		300	68587 – *78415*	2½ – 1½	I I	MI62
9834.02	10166.00		8 B	*72807* – 82641	1½ –	I I	MI62
9841.15	10158.64		400	*65669* – 75511	3½ – 3½	I I?	MI62
9841.15	10158.64		400	*67062* – 76903	1½ – 2½	I I?	MI62
9851.77	10147.70		1			I	MI62
9857.47	10141.83		100			I	MI62
9865.51	10133.56		40	68549 – *78415*	1½ – 1½	I I	MI62
9866.66	10132.38		3	*65644* – 75511	2½ – 3½	I I	MI62
9867.85	10131.16		750	63186 – *73054*	½ – 1½	I I	MI62
9872.81	10126.07		7	*71501* – 81374	½ – 1½	I I	MI62
9888.79	10109.70		5	70151 – *80039*	2½ – 1½	I I	MI62
9923.71	10074.13		7	*71813* – 81737	½ – 1½	I I	MI62
9931.01	10066.72		7	*71813* – 81744	½ – ½	I I	MI62
9947.42	10050.11		2 W			I	MI62
9962.76	10034.64		2	*72529* – 82491	2½ – 2½	I I	MI62
9967.03	10030.35		2	*65856* – 75823	½ – 1½	I I?	MI62
9967.03	10030.35		2	*72529* – 82496	2½ – 1½	I I?	MI62
9974.24	10023.10		22	70151 – *80125*	2½ – 2½	I I	MI62
9985.61	10011.68		20	*72807* – 82792	1½ – 2½	I I	MI62
9994.20	10003.06		350	61819 – *71813*	1½ – ½	I I	LU75

I References

MA60 Martin, W. C., and Corliss, C. H., J. Res. Nat. Bur. Stds. **64A**, 443–479 (1960).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Stated as being usually less than 0.1 cm⁻¹

MI62 Minnhagen, L., Ark. Fys. **21**, 415–478 (1962). The lines observed by Kiess and Corliss (1959) have been used in this publication.

VE69 Vergès, J., Spectrochim. Acta **24B**, 177–185 (1969).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS

HU71 Humphreys, C. J., Paul, E., Jr., and Minnhagen, L., J. Opt. Soc. Amer. **61**, 110–114 (1971).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1 m Littrow spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given

HU72 Humphreys, C. J., and Paul, E., Jr., J. Opt. Soc. Amer. **62**, 432–439 (1972).
Source: Electrodeless discharge tube (2.54 GHz)
Instrument: 1 m Littrow spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given—observed wavenumbers calculated from established energy levels

LU75 Luc-Koenig, E., Morillon, C., and Vergès, J., Physica Scripta **12**, 199–219 (1975).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Stated as being better than 0.015 cm⁻¹

Additional References

Eshbach, F. E., and Fisher, R. A., J. Opt. Soc. Amer. **44**, 868 (1954).

Kiess, C. C., and Corliss, C. H., J. Res. Nat. Bur. Stds. **63A**, 1 (1959).

Iron

Fe, Z = 26

Fe I Normal state of valence electrons $3d^64s^2\ ^5D_4$ I.P. = 63480 cm^{-1}

Fe II Normal state of valence electrons $3d^64s\ ^6D_{9/2}$ I.P. = 130524 cm^{-1}

Fe

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3527.843	28338.20	0.01	1			Fe	LI76
3561.861	28067.55	0.01	1			Fe	LI76
3750.025	26659.216	0.01	17	33412 – *37162*	3 – 3	Fe I	LI76
3755.852	26617.86	0.01	7	33765 – *37521*	2 – 2	Fe I	LI76
3799.41	26312.70	0.01	2			Fe	LI76
3812.545	26222.04	0.01	38	32873 – *36686*	4 – 4	Fe I	LI76
4011.154	24923.68	0.01	1	47005 – *51016*	5 – 5	Fe I	LI76
4042.708	24729.15	0.01	4			Fe	LI76
4055.939	24648.48	0.01	1			Fe	LI76
4071.116	24556.59	0.01	2	47005 – *51076*	5 – 4	Fe I	LI76
4072.541	24548.00	0.01	3			Fe	LI76
4082.571	24487.69	0.01	2	*40594* – 44677	4 – 4	Fe I	LI76
4101.545	24374.41	0.01	2			Fe	LI76
4108.443	24333.48	0.01	2	33412 – *37521*	3 – 2	Fe I	LI76
4120.152	24264.33	0.01	1			Fe	LI76
4151.061	24083.65	0.01	1	48531 – *52682*	3 – 2	Fe I	LI76
4178.680	23924.47	0.01	1			Fe	LI76
4219.171	23694.87	0.01	3	*40842* – 45061	3 – 3	Fe I	LI76
4221.149	23683.77	0.01	2	*42784* – 47005	6 – 5	Fe I	LI76
4240.509	23575.64	0.01	1	*53733* – 57974	3 – 2	Fe I	LI76
4242.115	23566.72	0.01	2	*49558* – 53800	4 – 5	Fe I	LI76
4252.295	23510.30	0.01	1	47960 – *52213*	4 – 3	Fe I	LI76
4289.115	23308.47	0.01	2	32873 – *37162*	4 – 3	Fe I	LI76
4314.050	23173.75	0.01	1			Fe	LI76
4315.821	23164.24	0.01	3	*41018* – 45333	2 – 2	Fe I	LI76
4319.475	23144.65	0.01	2	*49804* – 54124	3 – 4	Fe I	LI76
4375.957	22845.91	0.01	1	47005 – *51381*	5 – 4	Fe I	LI76
4378.549	22832.39	0.01	2	*41130* – 45509	1 – 1	Fe I	LI76
4396.241	22740.50	0.01	1			Fe	LI76
4419.689	22619.85	0.01	21	*40257* – 44677	5 – 4	Fe I	LI76
4448.506	22473.32	0.01	4			Fe	LI76
4459.081	22420.03	0.01	1			Fe	LI76
4464.486	22392.88	0.01	2	*41130* – 45595	1 – 0	Fe I	LI76
4466.035	22385.12	0.01	1	*42911* – 47377	5 – 4	Fe I	LI76
4466.893	22380.82	0.01	14	*40594* – 45061	4 – 3	Fe I	LI76
4478.064	22324.99	0.01	1			Fe	LI76
4491.098	22260.19	0.01	5	*41018* – 45509	2 – 1	Fe I	LI76
4491.718	22257.12	0.01	8	*40842* – 45333	3 – 2	Fe I	LI76
4565.995	21895.06	0.01	1	*49558* – 54124	4 – 4	Fe I	LI76
4575.120	21851.39	0.01	1	29371 – *33946*	3 – 2	Fe I	LI76
4707.149	21238.48	0.01	3	*39969* – 44677	3 – 4	Fe I	LI76
4715.607	21200.39	0.01	1			Fe	LI76
4720.561	21178.14	0.01	1			Fe	LI76
4732.556	21124.46	0.01	1	*43022* – 47755	4 – 3	Fe I	LI76
4762.638	20991.04	0.01	1	33412 – *38175*	3 – 3	Fe I	LI76
4796.962	20840.84	0.01	5	48531 – *53328*	3 – 4	Fe I	LI76
4805.193	20805.14	0.01	2	48928 – *53733*	2 – 3	Fe I	LI76
4806.438	20799.75	0.01	1	*49804* – 54611	3 – 2	Fe I	LI76
4806.604	20799.03	0.01	1			Fe	LI76
4821.019	20736.84	0.01	2	48036 – *52857*	2 – 1	Fe I	LI76
4825.643	20716.97	0.01	2	48531 – *53357*	3 – 3	Fe I	LI76
4829.990	20698.33	0.01	5	*40231* – 45061	2 – 3	Fe I	LI76
4846.048	20629.74	0.01	10			Fe	LI76
4856.771	20584.19	0.01	2	48531 – *53388*	3 – 3	Fe I	LI76
4899.182	20406.00	0.01	1	*43137* – 48036	3 – 2	Fe I	LI76
4909.462	20363.27	0.10	1 W			Fe	LI76

Fe—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4912.730	20349.73	0.01	2	33765 – *38678*	2 – 2	Fe I	LI76
4929.351	20281.11	0.01	5	*40404* – 45333	1 – 2	Fe I	LI76
4992.682	20023.85	0.01	7	47960 – *52953*	4 – 3	Fe I	LI76
5006.130	19970.06	0.01	1	29356 – *34362*	2 – 1	Fe I	LI76
5017.865	19923.36	0.01	2	*40491* – 45509	0 – 1	Fe I	LI76
5037.243	19846.71	0.01	1			Fe	LI76
5051.199	19791.88	0.01	22	*39625* – 44677	4 – 4	Fe I	LI76
5091.473	19635.32	0.01	10	*39969* – 45061	3 – 3	Fe I	LI76
5097.190	19613.30	0.10	1 W			Fe	LI76
5102.537	19592.74	0.01	3	*40231* – 45333	2 – 2	Fe I	LI76
5104.630	19584.71	0.01	1	*40404* – 45509	1 – 1	Fe I	LI76
5130.903	19484.43	0.10	1 W			Fe	LI76
5190.568	19260.46	0.01	2	*40404* – 45595	1 – 0	Fe I	LI76
5201.720	19219.16	0.01	1	48531 – *53733*	3 – 3	Fe I	LI76
5213.389	19176.15	0.01	1	*46137* – 51350	3 – 4	Fe I	LI76
5230.426	19113.68	0.01	25	33765 – *38995*	2 – 1	Fe I	LI76
5265.321	18987.01	0.01	47	33412 – *38678*	3 – 2	Fe I	LI76
5277.812	18942.07	0.01	4	*40231* – 45509	2 – 1	Fe I	LI76
5301.722	18856.65	0.01	105	32873 – *38175*	4 – 3	Fe I	LI76
5322.629	18782.58	0.10	2 W	*49052* – 54375	2 – 2	Fe I	LI76
5325.160	18773.65	0.10	2 W			Fe	LI76
5364.01	18637.68	0.01	3	*39969* – 45333	3 – 2	Fe I	LI76
5380.406	18580.88	0.10	1 W			Fe	LI76
5396.96	18523.89	0.01	1	47960 – *53357*	4 – 3	Fe I	LI76
5418.858	18449.04	0.10	1 W			Fe	LI76
5419.142	18448.07	0.10	1 W			Fe	LI76
5420.993	18441.77	0.10	1 W			Fe	LI76
5429.009	18414.54	0.01	7	48928 – *54357*	2 – 3	Fe I	LI76
5435.52	18392.48	0.01	2	*39625* – 45061	4 – 3	Fe I	LI76
5439.27	18379.80	0.10	3 W			Fe	LI76
5457.02	18320.02	0.01	1	*46313* – 51770	2 – 3	Fe I	LI76
5485.71	18224.20	0.01	4			Fe	LI76
5524.46	18096.37	0.10	1 W			Fe	LI76
5530.869	18075.41	0.01	1			Fe	LI76
5536.911	18055.68	0.01	1			Fe	LI76
5560.410	17979.38	0.01	1			Fe	LI76
5573.290	17937.82	0.01	3	47755 – *53328*	3 – 4	Fe I	LI76
5575.667	17930.18	0.01	5	47377 – *52953*	4 – 3	Fe I	LI76
5601.969	17845.99	0.01	2	47755 – *53357*	3 – 3	Fe I	LI76
5625.558	17771.16	0.01	5			Fe	LI76
5633.104	17747.36	0.01	1	47755 – *53388*	3 – 3	Fe I	LI76
5639.2	17728.2	0.10	1 W			Fe	LI76
5641.37	17721.35	0.10	1 W			Fe	LI76
5646.098	17706.51	0.01	1			Fe	LI76
5649.474	17695.93	0.01	1	47960 – *53610*	4 – 4	Fe I	LI76
5653.294	17683.97	0.10	1 W			Fe	LI76
5666.01	17644.29	0.01	1			Fe	LI76
5677.463	17608.69	0.10	1 W			Fe	LI76
5696.911	17548.58	0.01	1	48036 – *53733*	2 – 3	Fe I	LI76
5700.139	17538.64	0.01	1	*46137* – 51837	3 – 3	Fe I	LI76
5712.732	17499.98	0.01	1	48036 – *53749*	2 – 2	Fe I	LI76
5723.417	17467.31	0.01	1	*31322* – 37045	3 – 4	Fe I	LI76
5736.747	17426.72	0.01	1			Fe	LI76
5738.687	17420.83	0.01	1	*31307* – 37045	4 – 4	Fe I	LI76
5777.994	17302.32	0.01	5			Fe	LI76
5784.689	17282.29	0.01	1			Fe	LI76
5793.00	17257.50	0.01	1			Fe	LI76
5804.887	17222.16	0.01	1			Fe	LI76
5810.904	17204.33	0.01	2			Fe	LI76
5823.819	17166.17	0.01	1	47960 – *53784*	4 – 3	Fe I	LI76
5825.535	17161.12	0.01	3	48531 – *54357*	3 – 3	Fe I	LI76
5876.907	17011.11	0.01	4			Fe	LI76
5878.855	17005.47	0.01	3			Fe	LI76
5891.169	16969.92	0.01	3	48221 – *54112*	1 – 2	Fe I	LI76
5905.545	16928.61	0.01	1	47755 – *53661*	3 – 3	Fe I	LI76
5937.383	16837.84	0.01	1			Fe	LI76

Fe—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5950.878	16799.65	0.01	2	47377 – *53328*	4 – 4	Fe I	LI76
5967.433	16753.05	0.10	1 W			Fe	LI76
5978.046	16723.31	0.01	2	47755 – *53733*	3 – 3	Fe I	LI76
5979.550	16719.10	0.01	1	47377 – *53357*	4 – 3	Fe I	LI76
5993.873	16679.15	0.01	1	47755 *53749*	3 – 2	Fe I	LI76
5998.791	16665.47	0.01	3			Fe	LI76
6000.277	16661.35	0.10	1 W			Fe	LI76
6003.087	16653.55	0.01	2			Fe	LI76
6005.847	16645.89	0.01	3			Fe	LI76
6036.364	16561.74	0.01	2			Fe	LI76
6039.923	16551.98	0.01	1			Fe	LI76
6043.778	16541.42	0.01	2	47960 – *54004*	4 – 3	Fe I	LI76
6044.610	16539.15	0.01	1			Fe	LI76
6047.258	16531.90	0.01	1			Fe	LI76
6049.982	16524.46	0.01	4	48221 – *54271*	1 – 1	Fe I	LI76
6050.840	16522.12	0.01	1			Fe	LI76
6052.635	16517.22	0.01	4	47960 – *54013*	4 – 5	Fe I	LI76
6056.637	16506.30	0.01	1			Fe	LI76
6063.842	16486.69	0.01	20	43163 – *49227*	4 – 3	Fe I	LI76
6068.492	16474.06	0.01	2			Fe	LI76
6071.116	16466.94	0.10	1 W			Fe	LI76
6075.547	16454.93	0.01	1	48036 – *54112*	2 – 2	Fe I	LI76
6079.283	16444.82	0.01	13			Fe	LI76
6082.307	16436.64	0.01	2			Fe	LI76
6093.034	16407.70	0.10	1 W			Fe	LI76
6094.188	16404.60	0.10	2 W			Fe	LI76
6094.640	16403.38	0.01	2			Fe	LI76
6096.568	16398.19	0.01	4			Fe	LI76
6097.967	16394.43	0.01	5			Fe	LI76
6102.497	16382.26	0.01	2			Fe	LI76
6121.442	16331.56	0.01	1			Fe	LI76
6124.096	16324.48	0.01	6	43434 – *49558*	3 – 4	Fe I	LI76
6126.274	16318.68	0.01	2	47755 – *53881*	3 – 4	Fe I	LI76
6127.163	16316.31	0.01	8			Fe	LI76
6135.983	16292.86	0.01	2	47755 – *53891*	3 – 3	Fe I	LI76
6157.477	16235.98	0.01	2			Fe	LI76
6159.125	16231.64	0.01	2			Fe	LI76
6161.393	16225.66	0.01	1	17550 – *23711*	3 – 4	Fe I	LI76
6165.966	16213.55	0.01	1			Fe	LI76
6168.214	16207.72	0.01	3			Fe	LI76
6169.558	16204.19	0.01	1			Fe	LI76
6171.715	16198.53	0.01	7	43633 – *49804*	2 – 3	Fe I	LI76
6173.041	16195.05	0.01	2			Fe	LI76
6176.562	16185.81	0.01	1			Fe	LI76
6178.441	16180.89	0.01	1			Fe	LI76
6178.942	16179.58	0.01	1			Fe	LI76
6180.698	16174.98	0.01	1			Fe	LI76
6184.511	16165.01	0.01	6			Fe	LI76
6187.736	16156.59	0.01	1	54375 – *60563*	2 – 3	Fe I	LI76
6189.007	16153.27	0.01	5			Fe	LI76
6199.512	16125.90	0.01	4	51350 – *57550*	4 – 4	Fe I	LI76
6203.342	16115.94	0.01	1			Fe	LI76
6208.543	16102.44	0.01	9			Fe	LI76
6218.75	16076.01	0.10	1 W			Fe	LI76
6220.526	16071.42	0.01	1			Fe	LI76
6231.662	16042.70	0.01	1			Fe	LI76
6232.455	16040.66	0.01	7	47377 – *53610*	4 – 4	Fe I	LI76
6233.558	16037.82	0.01	1	20641 – *26874*	4 – 5	Fe I	LI76
6244.533	16009.63	0.01	6			Fe	LI76
6245.137	16008.09	0.01	1			Fe	LI76
6245.663	16006.74	0.01	3	*23110* – 29356	3 – 2	Fe I	LI76
6249.183	15997.72	0.01	2	47755 – *54004*	3 – 3	Fe I	LI76
6255.834	15980.71	0.01	8			Fe	LI76
6260.942	15967.67	0.01	1	*23110* – 29371	3 – 3	Fe I	LI76
6262.034	15964.89	0.01	4	*51435* – 57697	3 – 4	Fe I	LI76
6271.081	15941.86	0.01	2	51294 – *57565*	3 – 3	Fe I	LI76

Fe—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6276.485	15928.13	0.01	1			Fe	LI76
6279.445	15920.62	0.01	2			Fe	LI76
6283.127	15911.29	0.01	5	47377 – *53661*	4 – 3	Fe I	LI76
6285.205	15906.03	0.01	7	45333 – *51619*	2 – 3	Fe I	LI76
6285.87	15904.35	0.10	2 W			Fe	LI76
6286.987	15901.53	0.01	1			Fe	LI76
6288.369	15898.03	0.10	1 W	*51409* – 57697	4 – 4	Fe I	LI76
6289.482	15895.22	0.01	2			Fe	LI76
6290.362	15892.99	0.01	1			Fe	LI76
6290.594	15892.41	0.01	2	51350 – *57641*	4 – 3	Fe I	LI76
6292.432	15887.77	0.01	1	20874 – *27166*	3 – 4	Fe I	LI76
6296.124	15878.45	0.01	4	45333 – *51630*	2 – 2	Fe I	LI76
6300.062	15868.52	0.01	9	45061 – *51361*	3 – 3	Fe I	LI76
6301.97	15863.72	0.10	1 W			Fe	LI76
6311.327	15840.20	0.01	1			Fe	LI76
6312.354	15837.62	0.01	1			Fe	LI76
6313.345	15835.14	0.01	4			Fe	LI76
6318.263	15822.81	0.01	8	45509 – *51827*	1 – 2	Fe I	LI76
6318.705	15821.71	0.01	1			Fe	LI76
6319.739	15819.12	0.01	1			Fe	LI76
6320.132	15818.13	0.01	28	45061 – *51381*	3 – 4	Fe I	LI76
6320.728	15816.64	0.01	1	48036 – *54357*	2 – 3	Fe I	LI76
6323.318	15810.16	0.01	2	47005 – *53328*	5 – 4	Fe I	LI76
6327.963	15798.56	0.01	2	*47419* – 53747	2 – 3	Fe I	LI76
6328.101	15798.21	0.01	1	47960 – *54289*	4 – 3	Fe I	LI76
6331.793	15789.00	0.01	2			Fe	LI76
6337.784	15774.08	0.01	2			Fe	LI76
6339.175	15770.61	0.01	1			Fe	LI76
6339.656	15769.42	0.01	41	44677 – *51016*	4 – 5	Fe I	LI76
6342.909	15761.33	0.10	1 W			Fe	LI76
6347.815	15749.15	0.01	1	45061 – *51409*	3 – 4	Fe I	LI76
6350.730	15741.92	0.01	5	45595 – *51945*	0 – 1	Fe I	LI76
6355.629	15729.79	0.01	1	47377 – *53733*	4 – 3	Fe I	LI76
6358.133	15723.59	0.01	14	45333 – *51691*	2 – 3	Fe I	LI76
6370.621	15692.77	0.01	6	43434 – *49804*	3 – 3	Fe I	LI76
6370.995	15691.85	0.01	4			Fe	LI76
6373.197	15686.43	0.01	1	51192 – *57565*	4 – 3	Fe I	LI76
6376.816	15677.52	0.01	2			Fe	LI76
6381.813	15665.25	0.01	1			Fe	LI76
6383.129	15662.02	0.01	9			Fe	LI76
6386.853	15652.89	0.01	1			Fe	LI76
6388.628	15648.54	0.01	4			Fe	LI76
6395.399	15631.97	0.01	25	43163 – *49558*	4 – 4	Fe I	LI76
6399.616	15621.67	0.01	30	44677 – *51076*	4 – 4	Fe I	LI76
6406.779	15604.20	0.01	3	47377 – *53784*	4 – 3	Fe I	LI76
6412.003	15591.49	0.01	6			Fe	LI76
6413.318	15588.29	0.01	2			Fe	LI76
6428.93	15550.44	0.01	1			Fe	LI76
6432.382	15542.09	0.01	3			Fe	LI76
6435.634	15534.24	0.01	6	45509 – *51944*	1 – 2	Fe I	LI76
6436.668	15531.74	0.01	4	45509 – *51945*	1 – 1	Fe I	LI76
6449.3	15501.3	0.10	1 W			Fe	LI76
6453.876	15490.33	0.01	2	17726 – *24180*	2 – 3	Fe I	LI76
6493.539	15395.72	0.01	6	45333 – *51827*	2 – 2	Fe I	LI76
6493.980	15394.67	0.01	8			Fe	LI76
6499.336	15381.98	0.01	1			Fe	LI76
6508.535	15360.24	0.01	1			Fe	LI76
6515.516	15343.79	0.01	2	45595 – *52110*	0 – 1	Fe I	LI76
6519.077	15335.40	0.01	16			Fe	LI76
6533.501	15301.55	0.01	1	47755 – *54289*	3 – 3	Fe I	LI76
6536.479	15294.58	0.01	94			Fe	LI76
6557.750	15244.97	0.01	10	45061 – *51619*	3 – 3	Fe I	LI76
6566.470	15224.72	0.01	2			Fe	LI76
6568.671	15219.62	0.01	10	45061 – *51630*	3 – 2	Fe I	LI76
6573.885	15207.55	0.01	28			Fe	LI76
6579.538	15194.48	0.01	2	17927 – *24506*	1 – 2	Fe I	LI76

Fe—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6586.572	15178.26	0.01	1			Fe	LI76
6601.458	15144.03	0.01	2	45509 – *52110*	1 – 1	Fe I	LI76
6604.905	15136.13	0.01	1	47005 – *53610*	5 – 4	Fe I	LI76
6610.911	15122.38	0.01	4	45333 – *51945*	2 – 2	Fe I	LI76
6611.713	15120.54	0.01	1	*43922* – 50534	3 – 3	Fe I	LI76
6623.023	15094.72	0.01	3			Fe	LI76
6630.682	15077.28	0.01	6	17550 – *24180*	3 – 3	Fe I	LI76
6641.923	15051.77	0.01	37	43163 – *49804*	4 – 3	Fe I	LI76
6684.199	14956.57	0.01	3			Fe	LI76
6684.387	14956.15	0.01	11	44677 – *51361*	4 – 3	Fe I	LI76
6688.323	14947.35	0.01	1			Fe	LI76
6742.870	14826.43	0.01	40	42815 – *49558*	5 – 4	Fe I	LI76
6748.191	14814.74	0.01	4	*40257* – 47005	5 – 5	Fe I	LI76
6777.905	14749.79	0.10	2 W			Fe	LI76
6783.516	14737.59	0.01	2	*40594* – 47377	4 – 4	Fe I	LI76
6791.767	14719.69	0.01	6			Fe	LI76
6796.508	14709.42	0.01	2			Fe	LI76
6799.484	14702.98	0.01	11			Fe	LI76
6822.723	14652.90	0.01	2			Fe	LI76
6823.60	14651.02	0.01	1			Fe	LI76
6863.448	14565.95	0.01	14			Fe	LI76
6868.586	14555.06	0.01	50			Fe	LI76
6869.627	14552.85	0.01	2			Fe	LI76
6883.455	14523.62	0.01	2	45061 – *51944*	3 – 2	Fe I	LI76
6888.859	14512.23	0.01	72			Fe	LI76
6895.692	14497.84	0.01	5			Fe	LI76
6920.198	14446.50	0.01	1			Fe	LI76
6922.220	14442.28	0.01	20			Fe	LI76
6923.629	14439.35	0.01	2	*43499* – 50423	4 – 4	Fe I	LI76
6924.484	14437.56	0.01	3	*33946* – 40871	2 – 3	Fe I	LI76
6942.277	14400.56	0.01	96			Fe	LI76
6975.782	14331.39	0.01	2			Fe	LI76
6986.84	14308.69	0.01	16	24335 – *31322*	2 – 3	Fe I	LI76
6993.896	14294.27	0.01	3			Fe	LI76
6994.824	14292.38	0.01	14			Fe	LI76
6998.385	14285.11	0.01	24			Fe	LI76
7015.001	14251.27	0.01	3	44677 – *51691*	4 – 3	Fe I	LI76
7022.404	14236.25	0.01	30			Fe	LI76
7137.178	14007.31	0.01	10			Fe	LI76
7188.429	13907.44	0.01	1	24118 – *31307*	4 – 4	Fe I	LI76
7193.733	13897.19	0.01	10			Fe	LI76
7236.324	13815.39	0.01	2			Fe	LI76
7267.622	13755.90	0.01	6			Fe	LI76
7314.366	13667.99	0.01	7	29371 – *36686*	3 – 4	Fe I	LI76
7350.585	13600.64	0.01	2	24335 – *31686*	2 – 2	Fe I	LI76
7369.874	13565.04	0.01	17			Fe	LI76
7379.696	13546.99	0.01	5	*39625* – 47005	4 – 5	Fe I	LI76
7408.099	13495.05	0.01	3	*39969* – 47377	3 – 4	Fe I	LI76
7420.478	13472.54	0.01	1	*44183* – 51604	2 – 3	Fe I	LI76
7465.036	13392.12	0.01	10			Fe	LI76
7466.531	13389.44	0.01	3			Fe	LI76
7487.360	13352.19	0.01	6			Fe	LI76
7523.627	13287.83	0.01	7	23783 – *31307*	5 – 4	Fe I	LI76
7524.195	13286.82	0.01	2	*40231* – 47755	2 – 3	Fe I	LI76
7538.998	13260.74	0.01	2	*43922* – 51461	3 – 4	Fe I	LI76
7632.138	13098.91	0.01	2	*40404* – 48036	1 – 2	Fe I	LI76
7686.256	13006.68	0.01	4	24118 – *31805*	4 – 3	Fe I	LI76
7752.148	12896.12	0.01	1	*39625* – 47377	4 – 4	Fe I	LI76
7761.994	12879.76	0.01	14	18378 – *26140*	2 – 3	Fe I	LI76
7785.689	12840.57	0.01	2	*39969* – 47755	3 – 3	Fe I	LI76
7795.226	12824.86	0.01	3	24338 – *32133*	3 – 2	Fe I	LI76
7805.326	12808.26	0.01	1	*40231* – 48036	2 – 2	Fe I	LI76
7806.004	12807.15	0.01	4	29356 – *37162*	2 – 3	Fe I	LI76
7903.759	12648.75	0.01	7	*37157* – 45061	2 – 3	Fe I	LI76
7910.035	12638.71	0.01	15	*36766* – 44677	3 – 4	Fe I	LI76
7924.317	12615.93	0.01	2	*37409* – 45333	1 – 2	Fe I	LI76

Fe—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7961.511	12556.99	0.01	5	18378 – *26339*	2 – 2	Fe I	LI76
8099.594	12342.92	0.01	2	*37409* – 45509	1 – 1	Fe I	LI76
8101.195	12340.48	0.01	1	18378 – *26479*	2 – 1	Fe I	LI76
8176.307	12227.11	0.01	3	*37157* – 45333	2 – 2	Fe I	LI76
8201.133	12190.10	0.01	3	29320 – *37521*	1 – 2	Fe I	LI76
8248.914	12119.49	0.01	2	37045 – *45294*	4 – 5	Fe I	LI76
8294.357	12053.09	0.01	2	*36766* – 45061	3 – 3	Fe I	LI76
8349.807	11973.05	0.01	1030	17550 – *25899*	3 – 4	Fe I	LI76
8384.727	11923.18	0.01	1			Fe	LI76
8412.313	11884.08	0.01	225	17927 – *26339*	1 – 2	Fe I	LI76
8413.191	11882.84	0.01	580	17726 – *26140*	2 – 3	Fe I	LI76
8452.819	11827.14	0.01	1	36975 – *45428*	3 – 4	Fe I	LI76
8484.290	11783.26	0.01	160	22838 – *31322*	2 – 3	Fe I	LI76
8551.997	11689.98	0.01	230	17927 – *26479*	1 – 1	Fe I	LI76
8587.356	11641.85	0.01	1	36975 – *45562*	3 – 3	Fe I	LI76
8589.997	11638.26	0.01	160	17550 – *26140*	3 – 3	Fe I	LI76
8612.707	11607.57	0.01	255	17726 – *26339*	2 – 2	Fe I	LI76
8623.096	11593.59	0.01	91	17927 – *26550*	1 – 0	Fe I	LI76
8676.508	11522.22	0.01	2	26105 – *34782*	6 – 5	Fe I	LI76
8739.535	11439.12	0.01	87	22946 – *31686*	1 – 2	Fe I	LI76
8752.391	11422.32	0.01	52	17726 – *26479*	2 – 1	Fe I	LI76
8789.513	11374.08	0.01	14	17550 – *26339*	3 – 2	Fe I	LI76
8803.542	11355.96	0.01	2	29371 – *38175*	3 – 3	Fe I	LI76
8848.026	11298.86	0.01	11	22838 – *31686*	2 – 2	Fe I	LI76
8885.578	11251.11	0.01	6	23051 – *31937*	0 – 1	Fe I	LI76
8966.747	11149.26	0.01	5	22838 – *31805*	2 – 3	Fe I	LI76
8990.509	11119.80	0.01	21	22946 – *31937*	1 – 1	Fe I	LI76
9028.449	11073.07	0.01	1			Fe	LI76
9029.551	11071.72	0.01	1	24772 – *33801*	1 – 2	Fe I	LI76
9062.459	11031.51	0.01	1			Fe	LI76
9066.349	11026.78	0.01	1	*31805* – 40871	3 – 3	Fe I	LI76
9077.488	11013.25	0.01	1	*38678* – 47755	2 – 3	Fe I	LI76
9099.001	10987.21	0.01	1	22838 – *31937*	2 – 1	Fe I	LI76
9174.911	10896.30	0.01	4	24772 – *33946*	1 – 2	Fe I	LI76
9185.060	10884.26	0.01	3	*31686* – 40871	2 – 3	Fe I	LI76
9187.174	10881.76	0.01	2	22946 – *32133*	1 – 2	Fe I	LI76
9202.591	10863.53	0.01	3	*38175* – 47377	3 – 4	Fe I	LI76
9214.516	10849.47	0.01	1	44677 – *53891*	4 – 3	Fe I	LI76
9241.088	10818.27	0.01	2	*31937* – 41178	1 – 2	Fe I	LI76
9271.274	10783.05	0.01	5	25091 – *34362*	0 – 1	Fe I	LI76
9297.182	10753.00	0.01	3			Fe	LI76
9416.521	10616.72	0.01	1	26351 – *35767*	5 – 4	Fe I	LI76
9451.766	10577.14	0.01	1	26627 – *36079*	4 – 3	Fe I	LI76
9492.062	10532.23	0.01	6	*31686* – 41178	2 – 2	Fe I	LI76
9548.799	10469.65	0.01	13	*31322* – 40871	3 – 3	Fe I	LI76
9564.243	10452.75	0.01	2	*31307* – 40871	4 – 3	Fe I	LI76
9590.850	10423.75	0.01	2	24772 – *34362*	1 – 1	Fe I	LI76
9591.512	10423.03	0.01	1	21715 – *31307*	5 – 4	Fe I	LI76
9616.637	10395.80	0.01	7	17550 – *27166*	3 – 4	Fe I	LI76
9632.194	10379.01	0.01	1	17927 – *27559*	1 – 2	Fe I	LI76
9667.702	10340.89	0.01	4	17726 – *27394*	2 – 3	Fe I	LI76
9783.575	10218.41	0.01	3	24772 – *34555*	1 – 0	Fe I	LI76
9785.578	10216.32	0.01	15	*38175* – 47960	3 – 4	Fe I	LI76
9805.941	10195.10	0.01	1	21999 – *31805*	4 – 3	Fe I	LI76
9832.592	10167.47	0.01	1	17726 – *27559*	2 – 2	Fe I	LI76
9853.818	10145.57	0.01	9	*38678* – 48531	2 – 3	Fe I	LI76
9932.646	10065.05	0.01	6	*38995* – 48928	1 – 2	Fe I	LI76

Fe Reference

LI76 Litzén, U., and Vergès, J., Physica Scripta **13,** 240–244 (1976).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Fisher, R. A., Knoff, W. C., and Kinney, F. E., Astrophys. J. **130,** 683 (1959).
Reader, J., and Sugar, J., J. Phys. Chem. Ref. Data **4,** 353 (1975).
Litzén, U., Physica Scripta **14,** 165 (1976).

Krypton

Kr, $Z = 36$

Kr I Normal state of valence electrons $4s^24p^6\ {}^1S_0$ I.P. = 112914 cm^{-1}

Kr II Normal state of valence electrons $4s^24p^5\ {}^2P^\circ_{3/2}$ I.P. = 196475 cm^{-1}

Kr

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2457.228	40685.162		250	103313 – *105770*	1 – 1	Kr I	KA69
2526.312	39572.600		100	103121 – *105647*	2 – 2	Kr I	KA69
2527.292	39557.248		220	103121 – *105648*	2 – 1	Kr I	KA69
2531.820	39486.518		1100	103115 – *105647*	3 – 2	Kr I	KA69
2992.332	33409.635		40	94092 – *97085*	0 – 1	Kr I	KA69
2993.148	33400.538		20	*99894* – 102887	1 – 1	Kr I	KA69
3227.096	30979.162		300	*99894* – 103121	1 – 2	Kr I	KA69
3260.312	30663.542		300	*99626* – 102887	2 – 1	Kr I	KA69
3419.427	29236.693		300	*99894* – 103313	1 – 1	Kr I	KA69
3468.567	28822.491		140	*99894* – 103362	1 – 2	Kr I	KA69
3474.929	28769.714		150	*99646* – 103121	1 – 2	Kr I	KA69
3488.753	28655.717		1000 I	*99626* – 103115	2 – 3	Kr I	KA69
3494.261	28610.550		180	*99626* – 103121	2 – 2	Kr I	KA69
3716.400	26900.422		40	*99646* – 103362	1 – 2	Kr I	KA69
3735.731	26761.218		50	*99626* – 103362	2 – 2	Kr I	KA69
3867.588	25848.856		37	*99894* – 103761	1 – 0	Kr I	KA69
3961.854	25233.820		600	93123 – *97085*	2 – 1	Kr I	KA69
4036.267	24768.611		90	*99079* – 103115	3 – 3	Kr I	KA69
4041.774	24734.859		19	*99079* – 103121	3 – 2	Kr I	KA69
4115.421	24292.221		180	*99646* – 103761	1 – 0	Kr I	KA69
4120.801	24260.506		120	92964 – *97085*	1 – 1	Kr I	KA69
4253.712	23502.465		70	*98867* – 103121	2 – 2	Kr I	KA69
4283.245	23340.416		180	*99079* – 103362	3 – 2	Kr I	KA69
4364.789	22904.363		9	*104073* – 108438	0 – 1	Kr I	KA69
4434.268	22545.484		13	103362 – *107796*	2 – 2	Kr I	KA69
4440.711	22512.770		7	*104073* – 108514	0 – 1	Kr I	KA69
4446.043	22485.775		120	*98867* – 103313	2 – 1	Kr I	KA69
4495.182	22239.968		11	*98867* – 103362	2 – 2	Kr I	KA69
4564.440	21902.513		1800 I	93123 – *97687*	2 – 2	Kr I	KA69
4651.863	21490.898		13 B	*105208* – 109860	3 – 3	Kr I?	KA69
4651.890	21490.772		13 B	*105208* – 109860	3 – 4	Kr I?	KA69
4663.263	21438.360		56	103115 – *107778*	3 – 4	Kr I	KA69
4681.246	21356.004		5	103115 – *107796*	3 – 2	Kr I	KA69
4696.839	21285.103		5	*105163* – 109860	2 – 3	Kr I	KA69
4716.405	21196.806		10	102887 – *107603*	1 – 0	Kr I	KA69
4723.387	21165.471		600	92964 – *97687*	1 – 2	Kr I	KA69
4755.768	21021.362		15	103121 – *107876*	2 – 3	Kr I	KA69
4765.977	20976.332		18	*103801* – 108567	1 – 2	Kr I	KA69
4777.817	20924.350		95	92307 – *97085*	2 – 1	Kr I	KA69
4788.957	20875.676		14	102887 – *107676*	1 – 1	Kr I	KA69
4866.332	20543.752		75	*103701* – 108567	3 – 2	Kr I	KA69
4889.365	20446.971		140	*98226* – 103115	3 – 3	Kr I	KA69
4894.873	20423.964		300	*98226* – 103121	3 – 2	Kr I	KA69
4896.144	20418.662		1	103362 – *108258*	2 – 1	Kr I	KA69
4926.652	20292.221		14	*104916* – 109843	3 – 4	Kr I	KA69
4946.725	20209.878		140	98855 – *103801*	0 – 1	Kr I	KA69
4962.371	20146.157		5	103362 – *108325*	2 – 2	Kr I	KA69
4995.570	20012.271		36	*103442* – 108438	2 – 1	Kr I	KA69
5019.776	19915.772		17	*103801* – 108821	1 – 0	Kr I	KA69
5059.571	19759.129		5 B	103313 – *108373*	1 – 1	Kr I?	KA69
5060.547	19755.315		5 B	*103442* – 108503	2 – 3	Kr I?	KA69
5071.492	19712.680		6	*103442* – 108514	2 – 1	Kr I	KA69
5102.930	19591.238		17	93123 – *98226*	2 – 3	Kr I	KA69
5199.414	19227.688		30	*97687* – 102887	2 – 1	Kr I	KA69
5209.349	19191.016		13	103115 – *108325*	3 – 2	Kr I	KA69
5247.844	19050.243		9	*103266* – 108514	2 – 1	Kr I	KA69

Kr—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5251.901	19035.526		7	103121 – *108373*	2 – 1	Kr I	KA69
5318.347	18797.703		20	*97797* – 103115	4 – 3	Kr I	KA69
5321.174	18787.716		50	97945 – *103266*	2 – 2	Kr I	KA69
5321.813	18785.460		170	*85846* – 91168	1 – 1	Kr I	KA69
5347.193	18696.294		300	97919 – *103266*	1 – 2	Kr I	KA69
5380.403	18580.896		150	92307 – *97687*	2 – 2	Kr I	KA69
5427.854	18418.457		20	*97687* – 103115	2 – 3	Kr I	KA69
5433.362	18399.786		100	*97687* – 103121	2 – 2	Kr I	KA69
5497.526	18185.036		90	97945 – *103442*	2 – 2	Kr I	KA69
5502.888	18167.315		2600 I	92294 – *97797*	3 – 4	Kr I	KA69
5523.545	18099.372		80	97919 – *103442*	1 – 2	Kr I	KA69
5553.351	18002.229		700 I	94092 – *99646*	0 – 1	Kr I	KA69
5602.991	17842.737		650 I	91168 – *96771*	1 – 0	Kr I	KA69
5625.693	17770.736		4	*97687* – 103313	2 – 1	Kr I	KA69
5670.425	17630.547		4	97595 – *103266*	1 – 2	Kr I	KA69
5674.833	17616.854		150	*97687* – 103362	2 – 2	Kr I	KA69
5744.090	17404.443		120	93123 – *98867*	2 – 2	Kr I	KA69
5756.274	17367.606		700 I	97945 – *103701*	2 – 3	Kr I	KA69
5801.184	17233.152		30 B	94092 – *99894*	0 – 1	Kr I?	KA69
5801.999	17230.731		30 B	*97085* – 102887	1 – 1	Kr I?	KA69
5846.777	17098.771		600 I	97595 – *103442*	1 – 2	Kr I	KA69
5856.629	17070.008		40	97945 – *103801*	2 – 1	Kr I	KA69
5882.648	16994.505		10	97919 – *103801*	1 – 1	Kr I	KA69
5903.037	16935.806		1800 I	92964 – *98867*	1 – 2	Kr I	KA69
5916.681	16896.752		1600 I	91168 – *97085*	1 – 1	Kr I	KA69
5918.892	16890.441		2400 I	92307 – *98226*	2 – 3	Kr I	KA69
5931.869	16853.488		1000 I	92294 – *98226*	3 – 3	Kr I	KA69
5956.028	16785.128		2000 I	93123 – *99079*	2 – 3	Kr I	KA69
5976.900	16726.513		200	*85191* – 91168	0 – 1	Kr I	KA69
6032.246	16573.044		70	98855 – *104887*	0 – 1	Kr I	KA69
6071.517	16465.851		70	*99894* – 105965	1 – 2	Kr I	KA69
6115.689	16346.920		5	*96771* – 102887	0 – 1	Kr I	KA69
6127.561	16315.249		50	*99894* – 106021	1 – 2	Kr I	KA69
6205.880	16109.350		3	97595 – *103801*	1 – 1	Kr I	KA69
6228.279	16051.415		2	*97085* – 103313	1 – 1	Kr I	KA69
6277.418	15925.764		6	*97085* – 103362	1 – 2	Kr I	KA69
6318.234	15822.884		2	*99646* – 105964	1 – 1	Kr I	KA69
6319.350	15820.089		120	*99646* – 105965	1 – 2	Kr I	KA69
6338.682	15771.842		1	*99626* – 105965	2 – 2	Kr I	KA69
6375.395	15681.018		180	*99646* – 106021	1 – 2	Kr I	KA69
6393.962	15635.482		40 B	*99626* – 106020	2 – 3	Kr I?	KA69
6394.726	15633.614		40 B	*99626* – 106021	2 – 2	Kr I?	KA69
6460.677	15474.026		200	*85846* – 92307	1 – 2	Kr I	KA69
6477.558	15433.700		4	97595 – *104073*	1 – 0	Kr I	KA69
6503.541	15372.037		700	93123 – *99626*	2 – 2	Kr I	KA69
6519.267	15334.958		1500 I	91168 – *97687*	1 – 2	Kr I	KA69
6522.873	15326.480		130	93123 – *99646*	2 – 1	Kr I	KA69
6541.968	15281.743		17	*96771* – 103313	0 – 1	Kr I	KA69
6560.053	15239.615		1700 I	92307 – *98867*	2 – 2	Kr I	KA69
6573.030	15209.526		140	92294 – *98867*	3 – 2	Kr I	KA69
6662.488	15005.307		120	92964 – *99626*	1 – 2	Kr I	KA69
6676.440	14973.950		8	*97085* – 103761	1 – 0	Kr I	KA69
6681.820	14961.894		400	92964 – *99646*	1 – 1	Kr I	KA69
6770.706	14765.472		450	93123 – *99894*	2 – 1	Kr I	KA69
6771.990	14762.672		550	92307 – *99079*	2 – 3	Kr I	KA69
6784.968	14734.436		1600 I	92294 – *99079*	3 – 3	Kr I	KA69
6793.365	14716.220		2	98855 – *105648*	0 – 1	Kr I	KA69
6886.195	14517.839		100	*99079* – 105965	3 – 2	Kr I	KA69
6929.653	14426.793		2000 I	92964 – *99894*	1 – 1	Kr I	KA69
6941.476	14402.222		180	*99079* – 106020	3 – 3	Kr I	KA69
6971.315	14340.576		30	97945 – *104916*	2 – 3	Kr I	KA69
7062.080	14156.264		50	97945 – *105007*	2 – 2	Kr I	KA69
7088.100	14104.297		140	97919 – *105007*	1 – 2	Kr I	KA69
7097.016	14086.577		80 B	*98867* – 105964	2 – 1	Kr I?	KA69
7098.133	14084.362		80 B	*98867* – 105965	2 – 2	Kr I?	KA69
7117.692	14045.657		550	*85846* – 92964	1 – 1	Kr I	KA69

Kr—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7153.413	13975.520		150 B	*98867* – 106020	2 – 3	Kr I?	KA69
7154.177	13974.027		150 B	*98867* – 106021	2 – 2	Kr I?	KA69
7244.354	13800.080		3	97919 – *105163*	1 – 2	Kr I	KA69
7263.311	13764.062		6	97945 – *105208*	2 – 3	Kr I	KA69
7276.639	13738.851		600 I	*85846* – 93123	1 – 2	Kr I	KA69
7291.401	13711.036		200	97595 – *104887*	1 – 1	Kr I	KA69
7319.504	13658.393		800	92307 – *99626*	2 – 2	Kr I	KA69
7332.481	13634.220		2400 I	92294 – *99626*	3 – 2	Kr I	KA69
7338.835	13622.415		1000 I	92307 – *99646*	2 – 1	Kr I	KA69
7514.291	13304.337		5	*99626* – 107141	2 – 3	Kr I	KA69
7567.585	13210.641		10	97595 – *105163*	1 – 2	Kr I	KA69
7586.669	13177.412		1100 I	92307 – *99894*	2 – 1	Kr I	KA69
7698.917	12985.288		25	91168 – *98867*	1 – 2	Kr I	KA69
7703.269	12977.952		2	97945 – *105648*	2 – 1	Kr I	KA69
7729.289	12934.263		1	97919 – *105648*	1 – 1	Kr I	KA69
7772.779	12861.892		100	*85191* – 92964	0 – 1	Kr I	KA69
7794.574	12825.929		5 B	*98226* – 106020	3 – 3	Kr I?	KA69
7795.338	12824.671		5 B	*98226* – 106021	3 – 2	Kr I?	KA69
8167.321	12240.568		2	*99079* – 107246	3 – 2	Kr I	KA69
8174.787	12229.389		4	97595 – *105770*	1 – 1	Kr I	KA69
8223.556	12156.863		2	*97797* – 106020	4 – 3	Kr I	KA69
8246.161	12123.537		40	*85846* – 94092	1 – 0	Kr I	KA69
8277.783	12077.224		160	*97687* – 105965	2 – 2	Kr I	KA69
8333.063	11997.105		600	*97687* – 106020	2 – 3	Kr I	KA69
8333.827	11996.005		25	*97687* – 106021	2 – 2	Kr I	KA69
8458.368	11819.377		1500 I	91168 – *99626*	1 – 2	Kr I	KA69
8477.699	11792.425		150	91168 – *99646*	1 – 1	Kr I	KA69
8577.082	11655.786		1	*99894* – 108471	1 – 2	Kr I	KA69
8609.826	11611.458		1	*99894* – 108503	1 – 2	Kr I	KA69
8725.533	11457.481		500	91168 – *99894*	1 – 1	Kr I	KA69
8821.081	11333.375		1	98855 – *107676*	0 – 1	Kr I	KA69
8824.916	11328.451		4	*99646* – 108471	1 – 2	Kr I	KA69
8834.539	11316.111		1	*99646* – 108480	1 – 1	Kr I	KA69
8844.247	11303.690		1	*99626* – 108471	2 – 2	Kr I	KA69
8876.357	11262.799		2 B	*99626* – 108503	2 – 3	Kr I?	KA69
8876.991	11261.994		2 B	*99626* – 108503	2 – 2	Kr I?	KA69
8879.252	11259.126		150	*97085* – 105964	1 – 1	Kr I	KA69
8880.369	11257.711		200	*97085* – 105965	1 – 2	Kr I	KA69
8914.532	11214.568		5 B	*98226* – 107140	3 – 2	Kr I?	KA69
8914.902	11214.101		5 B	*98226* – 107141	3 – 3	Kr I?	KA69
8936.413	11187.108		100	*97085* – 106021	1 – 2	Kr I	KA69
9192.942	10874.931		80	*96771* – 105964	0 – 1	Kr I	KA69
9255.649	10801.254		1	*99894* – 109149	1 – 1	Kr I	KA69
9317.592	10729.447		2	*97687* – 107005	2 – 1	Kr I	KA69
9343.884	10699.256		20	*97797* – 107141	4 – 3	Kr I	KA69
9391.761	10644.714		1	*99079* – 108471	3 – 2	Kr I	KA69
9407.712	10626.665		8	*99079* – 108487	3 – 4	Kr I	KA69
9423.871	10608.444		20 B	*99079* – 108503	3 – 3	Kr I	KA69
9424.504	10607.731		20 B	*99079* – 108503	3 – 2	Kr I	KA69
9453.021	10575.731		1 B	*97687* – 107140	2 – 2	Kr I?	KA69
9453.392	10575.316		1 B	*97687* – 107141	2 – 3	Kr I?	KA69
9476.422	10549.615		1	*99626* – 109103	2 – 3	Kr I	KA69
9533.554	10486.394		2 B	*97687* – 107221	2 – 1	Kr I?	KA69
9534.076	10485.820		2 B	*99626* – 109161	2 – 2	Kr I?	KA69
9558.908	10458.580		6	*97687* – 107246	2 – 2	Kr I	KA69
9635.808	10375.113		10 B	*98867* – 108503	2 – 3	Kr I?	KA69
9636.442	10374.431		10 B	*98867* – 108503	2 – 2	Kr I?	KA69
9684.452	10323.000		2	97919 – *107603*	1 – 0	Kr I	KA69
9708.933	10296.971		80	94092 – *103801*	0 – 1	Kr I	KA69
9730.985	10273.636		2	97945 – *107676*	2 – 1	Kr I	KA69
9851.715	10147.735		10	97945 – *107796*	2 – 2	Kr I	KA69
9877.735	10121.004		30	97919 – *107796*	1 – 2	Kr I	KA69
9920.178	10077.702		10	*97085* – 107005	1 – 1	Kr I	KA69
9931.744	10065.965		10	97945 – *107876*	2 – 3	Kr I	KA69

Kr Reference

KA69 Kaufman, V., and Humphreys, C. J., J. Opt. Soc. Amer. **59,** 1614–1628 (1969).
Listed wavenumbers have been calculated from established energy levels and the individual intensities are from Sittner and Peck (1949) (10000–10375 Å), Meggers (1935) (10458–11333, 11611, 11655 Å), Humphreys and Kostkowski (1952) (11457, 11792–33409 Å), and Humphreys, Paul, Cowan, and Andrew (1967) (39486–40685 Å).

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TABLE 1. Synopsis of the selected data—(Continued)

Element	Spectrum	Range (Å)	Number of classified lines	Number of recorded lines	Page
Krypton	Kr I	10000–40690	174	174	171
Lanthanum	La III[b]		6	6	175
Lead	Pb I	10000–39040	53	56	176
Lithium	Li I[a]	10000–26880	14	14	178
Lutetium	Lu I[b]		7	7	179
Magnesium	Mg I Mg II	10000–26400	17 15	17 15	180
Mercury	Hg I	10000–40860	48	48	181
Neodymium	Nd I Nd II	10000–37430	227	401	183
Neon	Ne I Ne II	11140–37740 10000–10970	184 29	184 29	190
Nitrogen	N I N II	10000–18760 10000–10550	158 7	158 7	195
Oxygen	O I	10000–26180	31	31	198
Phosphorus	P I	10000–10820	10	14	199
Potassium	K I	10000–40160	25	25	200
Praseodymium	Pr III	10000–10720	6	6	201
Rhenium	Re I	10000–11620	38	38	202
Rubidium	Rb I[a]	10000–27910	12	12	203
Ruthenium	Ru I	10000–11490	15	15	204
Samarium	Sm I Sm II	10000–40750	215	318	205
Selenium	Se I	10000–28410	173	297	211
Silicon	Si I	10000–25860	113	117	216
Sodium	Na I[a]	10000–23380	19	19	219
Sulphur	S I	10000–34280	91	99	220
Tellurium	Te I	10000–27180	200	235	222
Terbium	Tb I[a]	10000–11640	84	84	226
Thorium	Th I Th II Th III	10000–24930	577 11	608 13	228
Thulium	Tm I Tm II	10000–24484	350	567	238
Tungsten	W I	10000–10480	13	17	247

TABLE 1. Synopsis of the selected data—(Continued)

Element	Spectrum	Range (Å)	Number of classified lines	Number of recorded lines	Page
Xenon	Xe I	10000–41520	153	153	248
Ytterbium	Yb I Yb II[a]	10000–11610	52	15 108	251
Yttrium	Y I Y II	10000–11490	16	16	254
Zinc	Zn I	10000–24380	25	25	255
Zirconium	Zr I	10000–27130	191	374	256

[a] A few lines are listed whose wavelength is outside the range given in this table.
[b] Only particular transitions have been reported for this element.

The actinide and lanthanide elements have been omitted from this section as their entries in sections II and III have already been reduced by the omission of faint lines.

1.3. The Wavenumber Table—Section II

The wavenumber table contains 8885 entries of classified and unclassified lines for 57 elements. The vacuum wavenumber, σ, air wavelength, λ, intensity, line character (see 1.5) and spectrum are given as reported in the reference listed for each spectral line. In the case of a particular transition being given in more than one publication, the decision as to which measured value should be retained was based on the consideration of the probable accuracy likely to be obtained from the type of instrumentation employed, the spectroscopic source used, the publication date of the data and the comparison of the observed wavenumbers with those predicted from the most precise energy level values which were available.

The measurement uncertainty, $\Delta\sigma$, for each wavenumber is also given whenever such information was available in the original publication. In a few cases a measurement uncertainty is given for a spectral range and this information is contained in the appropriate reference which is to be found at the end of the element table in section III. There are many instances where the original publication does not refer to the measurement uncertainty in any form.

When there is some doubt about the classification or assignment of a line then the symbol "?" immediately follows the spectrum information.

1.4. Wavenumber Tables arranged by Element—Section III

Section III contains the wavenumber tables for each element arranged alphabetically according to its chemical name. Each element table preceded by the element name, chemical symbol, atomic number, and the normal state of the valence electrons for each stage of ionisation together with the appropriate ionisation potential. This information has been taken from the compilations of Moore [10] and Martin et al. [11].

The wavenumber table for a given element contains, in addition to the information given for each entry in section II, the energy level and J values, where appropriate, which are concerned with a particular classified line. In the case of the energy level values the heading for the column is "Energy Levels (cm^{-1})" and the odd energy level value is given in italics. The J values are given in one column which is headed as "J". The first numerical J value given, in this column, is associated with the lower energy level and the second with the upper energy level. In the situation where the classified line is a possible blend either J value, or both J values, may be omitted if the "blend" is due to transitions to, or from, a term whose energy level values vary only slightly with the J value. Energy is expressed in the traditional equivalent wavenumber units (cm^{-1}, E/hc).

For each element the spectral line list is arranged in order of increasing wavenumber and a consequence of this arrangement is that in a multiplet with several lines, those lines may not be listed consecutively.

At the end of section III there is a reference list for some elements not tabulated here. In such references will be found some infrared atomic wavenumbers/wavelengths which have not been included in this publication either because the spectrum is known to be undergoing revision or because the disagreement between observed and predicted wavenumbers is not acceptable.

1.5. Intensities

The data on intensity given in sections I, II, and III must be used with caution.

The relative intensities, even within the same spectrum, depend to some extent upon a light source being operated in a particular way. In the infrared region the two most

popular light sources for observing the first and second spectrum of an element are (a) the hollow cathode and (b) the microwave excited electrodeless dischage tube (EDT). The operating conditions for the hollow cathode are fairly easy to specify but this is not so for EDT's. Recently Hammond and Outred [12] have indicated some of the problems associated with specifying the EDT operating conditions.

Furthermore the recorded intensity is also dependent on spectrograph efficiency and detector sensitivity which means it is virtually impossible to bring intensities onto a uniform scale. The result of this is that the intensity figures quoted are only applicable over a small wavenumber region, for a particular element, when they are measured by the same observer. Thus there continues to be a need for single consistently used intensity scale. A major step in this direction would be for all experimentalists to calibrate their spectrometer-detector system by using a suitable standard light source such as a tungsten ribbon filament lamp.

Some descriptive symbols are listed with the intensity figure to describe either the type of intensity scale used or the character of the line. If no symbol is used then the intensity scale is linear. The symbols used have the following means:

B Blend of two or more lines
D Diffuse
H Hazy
I Observed interferometrically
L Logarithmic intensity scale
M Partically masked by a molecular band
P Partially resolved
U Unsymmetric
V Visual estimate of photographic plate blackening
W Wide

In a few instances no intensity figure is given for a particular line because it is omitted from the original publication.

The main effort in observing infrared atomic spectra has been for the lanthanide and actinide elements. Consequently there is a wealth of information available and in this publication the entries for such elements have been limited by the omission of the fainter lines.

Before leaving the subject of intensity it is worth noting that in the case of a halide EDT the second spectrum of an element, if it appears, is normally intense at low microwave powers and decreases in intensity as the microwave power is increased, while the first spectrum intensity increases. This effect is a useful aid in helping to assign lines to the first or second spectrum.

1.6. References

The reference code, given with each spectral line entry, consists of two letters, normally the first two of the author's surname, followed by two numbers which indicate the year of publication. The explanation of this reference coding will be found in the reference list given at the end of each element table in section III.

The reference list for each element gives full details of the original publication together with an indication of the instrumentation, light source, and detector used. In some cases the "overall" measurement uncertainty is given.

For some elements, in conjunction with the coded references, additional references are given. Such references have, in general, been used at some stage in the preparation of this work.

1.7. Preparation of Tables

The data compiled here were taken from published and unpublished literature. It is only part of that stored on the magnetic tape which contains all the observed lines of an element irrespective of line intensity and in certain cases, where no other information is available, irrespective of measurement accuracy. Overlap of data were removed by the procedure described previously (see 1.3).

The stored information consists of the vacuum wavenumber, air wavelength, measurement uncertainty when this was given, intensity with coded information about the intensity scale and line character, spectrum and reference coded. In the case of a classified line the energy levels with associated J and g values, wherever possible, involved in the transition are also entered on to the tape. At the present time this tape contains $\sim$19000 entries of classified and unclassified lines for 70 different elements.

1.8. Future Availability of Data

Newly available data are continually being added to the magnetic tape by using an updating program.

By using the element search program it is possible to obtain, from the tape, an up to date vacuum wavenumber listing for a given element together with any other relevant information required. A wavenumber search program has also been developed to help in the identification of impurity spectral lines which may occur in the recorded spectrum of the element under investigation. In the latter program any wavenumber, stored on the tape, which falls within the measurement uncertainty of the wavenumber being searched for is printed out together with its measurement uncertainty, intensity, spectrum and reference code.

Any experimentalist who wishes to obtain an up to date listing for a particular element or requires a wavenumber search to be carried out is invited to write to the author.

References for the Introduction

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[11] Martin, W. C., Hagan, L., Reader, J., and Sugar, J., J. Phys. Chem. Ref. Data **3**, 771–780 (1974).
[12] Hammond, C. B., and Outred, M., Physica Scripta **14**, 81–84 (1976).

Section I. The Strong Lines Arranged by Element

Element	Spectrum	Wavenumber cm^{-1}	Wavelength Å	Intensity	Reference
Aluminium	Al I	7602.047	13150.76	14 L	ER63
	Al I	7617.888	13123.41	15 L	ER63
	Al I	8882.602	11254.881	15 L	ER63
	Al I	8883.936	11253.190	14 L	ER63
Argon	Ar I	5901.372	16940.584	5000	HU73
	Ar I	7287.393	13718.577	10000	HU73
	Ar I	7308.718	13678.549	5000	HU73
	Ar I	7338.704	13622.659	7500	HU73
	Ar I	7403.085	13504.190	9500	HU73
	Ar I	7479.003	13367.110	8500	HU73
	Ar I	7509.283	13313.209	5500	HU73
	Ar I	7532.239	13272.635	6000	HU73
	Ar I	7715.929	12956.658	4000	HU73
	Ar I	8036.825	12439.321	5000	HU73
Beryllium	Be I	5510.10	18143.54	6 L	JH62
	Be I	6826.91	14643.92	6 L	JH62
Boron	B I	8572.169	11662.467	3200	LI70
	B I	8573.949	11660.045	6600	LI70
Bromine	Br I	5066.11	19733.62	3450	TE63
	Br I	5975.23	16731.19	1800	TE63
	Br I	6964.52	14354.57	1800	TE63
	Br I	7563.85	13217.17	1700	TE63
	Br I	9294.66	10755.92	3000	TE63
	Br I	9559.47	10457.96	30000	TE63
	Br I	9633.45	10377.65	1500	TE63
	Br I	9765.10	10237.74	6000	TE63
	Br I	9859.15	10140.08	3000	TE63
Calcium	Ca I	5055.051	19776.79	50	RI68
	Ca I	5125.303	19505.72	47	RI68
	Ca I	5139.195	19452.99	49	RI68
	Ca I	5177.466	19309.20	48	RI68
Carbon	C I	6874.52	14542.50	179	JO65
	C I	8504.86	11754.76	114	JO65
	C I	8505.91	11753.32	142	JO65
	C I	9350.88	10691.250	10 L	JO66
Cesium	Cs I	6803.21	14694.93		JO61
	Cs I	7357.25	13758.83		JO61
Chlorine	Cl I	5060.56	19755.3	717	RA69
	Cl I	6263.96	15960.0	735	RA69
	Cl I	6299.61	15869.7	2780	RA69
	Cl I	6355.52	15730.1	1487	RA69
	Cl I	6441.42	15520.3	1094	RA69
	Cl I	8741.67	11436.33	1000	RA69

Section I. The Strong Lines Arranged by Element—Continued

Element	Spectrum	Wavenumber cm^{-1}	Wavelength Å	Intensity	Reference
Gallium	Ga I	8255.53	12109.78	9 L	JO67
	Ga I	8366.53	11949.12	10 L	JO67
Germanium	Ge I	6744.714	14822.375	4700	HU64
	Ge I	7627.069	13107.612	2350	HU64
	Ge I	8067.791	12391.575	10500	HU64
	Ge I	8283.286	12069.201	13000	HU64
	Ge I	8533.902	11714.763	6000	HU64
	Ge I	8884.220	11252.830	2300	HU64
Helium	He I	5346.925	18697.23	230	LT70
	He I	5350.328	18685.34	530	LT70
	He I	5879.894	17002.47	230	LT70
Indium	In I	7444.00	13429.96	9 L	JO67
	In I	7742.26	12912.59	10 L	JO67
Iodine	I I	8307.727	12033.69	300	LU75
	I I	8333.237	11996.86	450	LU75
	I I	8487.840	11778.34	320	LU75
	I I	8649.305	11558.46	350	LU75
	I I	8803.262	11356.32	2400	LU75
	I I	8836.763	11313.26	500	LU75
	I I	8897.113	11236.52	6700	LU75
	I I	9867.850	10131.16	400	LU75
	I I	9994.20	10003.06	350	LU75
Iron	Fe I	5301.722	18856.65	105	LI76
	Fe I	8349.807	11973.05	1030	LI76
	Fe I	8412.313	11884.08	225	LI76
	Fe I	8413.191	11882.84	580	LI76
	Fe I	8484.290	11783.26	160	LI76
	Fe I	8551.997	11689.98	230	LI76
	Fe I	8589.997	11638.26	160	LI76
	Fe I	8612.707	11607.57	255	LI76
Krypton	Kr I	4564.440	21902.513	1800	KA69
	Kr I	5502.888	18167.315	2600	KA69
	Kr I	5903.037	16935.806	1800	KA69
	Kr I	5916.681	16896.752	1600	KA69
	Kr I	5918.892	16890.441	2400	KA69
	Kr I	5956.028	16785.128	2000	KA69
	Kr I	6519.267	15334.958	1500	KA69
	Kr I	6560.053	15239.615	1700	KA69
	Kr I	6784.968	14734.436	1600	KA69
	Kr I	6929.653	14426.793	2000	KA69
	Kr I	7332.481	13634.220	2400	KA69
	Kr I	8458.368	11819.377	1500	KA69
Magnesium	Mg I	5843.396	17108.66	30	RI55
	Mg I	6647.012	15040.24	30	RI55
	Mg I	6653.758	15024.99	35	RI55
	Mg I	9247.233	10811.085	35 B	RI55
Mercury	Hg I	6535.882	15295.973	500	PE62
	Hg I	7166.22	13950.55	300	HU53
	Hg I	7311.42	13673.51	600	HU53
	Hg I	7367.07	13570.21	550	HU53
	Hg I	8857.006	11287.407		PE62
	Hg I	9859.431	10139.793		PE62

Section I. The Strong Lines Arranged by Element—Continued

Element	Spectrum	Wavenumber cm^{-1}	Wavelength Å	Intensity	Reference
Neon[a]	Ne I	4103.120	24365.048	1500	HU73
	Ne I	4173.979	23951.417	1800	HU73
	Ne I	4229.588	23636.515	3500	HU73
	Ne I	4437.236	22530.404	2250	HU73
	Ne I	8285.254	12066.334	3000	HU73
	Ne I	8496.167	11766.792	2000	HU73
	Ne I	8776.894	11390.434	1600	HU73
	Ne I	8944.073	11177.528	3500	HU73
	Ne I	8991.771	11143.020	3000	HU73
Nitrogen[a]	N I	7361.04	13581.33	1200	ER61
	N I	7444.20	13429.61	670	ER61
	N I	8017.30	12469.62	1350	ER61
	N I	8022.68	12461.25	680	ER61
	N I	8203.34	12186.82	480	ER61
Oxygen	O I	5479.867	18243.63	22 LB	ER63
	O I	5547.501	18021.21	23 LB	ER63
	O I	7593.757	13165.11	24 L	ER63
	O I	7593.905	13164.85	26 L	ER63
	O I	7644.976	13163.89	25 L	ER63
	O I	8857.392	11286.914	24 L	ER63
	O I	8857.840	11286.344	23 LB	ER63
Selenium	Se I	3978.629	25127.43	2600	MO74
	Se I	4662.350	21442.56	4603	MO74
	Se I	5945.878	16813.68	2557	MO74
	Se I	6598.230	15151.44	2480	MO74
	Se I	9625.371	10386.36	4114	MO74
	Se I	9680.457	10327.26	7935	MO74
Silicon	Si I	6292.18	15888.39	190	LI65
	Si I	8309.23	12031.51	440	LI65
	Si I	8336.91	11991.57	220	LI65
	Si I	9197.501	10869.541	350	LI65
	Si I	9233.562	10827.091	420	LI65
	Si I	9444.617	10585.141	230	LI65
Sulphur	S I	4402.584	22707.738	1250	JA67
	S I	5281.378	18929.285	635	JA67
	S I	9558.153	10459.406	1300	JA67
	S I	9561.769	10455.451	1850	JA67
Tellurium	Te I	5465.500	18291.59	2782	MO75
	Te I	5777.586	17303.54	1958	MO75
	Te I	6094.445	16403.90	3761	MO75
	Te I	6430.669	15546.23	2430	MO75
	Te I	8702.936	11487.23	6623	MO75
	Te I	9015.022	11089.56	10181	MO75
	Te I	9156.396	10918.34	1879	MO75
	Te I	9907.094	10091.01	4097	MO75
	Te I	9946.122	10051.41	5950	MO75
Xenon	Xe I	4027.145	24824.712	1800	HU73
	Xe I	4933.941	20262.242	3000	HU73
	Xe I	6483.988	15418.394	2500	HU73
	Xe I	6785.719	14732.805	3000	HU73
	Xe I	7320.221	13657.055	2000	HU73
	Xe I	7919.635	12623.391	2500	HU73

Section I. The Strong Lines Arranged by Element—Continued

Element	Spectrum	Wavenumber cm^{-1}	Wavelength Å	Intensity	Reference
Zirconium	Zr I	8211.28	12175.04	540	TA76
	Zr I	8307.26	12034.37	770	TA76
	Zr I	8367.25	11948.09	580	TA76
	Zr I	8438.56	11847.12	460	TA76
	Zr I	8575.40	11658.07	1500	TA76
	Zr I	8608.92	11612.68	900	TA76
	Zr I	9309.25	10739.07	460	TA76
	Zr I	9346.00	10696.84	550	TA76
	Zr I	9383.44	10654.16	570	TA76

[a] Strong lines listed for the wavelength range 12000–25000 Å.

Section II. Wavenumber Table (Finding List)

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
2401.24	41633.80		40	I I	HU72	2536.96	39406.47		125	I I	HU71
2408.112	41514.978		15	Xe I	HU73	2537.66	39395.70		140	I I	HU71
2436.02	41039.38		5	Br I	HU72	2538.94	39375.85		25	I I	HU71
2444.87	40890.82		15	Br I	HU72	2541.14	39341.75		45	Br I	HU71
2445.513	40880.069		4	Ar I	HU73	2542.24	39324.70		1000 B	Hg I	HU65
2446.879	40857.246		50	Hg I	HU65	2542.598	39319.127		2	Ar I	HU73
2452.859	40757.634		12	Xe I	HU73	2542.70	39317.60		70	Br I	HU71
2453.753	40742.801		20	Sm	MO70	2544.48	39290.11		1500 B	Hg I	HU65
2454.96	40722.76		40	Br I	HU72	2545.011	39281.849		5000	Hg I	HU65
2457.228	40685.162		250	Kr I	KA69	2545.32	39277.09		7	I I	HU71
2458.674	40661.242		400	Hg I	HU65	2546.77	39254.67		600 B	Hg I	HU65
2466.50	40532.16		15 B	Cl I	HU71	2548.06	39234.88		5	I I	HU71
2469.630	40480.860	0.01		Li I	LZ70	2548.77	39223.91		35	Br I	HU72
2469.749	40478.90	0.01	4	He I	LI70	2552.316	39169.420		1	Ar I	HU73
2472.622	40431.880	0.01		Na I	LZ70	2553.309	39154.184		20	Xe I	HU73
2473.71	40414.15		15	Br I	HU71	2560.82	39039.4		B	Pb I	AN68
2474.18	40406.39		10	Br I	HU71	2562.249	39017.585		15	Sm I	MO70
2476.30	40371.82		15	Br I	HU72	2566.13	38958.6			Pb I	AN68
2478.53	40335.56		25 B	Cl I?	HU71	2566.673	38950.321		4	Ar I	HU73
2480.07	40310.52		25 B	Cl I?	HU71	2566.68	38950.1			Pb I	AN68
2485.12	40228.54		80	I I	HU72	2567.380	38939.602		270	Xe I	HU73
2485.945	40215.185		200	Hg I	HU65	2571.716	38873.941		12	Sm I	MO70
2487.112	40196.317		25	Xe I	HU73	2573.570	38845.937		15	Sm I	MO70
2488.67	40171.21		100 B	Cl I	HU71	2574.05	38838.65		9	Cl I	HU72
2489.462	40158.370	0.01		K I	LZ70	2574.55	38831.1			Pb I	AN68
2493.73	40089.57		25	Cl I	HU71	2574.57	38830.82		90	I I	HU71
2493.98	40085.59		30	Cl I	HU71	2575.45	38817.64		6	Cl I	HU72
2496.85	40039.50		700 B	Hg I	HU65	2576.577	38800.601		4	Ar I	HU73
2498.06	40020.12		20	I I	HU71	2580.65	38739.40		210	I I?	HU71
2499.491	39997.240		4	Ar I	HU73	2580.65	38739.40		210	I I?	HU71
2500.21	39985.68		35 B	Cl I	HU71	2580.753	38737.815		175	Xe I	HU73
2500.42	39982.46		10	I I	HU71	2581.43	38727.61		190	I I	HU71
2501.55	39964.36		120 B	Br I	HU71	2584.211	38685.985		140	Xe I	HU73
2502.125	39955.140		120	Xe I	HU73	2587.936	38630.293		2	Ar I	HU73
2504.093	39923.730	0.01		Rb I	LZ70	2588.32	38624.60		3	I I	HU71
2505.769	39897.029		900	Hg I	HU65	2594.159	38537.629		20	Sm I	MO70
2506.26	39889.18		7	I	HU71	2596.926	38496.568		10	Xe I	HU73
2506.30	39888.58		5	I I	HU72	2600.619	38441.900		30	Sm I	MO70
2506.77	39881.09		25	Cl I	HU71	2604.483	38384.869		1	Ar I	HU73
2507.13	39875.33		40	Cl I	HU71	2606.59	38353.88		12	Cl I	HU72
2509.913	39831.157		300	Hg I	HU65	2607.14	38345.75		150	Br I	HU72
2510.334	39824.470		1	Ar I	HU73	2608.840	38320.762		2	Ar I	HU73
2514.98	39750.83		20	Cl I	HU71	2610.70	38293.46		6	I I	HU72
2515.41	39744.11		18	Cl I	HU71	2615.55	38222.45		10	Br I	HU72
2515.660	39740.175		11	Sm	MO70	2618.8	38175.0		800	Hg I	HU65
2517.19	39716.04		70 B	Cl I	HU71	2623.245	38110.332		9	Ar I	HU73
2517.83	39705.91		25	Br I	HU72	2631.33	37993.23		22	Cl I	HU72
2518.62	39693.50		25	Br I	HU71	2633.22	37966.02		160	Cl I	HU72
2522.979	39624.876		8	Xe I	HU73	2635.8	37928.8		200	Hg I	HU65
2523.58	39615.48		80	Cl I	HU71	2637.003	37911.499		1	Ar I	HU73
2524.32	39603.79		70	Cl I	HU71	2637.1	37910.1		80 B	Hg I?	HU65
2525.18	39587.14		6 B	I I?	HU71	2637.4	37905.8		80 B	Hg I?	HU65
2525.65	39583.05		20 B	Br I?	HU71	2644.25	37807.61		30	Cl I	HU72
2525.87	39577.08		6 B	I I?	HU71	2648.08	37752.91		3	I I	HU72
2525.94	39578.41		20 B	Br I?	HU71	2648.564	37746.015		15	Sm I	MO70
2526.312	39572.600		100	Kr I	KA69	2649.264	37736.035		30	Ne I	HU73
2527.292	39557.248		220	Kr I	KA69	2653.51	37675.60		40 B	Cl I?	HU72
2530.22	39511.42		16 B	Cl I?	HU72	2653.63	37674.01		40 B	Cl I?	HU72
2530.27	39510.64		16 B	Cl I?	HU72	2656.473	37633.648		10	Sm I	MO70
2531.24	39495.50		55	Br I	HU71	2659.1	37596.5		300	Hg I	HU65
2531.55	39490.74		35	Br I	HU71	2663.69	37531.67		30	Br I	HU72
2531.754	39487.540		1	Ar I	HU73	2666.175	37496.65		100	Hg I	HU65
2531.820	39486.518		1100	Kr I	KA69	2670.21	37440.03		20	I I	HU72
2535.82	39424.16		40	I I	HU71	2671.505	37421.891		12	Nd I	MO70
2535.830	39424.060	0.01		Cs I	LZ70	2676.938	37345.93	0.01	5	K I	JO72
2536.012	39421.230	0.01		Cs I	LZ70	2678.008	37331.11	0.01	1	K I	JO72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
2679.6	37308.8		160	Hg I	HU65	2793.54	35787.11		10	Br I	HU72
2680.47	37296.77		11	Cl I	HU72	2795.65	35760.04		11	Cl I	HU72
2680.9	37290.7		200 B	Hg I?	HU65	2797.522	35736.18		150	Hg I	HU65
2681.2	37286.6		200 B	Hg I?	HU65	2800.990	35691.926		30	Xe I	HU73
2682.56	37267.72		20 B	Cl I?	HU72	2801.25	35688.67		30	Cl I	HU72
2682.85	37263.69		20 B	Cl I?	HU72	2801.83	35681.23		13	Cl I	HU72
2683.458	37255.184		25	Xe I	HU73	2815.554	35507.304		20	Ne I	HU73
2683.755	37251.067		8	Ar I	HU73	2818.840	35465.914		10	Ar I	HU73
2684.21	37244.81		19	Cl I	HU72	2821.66	35430.52		120	Cl I	HU72
2687.02	37205.76		20	Cl I	HU72	2822.30	35422.40		22	Cl I	HU72
2687.771	37195.419		15	Sm I	MO70	2825.51	35382.19		13	Cl I	HU72
2689.170	37176.057		6	Ar I	HU73	2830.95	35314.16		13 B	Cl I?	HU72
2689.19	37175.78		50	Br I	HU72	2831.12	35312.04		13 B	Cl I?	HU72
2689.459	37172.062		15	Ne I	HU73	2833.56	35281.72		30	Cl I	HU72
2689.88	37166.31		22	Cl I	HU72	2835.12	35262.30		11	Cl I	HU72
2692.258	37133.416		9	Ar I	HU73	2836.354	35246.924		110	Xe I	HU73
2692.79	37126.08		4	I I	HU72	2838.390	35221.64		15 B	Ar I?	HU73
2696.442	37075.797		14	Ar I	HU73	2838.590	35219.15		15 B	Ar I?	HU73
2696.765	37071.37	0.01	3	K I	JO72	2838.7	35217.5		200 B	Hg I	HU65
2698.10	37053.01		15	Br I	HU72	2844.37	35147.58		7	I I	HU72
2701.711	37003.491		9	Ar I	HU73	2848.443	35097.327		2	Ar I	HU73
2702.04	36998.97		11	Cl I	HU72	2850.00	35078.15		5	I I	HU72
2711.05	36876.03		19	Cl I	HU72	2850.642	35070.253		5000 I	Xe I	HU73
2713.051	36848.818		190	Xe I	HU73	2851.594	35058.546		2	Ar I	HU73
2717.475	36788.827		850	Xe I	HU73	2852.90	35042.50		10	Br I	HU72
2719.94	36755.49		8	I I	HU72	2854.025	35028.676		75	Xe I	HU73
2720.672	36745.616		18	Sm I	MO70	2856.65	34996.48		40	Cl I	HU72
2726.478	36667.367		12	Sm I	MO70	2860.370	34950.98		30	Ar I	HU73
2730.380	36614.952		20	Xe I	HU73	2861.85	34932.90		8	Br I	HU72
2730.554	36612.62	0.01	7	K I	JO72	2862.27	34927.78		5000	Hg I	HU65
2737.81	36515.58		2	I I	HU72	2862.950	34919.495		12	Nd I	MO70
2738.352	36508.360		450	Xe I	HU73	2865.25	34891.45		15	Br I	HU72
2740.327	36482.046		30	Ar I	HU73	2866.77	34872.98		30	Hg I	HU65
2741.106	36471.678		20	Ne I	HU73	2867.89	34859.33		10	Br I	HU72
2744.964	36420.419		5	Ar I	HU73	2868.47	34852.26		8	Cl I	HU72
2747.627	36385.119		10 B	Ar I?	HU73	2870.46	34828.12		17	Cl I	HU72
2747.973	36380.538		10 B	Ar I?	HU73	2874.431	34780.010		80	Ne I	HU73
2749.26	36363.51		40	I I	HU72	2877.410	34744.002		170	Xe I	HU73
2749.309	36362.86	0.01	4	K I	JO72	2879.05	34724.16		250	Hg I	HU65
2749.91	36354.96		10	Cl I	HU72	2885.477	34646.877		20	Nd I	MO70
2752.763	36317.245		15	Sm I	MO70	2885.72	34643.95		4	I I	HU72
2753.32	36309.89		25	Br I	HU72	2889.52	34598.39		90	I I	HU72
2753.84	36303.07		7000	Hg I	HU65	2894.136	34543.217		20	Nd I	MO70
2753.878	36302.529		15	Ar I	HU73	2896.66	34513.11		900	I I	HU72
2754.80	36290.38		85	I I	HU72	2897.357	34504.815		14	Nd I	MO70
2755.49	36281.33		18	Cl I	HU72	2898.612	34489.860		40	Ne I	HU73
2756.88	36263.00		14	Cl I	HU72	2900.161	34471.442		100	Ne I	HU73
2758.79	36237.89		160	I I	HU72	2901.815	34451.806		10	Nd I	MO70
2759.258	36231.741		150	Xe I	HU73	2904.56	34419.27		14	Cl I	HU72
2760.841	36210.972		25	Ar I	HU73	2905.26	34410.94		4	I I	HU72
2760.976	36209.206		250	Xe I	HU73	2906.26	34399.09		16 B	Cl I?	HU72
2761.708	36199.603		18	Ne I	HU73	2906.47	34396.64		16 B	Cl I?	HU72
2769.39	36099.19		3	I I	HU72	2911.663	34335.274		450	Xe I	HU73
2773.52	36045.44		55	I I	HU72	2915.02	34295.73		10000	I I	HU72
2773.546	36045.094		20	Xe I	HU73	2917.143	34270.76	0.01	12	S I	JA67
2776.199	36010.65	0.01	25	B I	LI70	2917.88	34262.11		3	I I	HU72
2776.835	36002.41	0.01	50	B I	LI70	2918.192	34258.45	0.01	6	S I	JA67
2777.58	35992.81		15	Cl I	HU72	2920.251	34234.29	0.02	2	S I	JA67
2777.979	35987.589		10	Nd	MO70	2924.73	34181.87		150	Br I	HU72
2780.55	35954.30		35	Br I	HU72	2929.062	34131.310		600	Ne I	HU73
2786.32	35879.85		25	Br I	HU72	2929.68	34124.11		6	I I	HU72
2786.59	35876.36		24	Cl I	HU72	2930.36	34116.23		35	Cl I	HU72
2787.87	35859.94		35	Cl I	HU72	2930.900	34109.921		10	Nd	MO70
2789.824	35834.784		120	Ne I	HU73	2932.22	34094.52		13	Cl I	HU72
2790.95	35820.27		12	Cl I	HU72	2933.917	34074.837		90	Xe I	HU73
2793.15	35792.15		55	Cl I	HU72	2936.89	34040.34		3	I I	HU72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
2939.106	34014.669		150	Xe I	HU73	3080.575	32452.631		15	Nd	MO70
2939.927	34005.187		10	Nd	MO70	3081.34	32444.56		10	Br I	HU72
2943.38	33965.28		7	I I	HU72	3081.87	32438.98		8	I I	HU72
2944.42	33953.29		9	I I	HU72	3084.45	32411.89		13	Cl I	HU72
2947.909	33913.099		2200	Ne I	HU73	3086.50	32390.32		1	I I	LU75
2947.972	33912.38		3	Ar I	HU73	3089.08	32363.27		5	I I	LU75
2948.787	33902.998		1300 B	Ne I?	HU73	3089.808	32355.650		70	Xe I	HU73
2949.065	33899.801		1300 B	Ne I?	HU73	3091.56	32337.29		22	Cl I	HU72
2954.668	33835.533		30	Sm I	MO70	3091.76	32335.22		1	I I	LU75
2969.485	33666.692		3500 I	Xe I	HU73	3091.86	32334.17		50	Br I	HU72
2970.71	33652.85		60	Cl I	HU72	3092.732	32325.060		50	Ar I	HU73
2971.479	33644.110		11	Nd	MO70	3093.18	32320.37		8	I I	HU72
2974.105	33614.403		100	Sm I	MO70	3094.565	32305.919		10	Nd	MO70
2975.775	33595.540		12	Nd	MO70	3095.409	32297.104		12	Ar I	HU73
2976.100	33591.86		8	Ar I	HU73	3095.794	32293.081		100	Xe I	HU73
2978.262	33567.470		50	Xe I	HU73	3096.38	32286.97		60 B	Br I	HU72
2980.56	33541.63		13	Cl I	HU72	3099.68	32252.60		40	Br I	HU72
2981.93	33526.18		5	I I	HU72	3100.173	32247.469		30	Ar I	HU73
2982.68	33517.75		24 B	Cl I?	HU72	3102.185	32226.556		20	Ar I	HU73
2983.00	33514.20		24 B	Cl I?	HU72	3103.83	32209.43		140	Cl I	HU72
2983.252	33511.327		30	Ne I	HU73	3108.975	32156.182		10	Sm	MO70
2991.51	33418.82		2	I I	HU72	3109.485	32150.87		6000	Hg I	HU65
2991.64	33417.39		14	Cl I	HU72	3114.72	32096.86		5	Br I	HU72
2992.332	33409.635		40	Kr I	KA69	3115.090	32093.058		16	Sm	MO70
2993.148	33400.538		20	Kr I	KA69	3116.95	32073.90		1	I	LU75
2994.89	33381.07		28	Cl I	HU72	3120.360	32038.85		9	Ar I	HU73
2995.353	33375.955		50	Sm I	MO70	3121.60	32026.12		15	Br I	HU72
2997.472	33352.352		450	Ne I	HU73	3125.495	31986.21		25	Ar I	HU73
2998.43	33341.72		20 B	Cl I?	HU72	3125.75	31983.60		1	I	LU75
2998.57	33340.16		20 B	Cl I?	HU72	3126.068	31980.355		20	Nd I?	MO70
2999.240	33332.683		80	Ne I	HU73	3126.068	31980.355		20	Nd I?	MO70
3003.09	33289.95		45	Cl I	HU72	3129.660	31943.64		20	Ar I	HU73
3003.594	33284.366		80	Ar I	HU73	3131.849	31921.323		10	Sm	MO70
3004.40	33275.41		15 B	Cl I?	HU72	3133.817	31901.277		240	Sm I	MO70
3004.50	33274.38		15 B	Cl I?	HU72	3134.53	31894.01		5 B	I I?	HU72
3005.304	33265.433		75	Xe I	HU73	3134.83	31890.96		5 B	I I?	HU72
3008.31	33232.19		400	I I	HU72	3137.62	31862.60		300	Br I	HU72
3009.66	33217.32		40	Cl I	HU72	3137.878	31859.980		40	Ne I	HU73
3011.81	33193.60		14	Cl I	HU72	3138.74	31851.27		160	Cl I	HU72
3013.669	33173.094		250	Ne I	HU73	3140.28	31835.61		12	I I	HU72
3016.733	33139.400		95	Ar I	HU73	3140.70	31831.29		35	Cl I	HU72
3016.80	33138.67		6	I I	HU72	3141.900	31819.20		18 B	Ar I?	HU73
3018.740	33117.37	0.01	10	B I	LI70	3142.140	31816.76		18 B	Ar I?	HU73
3019.225	33112.05	0.01	16 B	B I	LI70	3145.75	31780.25		3	I I?	LU75
3023.087	33069.750		90	Ar I	HU73	3145.75	31780.25		3	I I?	LU75
3023.465	33065.627		10	Sm I	MO70	3145.90	31778.70	0.01	5 LB	Be I	HO69
3023.640	33063.713		10	Sm	MO70	3146.16	31776.11		340	Cl I	HU72
3024.68	33052.32		40	Cl I	HU72	3146.27	31775.05	0.01	4 LB	Be I	HO69
3030.61	32987.66		3	I I	HU72	3150.959	31727.726		15	Nd	MO70
3035.858	32930.634		8	Ar I	HU73	3151.860	31718.65		50 B	Ar I	HU73
3038.407	32903.020		200	Sm I	MO70	3158.96	31647.36		15	Br I	HU72
3040.564	32879.664		40	Ar I	HU73	3160.68	31630.13		600	Br I	HU72
3042.139	32861.786		25	Nd I	MO70	3162.37	31613.24		120	Cl I	HU72
3046.535	32815.236		25	Nd I	MO70	3162.903	31607.907		555	Xe I	HU73
3051.89	32757.60		50	Cl I	HU72	3164.396	31592.99	0.01	22	K I	JO72
3051.98	32756.62		1	I I	LU75	3166.57	31571.30		70	Cl I	HU72
3053.510	32740.278		25	Sm	MO70	3167.156	31565.469		14	Sm	MO70
3053.604	32739.262		1800 I	Xe I	HU73	3170.24	31534.75		12	I I	HU72
3057.84	32693.90		120	Br I	HU72	3173.62	31501.15		30	Cl I	HU72
3061.899	32650.57		2	I I	LU75	3175.407	31483.449		10	Sm	MO70
3061.927	32650.266		11	Ar I	HU73	3181.14	31426.71		19 B	Cl I?	HU72
3062.326	32646.023		12	Sm I	MO70	3181.35	31424.67		19 B	Cl I?	HU72
3063.85	32629.80		18	Cl I	HU72	3182.97	31408.63		30	I I	HU72
3066.335	32603.341		14	Sm I	MO70	3183.153	31406.82	0.01	7	K I	JO72
3068.350	32581.916		12	Xe I	HU73	3185.461	31384.07	0.01	33	K I	JO72
3071.72	32546.17		70	Cl I	HU72	3189.18	31347.47		5	I I	HU72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
3190.346	31336.011		125	Xe I	HU73	3292.70	30361.93		10	I I	LU75
3191.520	31324.485		800 I	Ar I	HU73	3299.43	30300.00		1	I I?	LU75
3193.200	31308.018		50	Nd I	MO70	3299.43	30300.00		1	I I?	LU75
3194.248	31297.747		65	Sm I	MO70	3303.842	30259.534		10	Ne I	HU73
3196.471	31275.972		80	Xe I	HU73	3304.540	30253.143		600	Xe I	HU73
3197.505	31265.866		14	Nd	MO70	3304.90	30249.89	0.01	4 L	Be I	HO69
3198.27	31258.39		11 B	Cl I?	HU72	3305.531	30244.086		12	Nd	MO70
3198.505	31256.091		130	Sm I	MO70	3306.56	30234.66		8	Br I	HU72
3198.53	31255.85		11 B	Cl I?	HU72	3307.25	30228.36		6	I I	HU72
3200.07	31240.80		20	Cl I	HU72	3307.291	30227.991		24	Nd	MO70
3200.52	31236.40		8	I I	HU72	3307.690	30224.345		20	Nd	MO70
3205.493	31187.953		15	Sm I	MO70	3310.303	30200.474		150 B	Ne I?	HU73
3206.54	31177.75		22	Cl I	HU72	3310.401	30199.579		150 B	Ne I?	HU73
3208.470	31159.00	0.01	11	S I	JA67	3315.813	30150.302		60	Nd	MO70
3210.912	31135.317		25	Nd I	MO70	3320.17	30110.73		40	Cl I	HU72
3212.137	31123.43	0.01	18	S I	JA67	3320.99	30103.3	0.01		Cs I	JO61
3215.376	31092.091		10	Nd	MO70	3321.93	30094.77		4	I I	HU72
3215.469	31091.192		15	Sm I	MO70	3322.79	30086.98		8	I I	HU72
3217.741	31069.227		6000 I	Xe I	HU73	3325.47	30062.73		13	Cl I	HU72
3218.174	31065.04	0.01	23	S I	JA67	3326.546	30053.01		3	I I	LU75
3219.812	31049.255		30	Nd	MO70	3327.356	30045.697		5	Ar I	HU73
3221.09	31036.94		24	Cl I	HU72	3327.669	30042.871		11	Ar I	HU73
3221.13	31036.54		8	I I	HU72	3328.844	30032.27		1	I I	LU75
3221.736	31030.713		12	Sm	MO70	3329.28	30028.33		120	I I	HU72
3222.21	31026.14		5	I I	HU72	3329.60	30025.45		1	I I?	LU75
3225.11	30998.23		14	Cl I	HU72	3329.60	30025.45		1	I I?	LU75
3226.199	30987.774		80	Ar I	HU73	3330.42	30018.05		6	Br I	HU72
3227.096	30979.162		300	Kr I	KA69	3331.39	30009.31		50	Cl I	HU72
3231.96	30932.6		100	Ba I	PA76	3333.27	29992.39		5	I I	HU72
3233.06	30922.02		6 B	Br I?	HU72	3333.56	29989.81		12	Cl I	HU72
3233.29	30919.82		6 B	Br I?	HU72	3334.089	29985.025		75	Xe I	HU73
3233.89	30914.08		5	Br I	HU72	3335.119	29975.771		20	Nd	MO70
3234.848	30904.934		10	Nd	MO70	3335.76	29970.00		7	I I	HU72
3240.059	30855.221		15	Xe I	HU73	3336.648	29962.034		80	Sm I	MO70
3246.481	30794.182		500	Xe I	HU73	3340.376	29928.596		10	Nd	MO70
3249.003	30770.290		150	Sm I	MO70	3340.73	29925.39		10	Cl I	HU72
3250.317	30757.850		20	Nd	MO70	3344.310	29893.390		30	Nd	MO70
3255.207	30711.639		20	Ne I	HU73	3347.45	29865.34		250	Br I	HU72
3258.02	30685.1		27	Ba I	PA76	3350.13	29841.45		350	Br I	HU72
3260.312	30663.542		300	Kr I	KA69	3351.358	29830.523		10	Sm	MO70
3260.60	30660.80		360	Cl I	HU72	3353.083	29815.177		10	Nd	MO70
3261.01	30656.98		110	Br I	HU72	3353.257	29813.622		100	Xe I	HU73
3263.060	30637.72		20 B	Ar I?	HU73	3353.97	29807.28		40	Br I	HU72
3263.300	30635.47		20 B	Ar I?	HU73	3355.21	29796.30		300	Cl I	HU72
3264.15	30627.49		7	I I	HU72	3356.066	29788.667		1200 I	Ar I	HU73
3267.620	30594.965		20	Ne I	HU73	3356.16	29787.8		62	Ba I	PA76
3269.74	30575.13		8	I I	HU72	3359.77	29755.83		1	I I	LU75
3273.020	30544.49		55	Ar I	HU73	3361.00	29744.94		1	I I	LU75
3273.63	30538.81		13	Cl I	HU72	3361.039	29744.601		15	Nd	MO70
3275.869	30517.937		12	Nd	MO70	3363.22	29725.30		4	I I	HU72
3277.352	30504.116		100	Xe I	HU73	3364.493	29714.054		15	Ne I	HU73
3277.65	30501.34		150	Br I	HU72	3365.129	29708.449		10	Nd	MO70
3280.434	30475.455		1500 I	Xe I	HU73	3365.416	29705.915		14	Sm I	MO70
3281.006	30470.156		10	Nd	MO70	3365.446	29705.650		30	Nd I	MO70
3281.29	30467.5		41	Ba I	PA76	3365.68	29703.61		11	Cl I	HU72
3282.29	30458.23		200	Br I	HU72	3368.46	29679.02		14	Cl I	HU72
3282.771	30453.764		60	Ar I	HU73	3369.75	29667.70		1	I I	LU75
3284.24	30440.14		14	Cl I	HU72	3371.809	29649.585		100	Xe I	HU73
3284.893	30434.100		25	Sm I	MO70	3373.214	29637.243		25	Nd	MO70
3285.347	30429.895		22	Nd I	MO70	3373.93	29630.98		40	Cl I	HU72
3286.033	30423.535		60	Xe I	HU73	3376.83	29605.50		250	Br I	HU72
3287.60	30409.03		1	I I	LU75	3379.809	29579.412		120	Sm	MO70
3288.65	30399.32		160	Cl I	HU72	3381.31	29566.28		14	Cl I	HU72
3290.321	30383.88		8	I I	LU75	3381.88	29561.29		4	I I	HU72
3290.65	30380.85		500	Br I	HU72	3382.230	29558.23		40 B	Ar I	HU73
3292.69	30362.00		110	Cl I	HU72	3383.54	29546.76		40	Cl I	HU72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
3383.665	29545.703		100	Nd I	MO70	3485.40	28683.29		30	Br I	HU72
3383.730	29545.127		20	Xe I	HU73	3488.753	28655.717		1000 I	Kr I	KA69
3385.08	29533.34		10	I I	HU72	3490.16	28644.17		14	Cl I	HU72
3385.10	29533.17		1	I I	LU75	3490.819	28638.770		15	Nd I	MO70
3385.528	29529.445		15	Sm	MO70	3493.94	28613.17		25	Cl I	HU72
3388.80	29500.92		160	Cl I	HU72	3494.032	28612.427		1000	Ar I	HU73
3390.809	29483.454		25	Nd	MO70	3494.261	28610.550		180	Kr I	KA69
3392.340	29470.148		25	Nd	MO70	3494.695	28607.006		50	Nd	MO70
3392.79	29466.26		11	Cl I	HU72	3495.359	28601.572		15	Nd	MO70
3394.80	29448.82		150	Cl I	HU72	3497.721	28582.246		750	Xe I	HU73
3394.884	29448.055		150	Xe I	HU73	3499.91	28564.35		100	Cl I	HU72
3394.910	29447.826		50	Ne I	HU73	3503.731	28533.216		85	Ne I	HU73
3395.55	29442.28		30	Br I	HU72	3504.051	28530.615		55	Ar I	HU73
3397.98	29421.23		10	Cl I	HU72	3504.970	28523.13		30 B	Ar I	HU73
3400.18	29402.19		1	I I	HU72	3506.77	28508.49		80	Br I	HU72
3401.815	29388.065		11	Sm	MO70	3508.066	28497.958		900	Ar I	HU73
3402.238	29384.406		300	Xe I	HU73	3509.896	28483.112		35	Nd I	MO70
3403.917	29369.918		10	Nd	MO70	3510.185	28480.767		100	Sm I	MO70
3405.20	29358.84		40	Br I	HU72	3511.927	28466.640		35	Nd I	MO70
3405.62	29355.22		15 B	Br I?	HU72	3511.937	28466.55		2	I I	LU75
3405.94	29352.46		15 B	Br I?	HU72	3512.006	28465.99		2	I I	LU75
3406.401	29348.501		15	Nd	MO70	3512.895	28458.790		8	Xe I	HU73
3406.96	29343.68		24	Cl I	HU72	3516.790	28427.265		45	Ar I	HU73
3409.56	29321.30		2	I I	HU72	3518.235	28415.59		12 B	Ar I?	HU73
3412.68	29294.49		300	Br I	HU72	3518.395	28414.30		12 B	Ar I?	HU73
3415.223	29272.677		90	Ar I	HU73	3519.15	28408.20		1	Se	MO74
3417.301	29254.880		60	Ar I	HU73	3519.84	28402.64		16 B	Cl I?	HU72
3419.427	29236.693		300	Kr I	KA69	3520.33	28398.70		16 B	Cl I?	HU72
3426.97	29172.34		3	I I	HU72	3521.877	28386.207		125	Ne I	HU73
3431.94	29130.08		50	Cl I	HU72	3522.455	28381.545		250	Xe I	HU73
3432.411	29126.092		300	Ar I	HU73	3523.00	28377.16		350	Br I	HU72
3433.109	29120.183		20	Sm I	MO70	3526.81	28346.50		500	Br I	HU72
3433.76	29114.65		100	Br I	HU72	3527.843	28338.20	0.01	1	Fe	LI76
3435.18	29102.59		20	Cl I	HU72	3527.873	28337.970		200	Sm	MO70
3435.424	29100.550		40	Ar I	HU73	3530.853	28314.045		300	Ar I	HU73
3436.67	29090.00		9	Cl I	HU72	3534.808	28282.36		6	Ar I	HU73
3437.541	29082.638		100	Nd I	MO70	3536.358	28269.97		12 B	Ar I?	HU73
3438.615	29073.555		10	Nd I	MO70	3536.518	28268.69		12 B	Ar I?	HU73
3441.789	29046.734		75	Xe I	HU73	3536.64	28267.71		240	Cl I	HU72
3444.812	29021.247		8	Xe I	HU73	3539.661	28243.597		12	Nd	MO70
3446.21	29009.45		110	Cl I	HU72	3540.00	28240.88		3	I I	HU72
3447.376	28999.668		40	Nd I	MO70	3540.112	28239.999		15	Nd I	MO70
3449.564	28981.265		12	Ar I	HU73	3540.330	28238.250		400	Ar I	HU73
3453.888	28944.992		30	Nd	MO70	3540.45	28237.29		30	Cl I	HU72
3454.91	28936.42		20	Br I	HU72	3540.563	28236.402		50	Nd	MO70
3457.135	28917.807		30	Nd I	MO70	3545.795	28194.726		300	Ar I	HU73
3457.47	28914.93		50 B	Cl I?	HU72	3555.15	28120.50		170	Cl I	HU72
3457.51	28914.68		50 B	Cl I?	HU72	3555.780	28115.553		50	Xe I	HU73
3460.98	28885.70		60	Cl I	HU72	3559.178	28088.713		15	Xe I	HU73
3463.292	28866.397		50	Nd I	MO70	3559.52	28086.01		60	Br I	HU72
3463.60	28863.82		1	I I	LU75	3559.70	28084.59		2	I I	LU75
3463.95	28860.90		1	I I	LU75	3559.931	28082.780		15	Nd I	MO70
3467.035	28835.223		450	Ar I	HU73	3561.31	28071.90		1	I I	LU75
3468.567	28822.491		140	Kr I	KA69	3561.861	28067.55	0.01	1	Fe	LI76
3472.23	28792.08		100	Cl I	HU72	3561.870	28067.493		20	Nd I	MO70
3473.825	28778.871		25	Nd	MO70	3562.59	28061.83		14 B	Cl I?	HU72
3474.281	28775.083		2500 I	Ar I	HU73	3562.74	28060.60		14 B	Cl I?	HU72
3474.929	28769.714		150	Kr I	KA69	3563.86	28051.81		120	Br I	HU72
3475.61	28764.08		2	I I	HU72	3564.264	28048.71		1	I I	LU75
3476.000	28760.864		25	Nd	MO70	3564.85	28044.05		35	Cl I	HU72
3478.001	28744.305		40	Ne I	HU73	3566.41	28031.78		9	Cl I	HU72
3482.770	28704.95		60	Ar I	HU73	3569.879	28004.514		11	Ar I	HU73
3483.24	28701.07		5	Br I	HU72	3570.37	28000.66		80	Br I	HU72
3483.65	28697.70		12	Cl I	HU72	3573.362	27977.219		150	Ar I	HU73
3483.772	28696.690		15	Xe I	HU73	3574.040	27971.914		40	Ne I	HU73
3484.578	28690.049		300	Ar I	HU73	3577.39	27945.72		1	I I	LU75

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
3578.450	27937.439		15 B	Ar I?	HU73	3737.70	26747.12		60	Cl I	HU72
3578.763	27934.995		15 B	Ar I?	HU73	3737.92	26745.55		1	I I	HU72
3582.562	27905.37	0.01		Rb I	JO61	3739.41	26734.89		250	Br I	HU72
3584.08	27893.53		40	Cl I	HU72	3741.058	26723.124		10	Nd I	MO70
3594.73	27810.89		180	Cl I	HU72	3750.025	26659.216	0.01	17	Fe I	LI76
3596.51	27797.15		150	Br I	HU72	3755.852	26617.86	0.01	7	Fe I	LI76
3597.55	27789.11		1	I I	LU75	3757.626	26605.288		75	Ar I	HU73
3597.962	27785.928		75	Ar I	HU73	3764.921	26553.74		15	Te	MO75
3599.28	27775.76		20 B	Br I?	HU72	3764.98	26553.32		1	I I	LU75
3599.88	27771.13		20 B	Br I?	HU72	3766.02	26545.99		10	Br I	HU72
3602.66	27749.7		12	Ba I	PA76	3766.438	26543.041		200	Ar I	HU73
3603.502	27743.212		15	Xe I	HU73	3766.988	26539.17		38	Te I	MO75
3605.27	27729.61		400	Cl I	HU72	3770.689	26513.12	0.01	13	S	JA67
3605.865	27725.042		15	Nd I	MO70	3771.01	26510.86		1	I	LU75
3611.44	27682.23		1	I I	HU72	3771.010	26510.861		2500 I	Xe I	HU73
3625.687	27573.461		100	Ne I	HU73	3771.945	26504.29	0.01	9	S	JA67
3625.74	27573.05		9	I I	LU75	3772.687	26499.08	0.01	6	S I	JA67
3626.47	27567.50		15	Br I	HU72	3774.254	26488.06		6	Cm I	CO76
3632.76	27519.78		80	Cl I	HU72	3774.48	26486.49		1	I I	LU75
3641.464	27454.002		20	Nd I	MO70	3775.25	26481.09		30	Cl I	HU72
3643.50	27438.65		5	I I	LU75	3776.608	26471.568		8	Xe I	HU73
3653.17	27366.03		60 B	Cl I?	HU72	3782.42	26430.89		1	Se	MO74
3653.250	27365.42		12	I I	LU75	3782.745	26428.62		13	Te	MO75
3653.58	27362.95		10	Br I	HU72	3787.41	26396.06		60	Cl I	HU72
3653.64	27362.50		60 B	Cl I?	HU72	3787.87	26392.9	0.01	5	Mg I	RI65
3654.462	27356.342		150	Ar I	HU73	3793.26	26355.34	0.02	43	Zr	TA76
3660.086	27314.31	0.01		Rb I	JO61	3797.08	26328.84		1	I I	LU75
3662.258	27298.111		30 B	Xe I?	HU73	3799.41	26312.70	0.01	2	Fe	LI76
3662.456	27296.636		30 B	Xe I?	HU73	3799.74	26310.38		40	Cl I	HU72
3663.82	27286.47		3	I I	HU72	3804.94	26274.45		3	I I	HU72
3663.916	27285.760		30	Ar I	HU73	3805.56	26270.17		15	Br I	HU72
3668.03	27255.16		1	I I	LU75	3805.718	26269.084		2000 I	Xe I	HU73
3672.012	27225.60		50 B	Ar I	HU73	3809.357	26243.998		12	Sm	MO70
3674.827	27204.74	0.01	36	K I	JO72	3810.715	26234.637		30	Ar I	HU73
3678.272	27179.26		7	Te	MO75	3812.545	26222.04	0.01	38	Fe I	LI76
3681.569	27154.92		5	I I	LU75	3816.67	26193.70		70	Br I	HU72
3681.73	27153.74		60 B	Br I?	HU72	3817.420	26188.56		6	Te	MO75
3681.81	27153.15		60 B	Br I?	HU72	3817.928	26185.07	0.02	5	S I	JA67
3682.853	27145.454		100	Ar I	HU73	3819.607	26173.56	0.02	13 LB	O I	IS68
3684.80	27131.11		350	Br I	HU72	3824.697	26138.73		5	I I	LU75
3685.34	27127.12	0.05	4 U	Zr	TA76	3827.83	26117.34		2 B	I I?	HU72
3686.93	27115.42		19 B	Cl I?	HU72	3827.88	26116.96		30	Cl I	HU72
3687.28	27112.89		19 B	Cl I?	HU72	3828.15	26115.15		2 B	I I?	HU72
3693.585	27066.58	0.01	59	K I	JO72	3838.686	26043.472		10	Xe I	HU73
3693.95	27063.92		30 B	Cl I?	HU72	3841.65	26023.38		2	I I	HU72
3693.96	27063.85		30 B	Cl I?	HU72	3842.046	26020.700		50	Xe I	HU73
3700.12	27018.78		40	Cl I	HU72	3842.590	26017.02		2	Te	MO75
3703.24	26996.01		40	Cl I	HU72	3847.15	25986.18		2	I I	LU75
3703.75	26992.30		1	I I	LU75	3847.23	25985.65		180	Cl I	HU72
3705.57	26979.06		11	Cl I	HU72	3848.70	25975.71		1	I I	LU75
3707.69	26963.62		200	Br I	HU72	3858.190	25911.828		50	Nd I	MO70
3709.99	26946.90		8	I I	HU72	3860.077	25899.15		4	Se	MO74
3710.63	26942.25		80	Cl I	HU72	3860.93	25893.43		4	I I	LU75
3715.117	26909.711		1000	Ar I	HU73	3862.050	25885.930		20	Nd I	MO70
3716.400	26900.422		40	Kr I	KA69	3862.23	25884.71		20	Cl I	HU72
3717.337	26893.64		1	I I	LU75	3866.682	25854.914		35	Ne I	HU73
3717.692	26891.07		4	I I	LU75	3866.76	25854.38	0.01	6	Si I	LI65
3719.525	26877.82	0.02	8	Li I	JO59	3866.768	25854.34		1	Se	MO74
3719.65	26876.92		4	Br I	HU72	3867.588	25848.856		37	Kr I	KA69
3719.74	26876.26		14	Cl I	HU72	3868.58	25842.20	0.02	1	C I	JO65
3723.604	26848.386		10	Nd I	MO70	3869.86	25833.66	0.02	1	C I	JO65
3724.57	26841.41		8	Br I	HU72	3871.254	25824.386		20	Sm	MO70
3725.362	26835.705		200	Ar I	HU73	3871.784	25820.844		30	Xe I	HU73
3727.95	26817.08		1	I I	LU75	3875.40	25796.75		1	I I	LU75
3729.62	26805.1		9	Ba I	PA76	3878.20	25778.12		1	I	LU75
3735.731	26761.218		50	Kr I	KA69	3882.110	25752.160		3	Ce III	LI72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
3882.61	25748.85		120	Br I	HU72	3977.706	25133.26		4	I I	LU75
3883.50	25742.96		22	Cl I	HU72	3978.51	25128.18		40	Br I	HU72
3886.760	25721.361		12	Nd	MO70	3978.629	25127.43		2600	Se I	MO74
3888.52	25709.69	0.20	3 H	Zr	TA76	3978.971	25125.271		900	Ar I	HU73
3889.08	25706.03	0.02	1	C I	JO65	3980.08	25118.25	0.05	38	Zr	TA76
3890.36	25697.56	0.02	1	C I	JO65	3980.28	25116.98	0.50	1 W	Hf	GO70
3893.83	25674.65		1	I I	LU75	3981.478	25109.45		2	I I	LU75
3894.73	25668.70	0.20	3 H	Zr	TA76	3981.838	25107.18		50	Se I	MO74
3895.898	25661.022		450	Ar I	HU73	3982.20	25104.90		1	I I	LU75
3900.33	25631.86	0.01	2	Gd III	LI73	3982.700	25101.754		15	Nd	MO70
3902.960	25614.599		20	Nd I	MO70	3988.637	25064.383		5	Ne I	HU73
3908.78	25576.48		12	Cl I	HU72	3991.36	25047.3		6	Cl I	RA69
3914.02	25542.21		30	Br I	HU72	3993.385	25034.590		20	Nd I	MO70
3915.161	25534.77		1	Se	MO74	3994.37	25028.43		40	Cl I	HU72
3916.60	25525.36		24	Cl I	HU72	3996.110	25017.51		650	Se I	MO74
3916.756	25524.366		650	Ne I	HU73	3996.42	25015.55		40	Cl I	HU72
3918.835	25510.836		14	Nd I?	MO70	3997.922	25006.16		3	Cm I	CO76
3918.835	25510.836		14	Nd I?	MO70	3998.620	25001.814		30	Nd I	MO70
3919.695	25505.228		400	Ar I	HU73	3998.942	24999.792		30	Ne I	HU73
3922.15	25489.27		1	I I	LU75	4005.20	24960.73		1	I I	LU75
3922.399	25487.646		120	Ar I	HU73	4008.60	24939.56		10	Br I	HU72
3922.54	25486.73		1	I	LU75	4009.258	24935.468		5	Ne I	HU73
3922.76	25485.30		120	Br I	HU72	4009.29	24935.29	0.05	200 U	Hf	GO70
3923.004	25483.725		20	Sm	MO70	4010.318	24928.877		500	Ne I	HU73
3923.18	25482.57		1	I	LU75	4010.692	24926.551		3 L	Th II	GI74
3925.60	25466.86		1	I I	LU75	4011.00	24924.64		1	I I	LU75
3926.60	25460.38		3	I I	LU75	4011.154	24923.68	0.01	1	Fe I	LI76
3928.361	25448.95		5	Cm I	CO76	4014.367	24903.732		180	Ne I	HU73
3929.00	25444.83		6	I I	LU75	4017.82	24882.31	0.02	2	Hf I	GO70
3929.805	25439.623		12	Nd I	MO70	4019.700	24870.700		50	Nd I	MO70
3933.62	25414.94		140	Br I	HU72	4019.989	24868.90		2	Te I?	MO75
3933.960	25412.748		45	Xe I	HU73	4019.989	24868.90		2	Te I?	MO75
3934.690	25408.03		4	Te I	MO75	4020.58	24865.25		1	I I	LU75
3935.190	25404.811		100	Nd I	MO70	4022.175	24855.397		100	Nd I	MO70
3936.990	25393.188		50	Ne I	HU73	4022.385	24854.09		8	Te	MO75
3938.41	25384.03		3	I I	LU75	4025.15	24837.00		50 B	Cl I?	HU72
3939.755	25375.35		6	Cm I	CO76	4025.54	24834.59		50 B	Cl I?	HU72
3939.78	25375.20		1	I I	LU75	4027.145	24824.712		1800 I	Xe I	HU73
3940.76	25368.89		1	I	LU75	4027.19	24824.44		80	Br I	HU72
3941.25	25365.74		1	I I?	LU75	4032.621	24791.00	0.02	3	S I	JA67
3941.25	25365.74		1	I I?	LU75	4033.04	24788.43	0.02	2	Hf	GO70
3941.58	25363.62		1	I	LU75	4033.29	24786.87		9	Cl I	HU72
3943.015	25354.394		40	Nd I	MO70	4034.762	24777.85		12 B	Ar I?	HU73
3944.74	25343.28	0.02	15	Zr	TA76	4034.95	24776.69		25	Br I	HU72
3945.55	25338.10		1	I I	LU75	4034.962	24776.62		12 B	Ar I?	HU73
3947.78	25323.78		300	Cl I	HU72	4034.988	24776.460		350	Ne I	HU73
3947.80	25323.7		6	Cl I	RA69	4035.033	24776.187		30	Xe I	HU73
3948.80	25317.24		1	I I	LU75	4036.267	24768.611		90	Kr I	KA69
3951.78	25298.17		100	Cl I	HU72	4037.18	24763.01		1	I I	LU75
3955.048	25277.246		10	Ne I	HU73	4038.620	24754.187		30	Nd I	MO70
3957.17	25263.69		25	Br I	HU72	4041.774	24734.859		19	Kr I	KA69
3959.20	25250.74		7	I I	LU75	4042.61	24729.77	0.05	1	Hf	GO70
3959.50	25248.82		60	Br I	HU72	4042.708	24729.15	0.01	4	Fe	LI76
3960.12	25244.88	0.10	4	Hf I	GO70	4045.02	24715.01		20 B	Br I?	HU72
3960.550	25242.140		10	Nd	MO70	4045.34	24713.06		20 B	Br I?	HU72
3961.854	25233.820		600	Kr I	KA69	4045.95	24709.31		11	Cl I	HU72
3962.720	25228.308		70 B	Ne I?	HU73	4046.404	24706.568		15	Sm	MO70
3962.779	25227.934		70 B	Ne I?	HU73	4047.099	24702.317		60	Xe I	HU73
3970.25	25180.47		60 B	Cl I?	HU72	4047.483	24699.97		2	Te I?	MO75
3970.62	25178.10		60 B	Cl I?	HU72	4047.483	24699.97		2	Te I?	MO75
3971.11	25174.99		40	Cl I	HU72	4048.06	24696.47		12	Cl I	HU72
3973.212	25161.689		250	Ne I	HU73	4051.08	24678.01	0.10	6	Hf I	GO70
3973.576	25159.384		60	Xe I	HU73	4055.939	24648.48	0.01	1	Fe	LI76
3973.992	25156.75	0.02	2	S	JA67	4056.29	24646.36		150	Cl I	HU72
3974.10	25156.09	0.05	2	Hf I	GO70	4057.23	24640.63		60	Cl I	HU72
3975.716	25145.842		175	Xe I	HU73	4059.09	24629.32		14	Cl I	HU72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4061.956	24611.95		6	Cm I	CO76	4119.14	24270.29		50	Cl I	HU72
4065.40	24591.12		1	I I	LU75	4119.63	24267.43	0.10	1	Hf I	GO70
4068.951	24569.64		3	Cm I	CO76	4120.152	24264.33	0.01	1	Fe	LI76
4070.657	24559.35		3	Cm I?	CO76	4120.48	24262.40		1	I I	LU75
4070.657	24559.35		3	Cm I?	CO76	4120.68	24261.22		2	I I	HU72
4071.116	24556.59	0.01	2	Fe I	LI76	4120.801	24260.506		120	Kr I	KA69
4072.541	24548.00	0.01	3	Fe	LI76	4121.04	24259.08	0.02	32	Zr I	TA76
4073.86	24540.07		40	Cl I	HU72	4121.06	24259.0	0.50	1	Hf	GO70
4076.228	24525.791		10	Ne I	HU73	4121.28	24257.69	0.20	1 L	Tm II	CA69
4077.79	24516.40		60	Cl I	HU72	4122.648	24249.638		600	Ne I	HU73
4077.843	24516.08	0.01	7	S I	JA67	4125.48	24232.99		1	I I	LU75
4078.13	24514.35		20	Br I	HU72	4127.875	24218.930		40	Ne I	HU73
4079.130	24508.352		15	Nd I	MO70	4129.032	24212.153		13	Sm I	MO70
4079.997	24503.12		6	Cm I	CO76	4129.542	24209.15		2	Te	MO75
4082.571	24487.69	0.01	2	Fe I	LI76	4129.734	24208.02		6	Cm I	CO76
4082.875	24485.872		13	Nd	MO70	4129.83	24207.47		1	I I	LU75
4083.02	24484.99		6 B	Br I	HU72	4130.347	24204.44		340	Se I	MO74
4083.34	24483.08	0.10	3 L	Tm I	CA69	4136.26	24169.84	0.20	1 L	Tm	CA69
4083.34	24483.10	0.10	1	Hf	GO70	4136.3	24169.6	0.50	100	Lu I	BO56
4083.38	24482.82	0.02	42	Zr I	TA76	4136.555	24168.119		16	Nd I	MO70
4084.158	24478.16		6	Cm I	CO76	4137.700	24161.420		500	Ne I	HU73
4085.326	24471.17		500	Se I	MO74	4138.076	24159.23		295	Se I	MO74
4085.52	24470.0		100	Cl I	RA69	4138.636	24155.956		15 B	Ne I?	HU73
4085.74	24468.69	0.02	30	Th III	LI74	4139.676	24149.887		15 B	Ne I?	HU73
4086.369	24464.927		25	Ne I	HU73	4139.890	24148.650		10	Nd I	MO70
4086.415	24464.66	0.02	6	Li I	JO59	4139.969	24148.18		700	Se I	MO74
4087.247	24459.670		700 B	Ne I?	HU73	4140.30	24146.2		4	Cl I	RA69
4087.298	24459.366		700 B	Ne I?	HU73	4142.013	24136.264		3 L	Th I	GI74
4088.345	24453.102		14	Ne I	HU73	4143.10	24129.93		5	Br I	HU72
4089.223	24447.850		400	Ne I	HU73	4144.040	24124.467		20	Nd I	MO70
4089.926	24443.648		70	Xe I	HU73	4144.94	24119.221	0.07	4 L	Nd I	BL70
4090.70	24439.02		140	Br I	HU72	4147.564	24103.961	0.12	4 L	Sm I	BL69
4092.86	24426.13		1	I I	LU75	4148.25	24099.97		2	Br I	TE63
4093.75	24420.82		32	I I	LU75	4148.496	24098.544		200	Ne I	HU73
4094.589	24415.81	0.01	21	S I	JA67	4149.556	24092.388		50 B	Ne I?	HU73
4094.948	24413.67		260	Se I	MO74	4150.492	24086.960		50 B	Ne I?	HU73
4095.500	24410.390		30	Sm I?	MO70	4151.061	24083.65	0.01	1	Fe I	LI76
4095.500	24410.390		30	Sm II?	MO70	4153.081	24071.949		10	Sm	MO70
4096.12	24406.69		7	I I	LU75	4154.468	24063.90		6	Te I	MO75
4097.72	24397.16		20	Br I	HU72	4154.87	24061.58		5	I I	LU75
4098.039	24395.259	0.06	7 L	Sm I	BL69	4155.308	24059.04		25	Te I	MO75
4099.597	24385.99		1400	Se I	MO74	4156.33	24053.12		8	Br I	HU72
4099.990	24383.658		14	Nd I	MO70	4157.739	24044.97		11	Te I	MO75
4100.038	24383.362		90	Ne I	HU73	4157.880	24044.16	0.02		Zn I	JO68
4101.06	24377.26		250	Yb II	ME67	4158.667	24039.61		4	Te I	MO75
4101.442	24375.02	0.02		Zn I	JO68	4162.10	24019.78	0.20	1 L	Tm	CA69
4101.545	24374.41	0.01	2	Fe	LI76	4163.235	24013.230		15	Ar I	HU73
4101.84	24372.65		150	Br I	HU72	4164.145	24007.982		4 L	Th I	GI74
4102.017	24371.599		800	Ne I	HU73	4166.210	23996.08		2	Te I?	MO75
4102.360	24369.56	0.02	4	S I	JA67	4166.210	23996.08		2	Te I?	MO75
4103.120	24365.048		1500	Ne I	HU73	4168.03	23985.58		55	Cl I	HU72
4103.413	24363.31	0.01	11	S I	JA67	4168.070	23985.382		12	Nd I	MO70
4104.959	24354.13	0.02	3	S I	JA67	4168.640	23982.09		1	I I	LU75
4106.515	24344.89		3	Cm I	CO76	4168.916	23980.51		5	Te I	MO75
4106.71	24343.75	0.05	6	Hf I	GO70	4169.231	23978.70		17	Te I	MO75
4107.002	24342.02	0.02	4	S I	JA67	4169.331	23978.122		1000	Ne I	HU73
4107.816	24337.204		12	Sm	MO70	4170.427	23971.820		10	Ne I	HU73
4108.443	24333.48	0.01	2	Fe I	LI76	4171.15	23967.66	0.15	1 L	Tm	CA69
4111.625	24314.657		70	Nd I	MO70	4171.349	23966.518		900	Ar I	HU73
4113.880	24301.330		11	Nd I	MO70	4171.350	23966.522		40	Sm I	MO70
4115.421	24292.221		180	Kr I	KA69	4171.742	23964.262		3 L	Th II	GI74
4115.586	24291.248		3 L	Th II	GI74	4172.726	23958.619		60	Sm I	MO70
4116.677	24284.81		5	Se	MO74	4173.101	23956.458		600	Ne I	HU73
4117.24	24281.49	0.15	2 L	Tm II	CA69	4173.16	23956.1		11	Cl I	RA69
4117.42	24280.45	0.02	1	Hf	GO70	4173.883	23951.978		60	Sm II	MO70
4117.95	24277.32	0.05	2 W	Hf I	GO70	4173.966	23951.49		12	Ar I	HU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4173.979	23951.417		1800	Ne I	HU73	4251.493	23514.732		5 L	Th I	GI74
4176.914	23934.491		30	Xe I	HU73	4251.78	23513.15		206	Br I	TE63
4178.680	23924.47	0.01	1	Fe	LI76	4252.295	23510.30	0.01	1	Fe I	LI76
4179.12	23921.92		50	Ge I	HU64	4253.712	23502.465		70	Kr I	KA69
4181.333	23909.296	0.10	3 L	Gd I	BL71	4254.106	23500.289	0.15	3 L	Sm I	BL69
4181.98	23905.60	0.05	10	Hf I	GO70	4263.714	23447.33		11	Se I	MO74
4182.125	23904.766		20	Ar I	HU73	4264.386	23443.639		35	Xe I	HU73
4184.426	23891.62	0.02		Zn I	JO68	4265.498	23437.525		5 L	Th II	GI74
4184.93	23888.74		1	I I	LU75	4265.61	23436.91		12	Cl I	HU72
4185.99	23882.7		18	Cl I	RA69	4265.970	23434.93		2	Se I	MO74
4186.62	23879.13	0.02	7 L	In I	JO67	4266.35	23432.85	0.10	3 L	Tm II	CA69
4187.270	23875.38		8	Cm I	CO76	4267.206	23428.145	0.12	4 L	Sm	BL69
4191.438	23851.65		40	Se I	MO74	4267.93	23424.20	0.10	1	Hf I	GO70
4191.44	23851.64		2	I I	LU75	4268.86	23419.08		60	Cl I	HU72
4192.58	23845.16	0.05	6 L	Tm I	CA69	4269.944	23413.12		20	Se I	MO74
4192.601	23845.035		2000	Ar I	HU73	4270.459	23410.30		2	Te I	MO75
4196.704	23821.72		4	Te	MO75	4270.470	23410.238	0.15	3 L	Sm	BL69
4201.14	23796.570	0.15	3 L	Nd	BL70	4271.58	23404.15		12	Br I	TE63
4201.158	23796.466		60	Xe I	HU73	4273.70	23392.54		30	Cl I	HU72
4203.33	23784.17	0.02	3	Th III	LI74	4274.376	23388.85		220	Se I	MO74
4203.742	23781.839		4 L	Th I	GI74	4276.15	23379.14	0.01		Na I	JO61
4205.763	23770.41		1	Se I	MO74	4277.274	23372.999		1050	Ne I	HU73
4206.01	23769.00	0.05	2	Hf I	GO70	4278.094	23368.52		8	Se I	MO74
4206.84	23764.327	0.15	3 L	Nd	BL70	4280.350	23356.20		10	Se I	MO74
4210.01	23746.433	0.08	4 L	Nd I	BL70	4280.492	23355.43		3	Se I	MO74
4210.770	23742.146		4 L	Th II	GI74	4281.39	23350.53		20	Br I	HU72
4211.450	23738.30		6	Cm I	CO76	4281.78	23348.38	0.01		Na I	JO61
4212.40	23732.96		40	Br I	TE63	4282.655	23343.632	0.15	3 L	Sm I	BL69
4212.97	23729.75		1	I I	LU75	4283.245	23340.416		180	Kr I	KA69
4216.062	23712.33		8	Cm I?	CO76	4284.242	23334.984	0.15	3 L	Sm I	BL69
4216.062	23712.33		8	Cm I?	CO76	4286.07	23325.03	0.02	10	Hf I	GO70
4216.628	23709.160		1100 B	Ne I?	HU73	4288.325	23312.768		1 L	Tb I	KL70
4216.906	23707.601		1100 B	Ne I?	HU73	4289.115	23308.47	0.01	2	Fe I	LI76
4217.77	23702.74		1	I I	LU75	4289.27	23307.61	0.05	2	Zr I	TA76
4217.966	23701.643		300	Ne I	HU73	4289.55	23306.11		2	I I	LU75
4219.171	23694.87	0.01	3	Fe I	LI76	4291.424	23295.93		2	Te I	MO75
4219.299	23694.15		2	I I	LU75	4291.606	23294.94		27	Te I	MO75
4220.414	23687.89		5	Se I	MO74	4292.00	23292.80		1	I I	LU75
4221.149	23683.77	0.01	2	Fe I	LI76	4294.445	23279.541		110	Xe I	HU73
4223.911	23668.28		4	Te I	MO75	4297.997	23260.302		1000	Ne I	HU73
4224.76	23663.53	0.01	2	Gd III	LI73	4299.393	23252.750		35	Xe I	HU73
4226.03	23656.415	0.10	4 L	Nd I	BL70	4299.62	23251.53	0.15	2 L	Tm I	CA69
4226.91	23651.49		1	Se I	MO74	4299.910	23249.96		37	Se I	MO74
4227.045	23650.73		2	Te	MO75	4300.525	23246.62		3	Cm I	CO76
4227.152	23650.14		1	I I	LU75	4300.96	23244.28	0.20	1 L	Tm I	CA69
4227.22	23649.75		70	Cl I	HU72	4301.93	23239.02	0.05	6	Zr	TA76
4229.588	23636.515		3500	Ne I	HU73	4303.98	23227.97		1	I I	LU75
4231.082	23628.17		115	Se	MO74	4303.981	23227.965	0.06	7 L	Sm I	BL69
4231.75	23624.47	0.10	4	Hf I	GO70	4304.92	23222.90	0.20	1 L	Tm	CA69
4231.842	23623.93		1	Se	MO74	4310.408	23193.332		1250 I	Xe I	HU73
4233.161	23616.56		45	Se I?	MO74	4311.24	23188.8		12	Cl I	RA69
4233.161	23616.56		45	Se I?	MO74	4312.13	23184.05	0.10	3	Zr	TA76
4234.231	23610.60		2	Se I	MO74	4312.34	23182.92	0.05	2	Hf	GO70
4234.28	23610.324	0.15	3 L	Nd I	BL70	4312.52	23181.96	0.02	25	Zr I	TA76
4234.93	23606.700	0.15	3 L	Nd	BL70	4313.730	23175.469		3 L	Th I	GI74
4235.116	23605.65		6	Cm I	CO76	4313.84	23174.879	0.15	3 L	Nd I	BL70
4235.37	23604.25		80	Br I	HU72	4314.050	23173.75	0.01	1	Fe	LI76
4235.77	23602.02		1	I I	LU75	4314.564	23170.99		2	Se I	MO74
4236.459	23598.18		22	Se I	MO74	4315.230	23167.414	0.15	3 L	Sm	BL69
4240.509	23575.64	0.01	1	Fe I	LI76	4315.821	23164.24	0.01	3	Fe I	LI76
4241.82	23568.35		5	I I	LU75	4316.98	23158.0	0.50	1	Hf	GO70
4242.115	23566.72	0.01	2	Fe I	LI76	4317.805	23153.597		4 L	Th I	GI74
4242.359	23565.362		850	Ne I	HU73	4318.25	23151.20	0.05	2	Hf	GO70
4244.43	23553.86		50 B	Cl I?	HU72	4318.45	23150.14		3	I I	LU75
4244.73	23552.20		50 B	Cl I?	HU72	4318.670	23148.96		2	Te I	MO75
4246.405	23542.91		10	Se I	MO74	4319.475	23144.65	0.01	2	Fe I	LI76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4319.78	23143.0	0.50	2	Hf	GO70	4375.570	22847.931	0.08	4 L	Gd I?	BL71
4319.87	23142.52	0.05	1 U	Hf I	GO70	4375.957	22845.91	0.01	1	Fe I	LI76
4320.865	23137.19		6	Cm I	CO76	4375.99	22845.76	0.10	2	Hf	GO70
4321.526	23133.66		110	Se I	MO74	4377.699	22836.819	0.15	3 L	Sm I	BL69
4321.611	23133.204		1000	Ar I	HU73	4378.549	22832.39	0.01	2	Fe I	LI76
4321.80	23132.19	0.10	1	Hf I	GO70	4379.122	22829.400	0.02	5	S I	JA67
4321.83	23132.03		1	I I	LU75	4380.08	22824.41	0.20	1 L	Tm II	CA69
4322.45	23128.72		2	I I?	LU75	4380.98	22819.716	0.15	3 L	Nd I	BL70
4322.45	23128.72		2	I I?	LU75	4380.99	22819.68		20	Cl I	HU72
4325.72	23111.23		1	I I	LU75	4381.52	22816.90	0.15	2 L	Tm I	CA69
4326.64	23106.32	0.05	7	Hf I	GO70	4382.55	22811.54	0.20	1 L	Tm	CA69
4326.837	23105.265		8	Xe I	HU73	4383.09	22808.74		16 B	Cl I?	HU72
4327.727	23100.514		600	Ne I	HU73	4383.26	22807.86		16 B	Cl I?	HU72
4327.894	23099.61		3	Cm I	CO76	4385.725	22795.029	0.01	70	S I	JA67
4329.975	23088.52		51	Se I	MO74	4387.21	22787.311	0.07	4 L	Nd I	BL70
4332.802	23073.456		45	Xe I	HU73	4387.737	22784.574	0.15	3 L	Sm I	BL69
4333.732	23068.506	0.15	3 L	Sm I	BL69	4389.35	22776.20		1	Se	MO74
4333.88	23067.72		40	Br I	HU72	4390.260	22771.48		2	Se	MO74
4334.62	23063.79	0.02	3	Hf I	GO70	4392.988	22757.34		12	Se	MO74
4335.177	23060.82		7	Se	MO74	4393.312	22755.66		48	Te I	MO75
4335.328	23060.01		1	Se	MO74	4393.706	22753.62		45	Se	MO74
4336.175	23055.51		43	Se I	MO74	4394.387	22750.09		2	Se	MO74
4336.55	23053.51		1	I I	LU75	4395.931	22742.102		5 B	Xe I?	HU73
4336.94	23051.46	0.10	1 W	Hf	GO70	4396.009	22741.699		5 B	Xe I?	HU73
4337.58	23048.07		12	Cl I	HU72	4396.15	22740.97		1	I I	LU75
4337.610	23047.87		6	Cm I	CO76	4396.241	22740.50	0.01	1	Fe	LI76
4339.32	23038.8		17	Cl I	RA69	4399.87	22721.7		5	Cl I	RA69
4340.34	23033.37	0.05	14	Zr I	TA76	4400.17	22720.19		60	Br I	TE63
4340.87	23030.57		10	Br I	HU72	4401.55	22713.08	0.05	8	Hf I	GO70
4341.36	23027.973	0.15	3 L	Nd	BL70	4402.107	22710.196		3 L	Th I	GI74
4342.407	23022.418		10	Xe I	HU73	4402.584	22707.738	0.01	1250	S I	JA67
4342.76	23020.54		11	Cl I	HU72	4403.284	22704.13		3	Te I	MO75
4343.70	23015.57		1	I I	LU75	4405.95	22690.389	0.07	5 L	Nd I	BL70
4346.07	23003.01		20	Cl I	HU72	4406.28	22688.7		12	Cl I	RA69
4349.063	22987.18	0.02	5 B	S I	JA67	4406.458	22687.775		50	Ne I	HU73
4349.43	22985.25	0.02	5 B	S I	JA67	4406.64	22686.85	0.05	1	Hf	GO70
4349.685	22983.89		5	Cm I	CO76	4408.08	22679.43	0.15	2 L	Tm I	CA69
4353.307	22964.776		40	Xe I	HU73	4409.70	22671.11	0.05	30	Hf I	GO70
4353.75	22962.44		15	Br I	HU72	4411.07	22664.05		10	Br I	HU72
4354.921	22956.264		40	Ar I	HU73	4411.506	22661.813		400	Ne I	HU73
4355.60	22952.70	0.02	2 B	S I	JA67	4411.74	22660.63	0.20	1	Hf	GO70
4357.153	22944.506	0.12	4 L	Sm	BL69	4412.746	22655.455	0.01	25	S I	JA67
4357.255	22943.96		3	Cm I	CO76	4413.100	22653.63		15	Ca I	RI68
4358.078	22939.64		6 B	Ar I?	HU73	4413.567	22651.23		30	Ca I	RI68
4358.258	22938.69		6 B	Ar I?	HU73	4413.76	22650.239	0.07	5 L	Nd I	BL70
4359.440	22932.47	0.01		Rb I	JO61	4413.945	22649.290	0.06	7 L	Sm I?	BL69
4359.61	22931.55	0.02	2 B	S I	JA67	4413.945	22649.290	0.06	7 L	Sm I?	BL69
4361.41	22922.09		19	Cl I	HU72	4414.548	22646.195		3 L	Th I	GI74
4363.03	22913.58		40	Cl I	HU72	4414.940	22644.17		4	Cm I	CO76
4364.37	22906.56	0.02	7	C I	JO65	4414.958	22644.090	0.01	135	S I	JA67
4364.49	22905.934	0.07	5 L	Nd I	BL70	4418.07	22628.12	0.10	1	Hf	GO70
4364.789	22904.363		9	Kr I	KA69	4418.353	22626.69		15	Ca I	RI68
4365.22	22902.11		60	Cl I	HU72	4418.698	22624.93		25	Ca I	RI68
4365.972	22898.15		4	Cm I	CO76	4418.73	22604.7		3	Cl	RA69
4367.16	22891.9		4	Cl	RA69	4419.689	22619.85	0.01	21	Fe I	LI76
4367.817	22888.488	0.01	26 B	S I	JA67	4419.711	22619.74		8	Se	MO74
4368.06	22887.23	0.01	26 B	S I	JA67	4419.996	22618.283		90	Xe I	HU73
4369.00	22882.29		1	I I	LU75	4420.758	22614.383		4 L	Th I	GI74
4369.22	22881.14		30	Br I	HU72	4421.15	22612.38		50	Br I	HU72
4370.271	22875.640	0.02	1	S I	JA67	4422.021	22607.93		20	Ca I	RI68
4370.97	22871.98	0.15	2 L	Tm I	CA69	4424.08	22597.39		35	Cl I	HU72
4372.18	22865.65		950	Br I	TE63	4424.44	22595.56		20	Br I	HU72
4372.25	22865.28		1	I	LU75	4424.629	22594.59		3	Cm I	CO76
4374.10	22855.61		1	I I	LU75	4425.12	22592.092	0.07	5 L	Nd I	BL70
4374.861	22851.632		3 L	Th I	GI74	4425.210	22591.63		2	Te I	MO75
4375.570	22847.931	0.08	4 L	Gd I?	BL71	4428.386	22575.431	0.01	75	S I	JA67

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4429.71	22568.71	0.02	7 L	Ga I	JO67	4482.13	22304.73	0.20	1 L	Tm I	CA69
4430.655	22563.867	0.01	225	S I	JA67	4482.836	22301.22		2	Se I	MO74
4431.40	22560.075	0.07	5 L	Nd I	BL70	4483.437	22298.232	0.08	6 L	Sm I	BL69
4432.088	22556.56		4	Cm I	CO76	4484.88	22291.06	0.02	6 L	In I	JO67
4432.340	22555.29		74	Te I	MO75	4485.39	22288.5		9	Cl I	RA69
4432.866	22552.612	0.01	280	S I	JA67	4486.191	22284.54		4	Te I	MO75
4434.071	22546.49		7	Se I	MO74	4489.154	22269.836		60	Xe I	HU73
4434.22	22545.71		30	Cl I	HU72	4490.259	22264.353		6 L	Th II	GI74
4434.268	22545.484		13	Kr I	KA69	4491.098	22260.19	0.01	5	Fe I	LI76
4435.787	22537.763		3 L	Th I	GI74	4491.706	22257.182	0.08	6 L	Sm I	BL69
4436.607	22533.597		8	Ar I	HU73	4491.718	22257.12	0.01	8	Fe I	LI76
4437.079	22531.20		3	Te	MO75	4492.320	22254.14		30 B	Ar I	HU73
4437.22	22530.48		28	Cl I	HU72	4492.62	22252.65	0.05	6 L	Tm I	CA69
4437.236	22530.404		2250	Ne I	HU73	4492.692	22252.30		6	Se I	MO74
4437.385	22529.65	0.01		Rb I	JO61	4493.691	22247.348		300	Ne I	HU73
4438.093	22526.053	0.01	115	S I	JA67	4493.962	22246.00		7	Cm I	CO76
4438.16	22525.72	0.10	2	Hf I	GO70	4495.182	22239.968		11	Kr I	KA69
4438.73	22522.8		6	Cl I	RA69	4497.33	22229.349	0.10	3 L	Nd I	BL70
4438.860	22522.16		2	I I	LU75	4497.75	22227.27	0.10	3 L	Tm I	CA69
4439.462	22519.105	0.01	185	S I	JA67	4497.90	22226.53		150	I I	LU75
4440.711	22512.770		7	Kr I	KA69	4499.31	22219.56	0.20	1	Hf	GO70
4441.03	22511.16		1	I I	LU75	4499.63	22217.98	0.50	1	Hf	GO70
4441.733	22507.592	0.01	115	S I	JA67	4500.70	22212.69	0.02	22	Zr	TA76
4442.022	22506.128		4 L	Th II	GI74	4500.84	22212.0	0.50	1	Hf	GO70
4442.21	22505.18	0.05	6 L	Tm I	CA69	4501.315	22209.669		5	Ar I	HU73
4442.72	22502.61		20	Cl I	HU72	4501.68	22207.85	0.05	4	Zr I	TA76
4444.55	22493.33	0.01	3	Gd III	LI73	4503.92	22196.823	0.07	5 L	Nd I	BL70
4445.238	22489.846	0.10	5 L	Sm I	BL69	4506.72	22183.03		220	I I	LU75
4445.72	22487.41		20	Br I	HU72	4507.68	22178.31	0.20	1 L	Tm I	CA69
4445.925	22486.36		7	Cm I	CO76	4507.73	22178.05	0.02	10	Zr	TA76
4446.043	22485.775		120	Kr I	KA69	4510.312	22165.365	0.06	6 L	Gd I	BL71
4448.506	22473.32	0.01	4	Fe	LI76	4511.778	22158.164	0.12	4 L	Sm II	BL69
4449.474	22468.43		2	Se	MO74	4513.89	22147.80		50	Br I	HU72
4449.797	22466.802		130	Ne I	HU73	4515.64	22139.21		3	I I	LU75
4452.20	22454.67		17	Cl I	HU72	4516.79	22133.576	0.07	5 L	Nd I	BL70
4453.97	22445.76		20	Cl I	HU72	4521.069	22112.626		100	Ar I	HU73
4454.323	22443.98		5	Se	MO74	4521.52	22110.41	0.02	25	Zr I	TA76
4457.469	22428.133		350	Ne I	HU73	4522.907	22103.641		4 L	Th I	GI74
4459.081	22420.03	0.01	1	Fe	LI76	4522.966	22103.35		4	Te I?	MO75
4459.366	22418.590	0.01	5	Ce III	LI72	4522.966	22103.35		4	Te I?	MO75
4461.653	22407.09		7	Cm I	CO76	4525.32	22091.84		90	Ge I	HU64
4461.710	22406.818		75	Xe I	HU73	4527.00	22083.66	0.01		Na I	JO61
4464.45	22393.08		18	Cl I	HU72	4528.328	22077.181		900	Ar I	HU73
4464.486	22392.88	0.01	2	Fe I	LI76	4528.57	22075.99		24	Cl I	HU72
4465.781	22386.390		40 B	Xe I?	HU73	4528.620	22075.757	0.15	3 L	Sm	BL69
4465.90	22385.78		10	Cl I	HU72	4529.076	22073.53		8	Cm I	CO76
4466.035	22385.12	0.01	1	Fe I	LI76	4531.30	22062.71	0.01	12	Si I	LI65
4466.505	22382.762		40 B	Xe I?	HU73	4532.59	22056.40	0.01		Na I	JO61
4466.70	22381.78		1	I I	LU75	4533.02	22054.31		28	Cl I	HU72
4466.893	22380.82	0.01	14	Fe I	LI76	4534.94	22044.98	0.02	19	Zr I	TA76
4467.335	22378.603	0.10	5 L	Sm I	BL69	4536.057	22039.561		250	Ar I	HU73
4468.08	22374.86		50	Cl I	HU72	4537.89	22030.661	0.07	5 L	Nd I	BL70
4468.321	22373.666	0.10	3 L	Gd I	BL71	4538.66	22026.92		500	Cl I	HU72
4469.388	22368.32		2	Se	MO74	4538.71	22026.7		40	Cl I	RA69
4469.87	22365.91	0.20	1 L	Tm	CA69	4539.68	22021.974	0.07	4 L	Nd	BL70
4470.18	22364.36	0.25	1 L	I I	VE69	4539.926	22020.781	0.12	4 L	Sm	BL69
4470.85	22361.0	0.50	2	Hf	GO70	4540.75	22016.81	0.02	6 L	Ga I	JO67
4471.17	22359.41	0.10	1	Hf	GO70	4540.97	22015.72	0.10	4 L	Tm I	CA69
4472.25	22354.0	0.50	1	Hf	GO70	4542.25	22009.51		10	Br I	HU72
4472.81	22351.21	0.15	2 L	Tm I	CA69	4542.804	22006.82		4	Cm I	CO76
4474.281	22343.861		3 L	Th II	GI74	4543.34	22004.25		40	Cl I	HU72
4478.064	22324.99	0.01	1	Fe	LI76	4544.75	21997.41		40	Br I	HU72
4479.79	22316.385	0.10	3 L	Nd I	BL70	4546.952	21986.75		7	Te I	MO75
4480.07	22315.0	0.50	1	Hf	GO70	4547.098	21986.049	0.06	7 L	Sm I	BL69
4481.23	22309.21		30	I I	LU75	4549.25	21975.63	0.05	3	Zr	TA76
4481.91	22305.83		30	Br I	HU72	4550.859	21967.87		8	Cm I	CO76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4551.90	21962.85	0.15	3 L	Tm II	CA69	4621.54	21631.91		359	Br I	TE63
4552.01	21962.33	0.02	140	Hf I	GO70	4622.161	21628.998		4 L	Th I	GI74
4555.612	21944.958		4 L	Th I	GI74	4622.166	21628.98		39	Se I	MO74
4558.43	21931.39	0.20	1 L	Tm I	CA69	4624.14	21619.742	0.07	5 L	Nd I	BL70
4559.70	21925.28		1	Se I	MO74	4624.629	21617.457	0.06	5 L	Gd I	BL71
4560.30	21922.40		1	Se I	MO74	4625.99	21611.11	0.02	8	Hf	GO70
4561.797	21915.20		3	Cm I	CO76	4626.824	21607.20		6	Se	MO74
4562.90	21909.91		1	Se I	MO74	4627.70	21603.11		70 B	Br I?	HU72
4564.440	21902.513		1800 I	Kr I	KA69	4627.830	21602.50		464	Te I	MO75
4564.48	21902.3		14	Cl I	RA69	4628.02	21601.62		70 B	Br I?	HU72
4564.67	21901.40	0.05	4	Zr	TA76	4629.520	21594.618	0.15	3 L	Sm I?	BL69
4565.21	21898.81	0.02	10	Zr I	TA76	4629.520	21594.618	0.15	3 L	Sm II?	BL69
4565.54	21897.24	0.20	1 L	Tm	CA69	4630.75	21588.88	0.20	1 L	Tm I	CA69
4565.995	21895.06	0.01	1	Fe I	LI76	4630.97	21587.857	0.10	3 L	Nd	BL70
4569.27	21879.35	0.01	8	Si I	LI65	4631.090	21587.297	0.15	3 L	Sm	BL69
4569.373	21878.87		2	Se I	MO74	4632.14	21582.4		12	Cl I	RA69
4570.557	21873.20		2	Te I	MO75	4636.22	21563.39	0.05	1	Hf I	GO70
4572.747	21862.73		2	Se	MO74	4636.42	21562.48	0.15	2 L	Tm I	CA69
4572.878	21862.10		1	Se	MO74	4637.51	21557.39		35	Cl I	HU72
4574.17	21855.92	0.10	1	Hf	GO70	4642.507	21534.207		750	Ar I	HU73
4575.120	21851.39	0.01	1	Fe I	LI76	4644.08	21526.91		1	I I	LU75
4575.458	21849.76		7	Cm I	CO76	4644.42	21525.34	0.15	2 L	Tm I	CA69
4576.10	21846.71		9	Cl I	HU72	4645.94	21518.30		42	Ge I	HU64
4578.91	21833.30	0.10	3 L	Tm I	CA69	4646.675	21514.89		11	Se	MO74
4579.52	21830.4		10	Cl I	RA69	4648.24	21507.65		80	Br I	HU72
4580.443	21825.98		8	Cm I	CO76	4648.99	21504.18	0.02	5	Th III	LI74
4581.77	21819.69	0.01	5	Si I	LI65	4649.06	21503.84		80	Cl I	HU72
4582.50	21816.20	0.15	2 L	Tm	CA69	4649.70	21500.90	0.15	2 L	Tm I	CA69
4583.400	21811.91		3 L	Ce I	VE72	4650.58	21496.81	0.10	2 H	Zr	TA76
4583.944	21809.32		5	Sc	MO74	4651.37	21493.17		30	Cl I	HU72
4585.57	21801.59		6	Br I	TE63	4651.59	21492.16	0.10	1	Hf	GO70
4585.980	21799.64		37	Te I	MO75	4651.863	21490.898		13 B	Kr I?	KA69
4586.39	21797.68		24	Cl I	HU72	4651.890	21490.772		13 B	Kr I?	KA69
4587.17	21793.97	0.02	15	Zr I	TA76	4652.880	21486.20		3 L	Ce I	VE72
4588.413	21788.07		3	Cm I	CO76	4654.33	21479.51		1	I I	LU75
4588.59	21787.24		469	Br I	TE63	4655.32	21471.94	0.20	2	Hf I	GO70
4589.14	21784.64	0.02	3	Hf I	GO70	4655.637	21473.48		1721	Se I	MO74
4589.53	21782.78	0.15	2 L	Tm	CA69	4655.72	21473.09		1	I I	LU75
4590.16	21779.77	0.01	9	Si I	LI65	4655.97	21471.93	0.02	170	Zr I	TA76
4593.550	21763.72		2	Te	MO75	4655.97	21471.94	0.10	1 U	Hf	GO70
4595.43	21754.812	0.10	3 L	Nd I	BL70	4656.372	21470.089		250	Xe I	HU73
4597.715	21743.999		5 L	Th II?	GI74	4659.720	21454.661		12	Ar I	HU73
4597.715	21743.999		5 L	Th I?	GI74	4661.35	21447.16	0.10	3 L	Tm	CA69
4597.72	21743.98		14	Br I	TE63	4662.04	21444.0	0.50	1	Hf	GO70
4600.07	21732.87	0.20	1 L	Tm II	CA69	4662.350	21442.56		4603	Se I	MO74
4600.551	21730.60		570	Se I	MO74	4663.263	21438.360		56	Kr I	KA69
4601.61	21725.595	0.07	5 L	Nd I	BL70	4664.62	21432.11	0.01	5	Mg II	RI65
4601.93	21724.08	0.10	3 L	Tm II	CA69	4667.24	21420.09		1	I I	LU75
4603.46	21716.83		25	Ge I	HU64	4668.75	21413.18	0.05	1	Hf I	GO70
4603.566	21716.36		730	Se I	MO74	4673.101	21393.22		9	Cm I	CO76
4603.825	21715.14		1	I I	LU75	4673.44	21391.66		18	Ge	HU64
4604.370	21712.571		4 L	Th I	GI74	4675.942	21380.230	0.01	12	Ce III	LI72
4605.309	21708.145		750	Ne I	HU73	4677.060	21375.118		3 L	Th I	GI74
4605.395	21707.74		10	Te I	MO75	4677.252	21374.24		556	Se I	MO74
4605.45	21707.48		22	Cl I	HU72	4677.508	21373.073		50	Xe I	HU73
4606.44	21702.82	0.15	2 L	Tm	CA69	4678.42	21368.91	0.01	7	Mg II	RI65
4608.240	21694.33		4	Cm I	CO76	4678.43	21368.86		5	I I	LU75
4609.37	21689.0	0.50	1	Hf	GO70	4681.246	21356.004		5	Kr I	KA69
4609.87	21686.67		20	Br I	HU72	4681.43	21355.17	0.20	1 L	Tm	CA69
4610.18	21685.20	0.05	2	Hf	GO70	4681.63	21354.24	0.01	21	Si I	LI65
4610.82	21682.20		2	I I	LU75	4681.864	21353.185		3 L	Th I	GI74
4613.480	21669.70		15	Ar I	HU73	4681.88	21353.11		5	Br I	HU72
4614.36	21665.56	0.02	1	Hf	GO70	4684.62	21340.62	0.10	3 L	Tm I	CA69
4617.29	21651.82	0.10	1 W	Hf I	GO70	4686.319	21332.885		120	Ar I	HU73
4621.495	21632.12		10	Te I	MO75	4686.811	21330.648	0.12	4 L	Sm	BL69
4621.51	21632.05	0.05	2	Hf I	GO70	4686.89	21330.29		37	Br I	TE63

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4686.96	21329.97	0.20	1 L	Tm I	CA69	4740.06	21091.023	0.07	5 L	Nd I?	BL70
4688.96	21320.872	0.10	3 L	Nd I	BL70	4741.35	21085.27	0.02	17	Zr I	TA76
4689.97	21316.28		1	I	LU75	4741.55	21084.40		1	I	LU75
4690.68	21313.05		1	I	LU75	4741.90	21082.84		1	I	LU75
4691.00	21311.60		15	Cl I	HU72	4743.87	21074.08	0.20	1 L	Tm II	CA69
4691.872	21307.64		5	Se	MO74	4743.901	21073.94		7	Cm I	CO76
4692.126	21306.48		7	Cm I	CO76	4744.24	21072.45		10	Cl I	HU72
4692.661	21304.06		3	Te I	MO75	4745.09	21068.64	0.02	2 U	Hf I	GO70
4694.60	21295.27	0.02	1	C I	JO65	4745.540	21066.66		3	Cm I?	CO76
4694.68	21294.89		2	I I	LU75	4745.540	21066.66		3	Cm I?	CO76
4696.70	21285.74		17	Br I	TE63	4747.98	21055.841	0.05	6 L	Nd I	BL70
4696.839	21285.103		5	Kr I	KA69	4748.373	21054.099	0.10	5 L	Sm I	BL69
4697.64	21281.48	0.05	5 L	Tm I	CA69	4750.508	21044.63		6	Cm I	CO76
4699.510	21273.00		4	Cm I	CO76	4750.712	21043.73		1023	Te I	MO75
4700.400	21268.98		3 L	Ce II	VE72	4751.262	21041.295		1200	Ne I	HU73
4702.41	21259.89	0.02	8 B	C I	JO65	4751.785	21038.98		8	Te I	MO75
4702.51	21259.44	0.01	4	Gd III	LI73	4752.496	21035.834		44	Ar I	HU73
4703.999	21252.71		9	Se I	MO74	4754.52	21026.88		1	I I	HU72
4705.03	21248.050	0.05	5 L	Nd	BL70	4755.37	21023.13	0.02	8	C I	JO65
4705.64	21245.30	0.20	1 L	Tm	CA69	4755.768	21021.362		15	Kr I	KA69
4706.579	21241.05		9	Cm I	CO76	4755.786	21021.28		1	I I	LU75
4707.149	21238.48	0.01	3	Fe I	LI76	4756.28	21019.097	0.05	6 L	Nd I	BL70
4707.98	21234.737	0.07	4 L	Nd II	BL70	4759.16	21006.378	0.05	5 L	Nd	BL70
4708.80	21231.0	0.50	2	Hf	GO70	4760.529	21000.34		4	Te	MO75
4710.360	21224.007	0.15	3 L	Sm	BL69	4761.80	20994.73	0.20	1 L	Tm	CA69
4710.37	21223.96		1	I I	LU75	4762.638	20991.04	0.01	1	Fe I	LI76
4712.78	21213.11		14	Br I	TE63	4762.760	20990.50		5 L	Ce I	VE72
4712.98	21212.21	0.15	3 L	Tm I	CA69	4763.57	20986.93	0.02	15	Th III	LI74
4713.13	21211.55	0.02	2	C I	JO65	4763.756	20986.111		1200	Ar I	HU73
4713.91	21208.0	0.50	1	Hf	GO70	4763.934	20985.327	0.15	3 L	Sm	BL69
4714.97	21203.24	0.05	4	Hf I	GO70	4765.977	20976.332		18	Kr I	KA69
4715.607	21200.39	0.01	1	Fe	LI76	4766.20	20975.35	0.20	1 L	Tm	CA69
4716.405	21196.806		10	Kr I	KA69	4767.320	20970.421	0.06	6 L	Gd I	BL71
4716.89	21194.63	0.15	2 L	Tm	CA69	4767.845	20968.10		9	Cm I	CO76
4717.430	21192.20		2	Se	MO74	4767.919	20967.786	0.06	6 L	Gd I	BL71
4717.61	21191.41	0.02	4 B	C I	JO65	4770.20	20957.76		1	I I	LU75
4718.15	21188.98		50	Cl I	HU72	4771.43	20952.36		1	I I	LU75
4718.649	21186.72		6	Se I	MO74	4773.39	20943.75		80	Br I	HU72
4719.709	21181.966	0.15	3 L	Sm I	BL69	4774.11	20940.61	0.05	50	Hf I	GO70
4720.561	21178.14	0.01	1	Fe	LI76	4775.86	20932.92	0.15	2 L	Tm	CA69
4720.61	21177.92		1	I I	LU75	4777.817	20924.350		95	Kr I	KA69
4723.10	21166.74	0.02	20	Zr I	TA76	4779.04	20918.994	0.10	3 L	Nd I	BL70
4723.387	21165.471		600	Kr I	KA69	4779.47	20917.13	0.01	12	Si I	LI65
4723.772	21163.75	0.01	13 L	Al I	ER63	4780.748	20911.51		9	Cm I	CO76
4724.006	21162.697		5 L	Th II	GI74	4781.51	20908.19	0.20	1 L	Tm I	CA69
4725.77	21154.80	0.02	40	Hf I	GO70	4783.37	20900.05	0.02	9	Zr I	TA76
4727.175	21148.510		3 L	Th I	GI74	4783.867	20897.89		42	Te I	MO75
4727.75	21145.94	0.20	1 L	Tm	CA69	4785.47	20890.89		35	Br I	HU72
4727.95	21145.04		20	Br I	HU72	4785.69	20889.91		24	Cl I	HU72
4728.369	21143.170		4 L	Th I	GI74	4785.708	20889.849	0.07	5 L	Gd I	BL71
4728.86	21140.98		5	Br I	HU72	4788.957	20875.676		14	Kr I	KA69
4729.86	21136.51	0.02	3	Hf	GO70	4790.385	20869.452		4 L	Th I	GI74
4730.862	21132.03	0.01	20	He I	LT70	4794.052	20853.48		8	Cm I	CO76
4731.91	21127.349	0.10	3 L	Nd	BL70	4794.20	20852.85		1	Se	MO74
4732.556	21124.46	0.01	1	Fe I	LI76	4794.69	20850.71	0.10	3 L	Tm I	CA69
4732.90	21122.929	0.10	3 L	Nd	BL70	4795.64	20846.57	0.02	100	Zr I	TA76
4733.24	21121.43	0.01	10	He I	LT70	4796.46	20843.0	0.50	2	Hf	GO70
4733.541	21120.07	0.01	80	He I	LT70	4796.64	20842.23	0.10	2	Zr	TA76
4734.196	21117.14		6	Cm I	CO76	4796.857	20841.29		2	Te I	MO75
4735.78	21110.08	0.15	2 L	Tm I	CA69	4796.93	20840.98	0.15	2 L	Tm II	CA69
4738.900	21096.18		7	Cm I	CO76	4796.962	20840.84	0.01	5	Fe I	LI76
4738.99	21095.78	0.02	50	Th III	LI74	4803.168	20813.90		3	Cm I	CO76
4739.108	21095.25		6	Cm I	CO76	4803.830	20811.042		110	Ar I	HU73
4739.43	21093.83		43	Br I	TE63	4804.023	20810.20		3	Cm I	CO76
4739.606	21093.04	0.01	12 L	Al I	ER63	4804.307	20808.98		2	Se	MO74
4740.06	21091.023	0.07	5 L	Nd I?	BL70	4804.732	20807.136	0.15	3 L	Sm I	BL69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4805.193	20805.14	0.01	2	Fe I	LI76	4858.71	20575.979	0.05	6 L	Nd I	BL70
4805.43	20804.13	0.01	4	Si I	LI65	4860.28	20569.33		15	Br I	HU72
4805.899	20802.08		3	Te I	MO75	4860.402	20568.816		75	Ar I	HU73
4806.10	20801.21	0.05	6 L	Tm I	CA69	4860.96	20566.46	0.10	3 L	Tm II	CA69
4806.377	20800.01		4	Te	MO75	4861.275	20565.121		20	Ne I	HU73
4806.438	20799.75	0.01	1	Fe I	LI76	4861.31	20564.973	0.05	6 L	Nd I	BL70
4806.604	20799.03	0.01	1	Fe	LI76	4861.510	20564.129	0.07	5 L	Gd I	BL71
4808.10	20792.56		1	I I	LU75	4863.197	20556.994		1	Ar I	HU73
4809.45	20786.72		1	I I	LU75	4863.782	20554.521		3 L	Th II	GI74
4810.18	20783.570	0.10	3 L	Nd	BL70	4864.745	20550.45		3	Te I	MO75
4810.281	20783.13		7	Se	MO74	4865.05	20549.17	0.10	4 L	Tm II	CA69
4810.428	20782.50		2	Se	MO74	4865.19	20548.57		1	I I	LU75
4810.632	20781.62		57	Te I	MO75	4865.365	20547.83		2	Se	MO74
4811.506	20777.841	0.05	7 L	Gd I	BL71	4866.332	20543.752		75	Kr I	KA69
4814.46	20765.09		4	I I	LU75	4866.54	20542.873	0.05	5 L	Nd	BL70
4820.111	20740.75		4 L	Ce II	VE72	4867.04	20540.76	0.15	2 L	Tm I	CA69
4821.019	20736.84	0.01	2	Fe I	LI76	4868.26	20535.61	0.10	20	Hf	GO70
4821.366	20735.350		120 B	Ar I?	HU73	4869.18	20531.72	0.02	2	Hf I	GO70
4821.765	20733.634		120 B	Ar I?	HU73	4869.857	20528.880		4 L	Th II	GI74
4823.67	20725.4		56	Cl I	RA69	4870.32	20526.93	0.02	170	Hf	GO70
4825.643	20716.97	0.01	2	Fe I	LI76	4870.464	20526.31		9	Cm I?	CO76
4825.791	20716.338		22	Ar I	HU73	4870.464	20526.31		9	Cm I?	CO76
4827.01	20711.09	0.10	3	Zr	TA76	4870.597	20525.76		8	Te I	MO75
4828.494	20704.738	0.06	6 L	Gd I	BL71	4871.568	20521.66		3	Cm I	CO76
4829.94	20698.56	0.01	4	Si I	LI65	4873.92	20511.767	0.10	3 L	Nd	BL70
4829.990	20698.33	0.01	5	Fe I	LI76	4876.770	20499.78		3 L	Ce II?	VE72
4831.239	20692.98		5	Te I?	MO75	4876.770	20499.78		3 L	Ce I?	VE72
4831.239	20692.98		5	Te I?	MO75	4876.770	20499.78		3 L	Ce I?	VE72
4831.452	20692.063		6 L	Th II	GI74	4878.45	20492.721	0.05	6 L	Nd I	BL70
4831.63	20691.29	0.02	28	Zr I	TA76	4882.09	20477.44	0.20	1 L	Tm	CA69
4832.319	20688.351	0.08	4 L	Gd I	BL71	4883.943	20469.67		5	Se I	MO74
4832.954	20685.630	0.01	30	Ce III	LI72	4884.04	20469.25	0.02	18	Zr I	TA76
4833.595	20682.889		4 L	Th II	GI74	4884.186	20468.653		4 L	Th II	GI74
4833.710	20682.40		25	Ar I	HU73	4884.86	20465.84	0.10	1	Hf	GO70
4834.241	20680.125		4 L	Th I	GI74	4885.36	20463.74	0.15	2 L	Tm	CA69
4835.75	20673.64		275	Ge I	HU64	4887.59	20454.42	0.10	6 U	Hf	GO70
4836.53	20670.34		2	I I	LU75	4887.74	20453.76	0.02	200	Zr I	TA76
4836.76	20669.34	0.10	2	Zr	TA76	4887.75	20453.73	0.20	1 L	Tm	CA69
4837.45	20666.41		6	I I	LU75	4889.248	20447.463	0.05	7 L	Gd I	BL71
4837.46	20666.36		30	Br I	HU72	4889.365	20446.971		140	Kr I	KA69
4839.255	20658.69		8	Cm I	CO76	4892.46	20434.04	0.20	1 L	Tm I	CA69
4839.700	20656.80		11	Te	MO75	4894.80	20424.26	0.02	80	Zr I	TA76
4840.192	20654.69		8	Cm I	CO76	4894.873	20423.964		300	Kr I	KA69
4840.23	20654.54	0.15	2 L	Tm	CA69	4895.401	20421.761		3 L	Th I	GI74
4841.46	20649.28	0.10	2	Zr I	TA76	4895.470	20421.47		15	Se I	MO74
4841.60	20648.69		10	I I	LU75	4895.50	20421.33	0.10	1	Hf I	GO70
4841.965	20647.135		150	Ar I	HU73	4896.144	20418.662		1	Kr I	KA69
4843.64	20640.0	0.50	2	Hf	GO70	4896.78	20416.0	0.05	1	Hf	GO70
4843.84	20639.15	0.05	6 L	Tm	CA69	4897.56	20412.759	0.10	3 L	Nd I	BL70
4843.95	20638.675	0.05	5 L	Nd I	BL70	4897.62	20412.51		1	I I	LU75
4844.962	20634.364		6 L	Th I	GI74	4898.30	20409.67		1	Se I	MO74
4846.048	20629.74	0.01	10	Fe	LI76	4898.33	20409.55		1	I I	LU75
4846.201	20629.09		3 L	Ce I	VE72	4898.64	20408.25	0.05	2	Hf I	GO70
4847.151	20625.05		6	Se I	MO74	4899.182	20406.00	0.01	1	Fe I	LI76
4847.24	20624.67		547	Br I	TE63	4899.19	20405.97		7	Br I	TE63
4847.28	20624.50		1	I	LU75	4901.647	20395.738		3 L	Th II	GI74
4849.224	20616.229		2500	Ar I	HU73	4902.62	20391.691	0.05	5 L	Nd	BL70
4849.37	20615.62	0.05	30	Hf I	GO70	4903.096	20389.710		4 L	Th II	GI74
4849.66	20614.375	0.10	3 L	Nd	BL70	4904.85	20382.43	0.01	1	Si I	LI65
4850.367	20611.368	0.10	3 L	Gd	BL71	4905.117	20381.309		3 L	Th I	GI74
4850.970	20608.81		3	Te I	MO75	4905.82	20378.38	0.01	2	Si I	LI65
4851.02	20608.596	0.05	5 L	Nd I	BL70	4907.81	20370.1		85	Cl I	RA69
4852.37	20602.86	0.01	4	Si I	LI65	4909.462	20363.27	0.10	1 W	Fe	LI76
4853.50	20598.066	0.07	4 L	Nd I	BL70	4910.21	20360.17	0.10	4 L	Tm II	CA69
4854.41	20594.20	0.05	7 L	Tm I	CA69	4910.51	20358.93	0.02	10	Th III	LI74
4856.771	20584.19	0.01	2	Fe I	LI76	4912.607	20350.238		120	Ne I	HU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
4912.66	20350.02	0.10	20	Hf	GO70	4962.030	20147.54		239	Te I	MO75
4912.730	20349.73	0.01	2	Fe I	LI76	4962.371	20146.157		5	Kr I	KA69
4912.86	20349.18		50 B	Cl I?	HU72	4963.749	20140.56		9	Te	MO75
4913.11	20348.17		50 B	Cl I?	HU72	4964.273	20138.44		66	Te I	MO75
4914.14	20343.87	0.01	4	Si I	LI65	4965.83	20132.11	0.05	2	Hf I	GO70
4914.50	20342.39	0.05	28	Zr I	TA76	4966.35	20130.017	0.10	3 L	Nd I?	BL70
4915.59	20337.89	0.02	6	Hf	GO70	4966.35	20130.017	0.10	3 L	Nd II?	BL70
4918.680	20325.11		3 L	Ce I	VE72	4966.678	20128.687		3 L	Th I	GI74
4918.87	20324.31	0.05	6	Zr I	TA76	4969.83	20115.92		100	Cl I	HU72
4918.88	20324.284	0.10	3 L	Nd I	BL70	4971.650	20108.558	0.09	7 L	Gd I	BL71
4920.455	20317.777		4 L	Th I	GI74	4972.220	20106.252	0.10	3 L	Gd I	BL71
4920.641	20317.011		160	Ar I	HU73	4972.887	20103.554	0.08	7 L	Gd I	BL71
4921.52	20313.40	0.10	1 U	Hf	GO70	4980.32	20073.55		7	Br I	TE63
4921.527	20313.35		1	I I	LU75	4981.46	20068.95	0.10	6	Zr	TA76
4923.28	20306.119	0.15	3 L	Nd I	BL70	4981.466	20068.932		25	Ar I	HU73
4923.870	20303.69		46	Te I	MO75	4983.383	20061.213	0.10	7 L	Gd I	BL71
4924.32	20301.83	0.01	1	Si I	LI65	4987.120	20046.18		5 L	Ce II?	VE72
4924.54	20300.92	0.02	20	Th III	LI74	4987.120	20046.18		5 L	Ce I?	VE72
4924.803	20299.83		4	Cm I	CO76	4988.349	20041.24		3 L	Ce II	VE72
4925.65	20296.36	0.01	2	Si I	LI65	4991.125	20030.097		30	Ar I	HU73
4926.652	20292.221		14	Kr I	KA69	4991.94	20026.82		30 B	Br I?	HU72
4927.04	20290.623	0.10	3 L	Nd I	BL70	4992.227	20025.672		60	Ar I	HU73
4928.69	20283.82	0.05	4	Zr I	TA76	4992.26	20025.54		30 B	Br I?	HU72
4929.20	20281.73		500	Br I	TE63	4992.682	20023.85	0.01	7	Fe I	LI76
4929.351	20281.11	0.01	5	Fe I	LI76	4993.74	20019.60	0.10	3	Zr	TA76
4932.259	20269.15		10	Se I	MO74	4995.384	20013.020		1 L	Tb I	KL70
4933.94	20262.25		2	I	LU75	4995.570	20012.271		36	Kr I	KA69
4933.941	20262.242		3000 I	Xe I	HU73	4996.029	20010.435	0.10	3 L	Gd I	BL71
4935.04	20257.731	0.05	5 L	Nd I	BL70	4996.64	20007.97	0.01	3	Si I	LI65
4937.32	20248.38		8	Br I	TE63	4997.18	20005.84	0.20	1	Hf	GO70
4937.390	20248.09		3 L	Ce II?	VE72	4997.29	20005.38	0.02	70	Th III	LI74
4937.390	20248.09		3 L	Ce I?	VE72	4998.754	19999.53		3	Te I?	MO75
4937.390	20248.09		3 L	Ce I?	VE72	4998.754	19999.53		3	Te I?	MO75
4937.40	20248.05		2	I I	LU75	4999.55	19996.34	0.01	4	Gd III	LI73
4942.12	20228.71	0.05	10 U	Hf	GO70	5000.06	19994.32	0.02	1	Hf I	GO70
4942.69	20226.38		12	Ge I	HU64	5000.578	19992.232		4	Ar I	HU73
4945.89	20213.29	0.05	7 L	Tm I	CA69	5002.201	19985.744	0.10	3 L	Gd I	BL71
4946.085	20212.491	0.05	7 L	Gd I	BL71	5004.56	19976.31	0.05	1 W	Hf	GO70
4946.507	20210.770		4	Ce III	LI72	5004.645	19975.98		9	Cm I	CO76
4946.55	20210.58	0.02	20	Zr	TA76	5004.75	19975.55	0.10	2	Zr I	TA76
4946.639	20210.23		7	Se I	MO74	5005.44	19972.812	0.10	3 L	Nd I	BL70
4946.725	20209.878		140	Kr I	KA69	5006.02	19970.50	0.10	3 L	Tm	CA69
4947.27	20207.65	0.05	7 L	Tm I	CA69	5006.130	19970.06	0.01	1	Fe I	LI76
4948.231	20203.73		3	I I	LU75	5007.06	19966.350	0.07	4 L	Nd	BL70
4948.84	20201.24	0.10	4 L	Tm I	CA69	5007.215	19965.730		160	Ar I	HU73
4949.05	20200.38		2	I I	LU75	5008.186	19961.86		18	Ca I	RI68
4949.30	20199.4		227	Cl I	RA69	5008.38	19961.08	0.05	8 W	Zr I	TA76
4949.60	20198.140	0.10	3 L	Nd	BL70	5010.41	19953.00	0.10	3 L	Tm I	CA69
4949.605	20198.119	0.15	3 L	Sm II	BL69	5011.075	19950.351	0.08	4 L	Gd II	BL71
4950.71	20193.61	0.10	4 L	Tm I	CA69	5011.91	19947.02	0.02	1 U	Hf	GO70
4951.256	20191.383		3 L	Th I	GI74	5012.402	19945.068		25	Ar I	HU73
4952.15	20187.739	0.10	3 L	Nd II	BL70	5012.446	19944.89		1	I I	LU75
4952.285	20187.190		150	Xe I	HU73	5013.157	19942.067	0.10	5 L	Sm I	BL69
4952.57	20186.03	0.10	5 L	Tm I	CA69	5013.16	19942.05	0.02	20	Th III	LI74
4953.33	20182.93		1	I I	LU75	5013.27	19941.62	0.05	6 L	Tm I	CA69
4953.820	20180.93		3	Cm I	CO76	5014.06	19938.46	0.02	14	Zr I	TA76
4954.26	20179.14	0.05	7 L	Tm I	CA69	5014.86	19935.29	0.15	2 L	Tm I	CA69
4957.17	20167.28		16	Cl I	HU72	5015.262	19933.70		24	Ca I	RI68
4957.20	20167.17		1	I I	LU75	5015.54	19932.591	0.10	3 L	Nd	BL70
4957.720	20165.057		3 L	Th	GI74	5016.27	19929.68	0.02	12 U	Zr	TA76
4958.131	20163.386	0.10	7 L	Gd I	BL71	5016.47	19928.88	0.02	31	Si I	LI65
4958.35	20162.50		138	Br I	TE63	5017.27	19925.72		138	Br I	TE63
4958.771	20160.78		3	Cm I	CO76	5017.865	19923.36	0.01	2	Fe I	LI76
4959.500	20157.82		5 L	Ce I	VE72	5018.385	19921.29		15	Te I	MO75
4960.717	20152.87		9	I I	LU75	5019.418	19917.19		23	Ca I	RI68
4960.879	20152.217	0.07	5 L	Gd I	BL71	5019.776	19915.772		17	Kr I	KA69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5022.952	19903.18		12 B	Ar I	HU73	5074.71	19700.17		20	Hg I	HU53
5023.071	19902.706		4 L	Th I	GI74	5074.81	19699.793	0.10	3 L	Nd	BL70
5023.105	19902.572	0.12	4 L	Sm I	BL69	5075.351	19697.69		3	Cm I	CO76
5025.09	19894.71		68	Br I	TE63	5075.69	19696.378	0.10	3 L	Nd	BL70
5025.604	19892.677	0.08	7 L	Gd I	BL71	5076.39	19693.66	0.10	6 L	Tm I	CA69
5025.90	19891.50		1	I I	LU75	5077.510	19689.32		37	Te I	MO75
5026.624	19888.64		1	I I	LU75	5079.034	19683.409		5 L	Th II	GI74
5027.92	19883.52	0.05	6	Hf I	GO70	5079.084	19683.215		4 L	Th I	GI74
5028.44	19881.46	0.05	7 L	Tm I	CA69	5079.89	19680.08	0.02	20	Zr I	TA76
5032.907	19863.809	0.10	7 L	Gd I	BL71	5080.28	19678.58		1	I I	LU75
5033.309	19862.22		34	Ca I	RI68	5081.325	19674.535		3 L	Th I	GI74
5033.34	19862.10		30	Br I	HU72	5081.529	19673.746	0.10	7 L	Gd I	BL71
5033.634	19860.943		1	Ar I	HU73	5082.78	19668.90		1	I I	LU75
5034.13	19859.00	0.02	6	Hf I	GO70	5082.894	19668.461		4 L	Th I	GI74
5035.623	19853.10		35	Ca I	RI68	5083.619	19665.657	0.15	3 L	Sm	BL69
5035.86	19852.15	0.10	5	Zr	TA76	5085.679	19657.68		8	Cm I	CO76
5036.90	19848.04	0.02	1	Hf	GO70	5087.26	19651.58	0.10	3 L	Tm I	CA69
5037.243	19846.71	0.01	1	Fe	LI76	5089.05	19644.67		1	I I	LU75
5040.136	19835.32		7	I I	LU75	5089.088	19644.523		4 L	Th II	GI74
5040.387	19834.332	0.10	3 L	Gd I	BL71	5089.501	19642.93		3 L	Ce	VE72
5042.855	19824.62		6	I I	LU75	5091.473	19635.32	0.01	10	Fe I	LI76
5044.666	19817.508		550	Ar I	HU73	5094.534	19623.52		269	Te I	MO75
5045.300	19815.02		19	Ca I	RI68	5095.15	19621.15		1	I I	LU75
5046.43	19810.58		452	Br I	TE63	5096.856	19614.583	0.15	3 L	Sm	BL69
5047.833	19805.07		6	Se	MO74	5097.190	19613.30	0.10	1 W	Fe	LI76
5050.550	19794.42		4 L	Ce II	VE72	5097.97	19610.29	0.10	5	Zr I	TA76
5050.67	19793.95	0.02	20	Hf I	GO70	5097.99	19610.220	0.10	3 L	Nd	BL70
5051.199	19791.88	0.01	22	Fe I	LI76	5098.85	19606.91		1	I I	LU75
5051.365	19791.226	0.12	4 L	Sm I	BL69	5098.94	19606.57		263	Br I	TE63
5051.62	19790.228	0.10	3 L	Nd	BL70	5101.928	19595.083		3 L	Th I	GI74
5052.698	19786.004		5 L	Th I	GI74	5102.537	19592.74	0.01	3	Fe I	LI76
5052.90	19785.20	0.05	3	Zr I	TA76	5102.919	19591.28		2	Se	MO74
5053.240	19783.884	0.10	7 L	Gd I	BL71	5102.930	19591.238		17	Kr I	KA69
5054.61	19778.52	0.02	3	Hf I	GO70	5103.119	19590.51		3 L	Ce II	VE72
5054.62	19778.482	0.10	3 L	Nd I?	BL70	5103.42	19589.34	0.05	40	Zr I	TA76
5054.62	19778.482	0.10	3 L	Nd I?	BL70	5104.630	19584.71	0.01	1	Fe I	LI76
5054.79	19777.82	0.20	1 L	Tm II	CA69	5104.70	19584.44	0.15	2 L	Tm I	CA69
5055.051	19776.79		50	Ca I	RI68	5105.85	19580.02	0.05	3	Zr	TA76
5055.059	19776.76		3	Cm	CO76	5106.605	19577.136		170	Ne I	HU73
5055.258	19775.99		5	Te I?	MO75	5107.484	19573.769		50	Ne I	HU73
5055.258	19775.99		5	Te I?	MO75	5107.783	19572.62		9	Cm I?	CO76
5055.690	19774.295		6 L	Th II	GI74	5107.783	19572.62		9	Cm I?	CO76
5057.61	19766.8		185	Cl I	RA69	5107.783	19572.62		9	Cm I?	CO76
5057.810	19766.005	0.06	6 L	Gd I	BL71	5111.88	19556.92	0.02	5	Hf	GO70
5057.99	19765.29	0.01	4 L	Be I	HO69	5111.90	19556.86		1	I I	LU75
5058.022	19765.178		3 L	Th I	GI74	5112.609	19554.147	0.15	3 L	Sm I	BL69
5059.571	19759.129		5 B	Kr I?	KA69	5113.189	19551.93		5 L	Ce I	VE72
5060.547	19755.315		5 B	Kr I?	KA69	5113.243	19551.72		6	Cm I	CO76
5060.56	19755.3		717	Cl I	RA69	5114.20	19548.06		1	I I	LU75
5060.57	19755.23		1	I	LU75	5115.505	19543.08	0.01	20	He I	LT70
5062.48	19747.77	0.05	7 L	Tm I	CA69	5118.51	19531.59	0.02	1	Hf I	GO70
5064.107	19741.428		5 L	Th I	GI74	5119.01	19529.69	0.02	1	Hf	GO70
5064.704	19739.10		3	I I	LU75	5120.456	19524.180	0.01	55	Ce III	LI72
5066.11	19733.62		3450	Br I	TE63	5121.251	19521.15		5 L	Ce II	VE72
5066.14	19733.51		1	I	LU75	5124.67	19508.13	0.02	14	Si I	LI65
5067.082	19729.83		4	Cm I	CO76	5125.20	19506.12	0.02	5	Si I	LI65
5067.79	19727.07		55	Ge I	HU64	5125.303	19505.72		47	Ca I	RI68
5068.440	19724.55		3 L	Ce II?	VE72	5126.05	19502.84		1	I I	LU75
5068.440	19724.55		3 L	Ce I?	VE72	5127.239	19498.35		4 L	Ce I?	VE72
5068.97	19722.50	0.02	110	Si I	LI65	5127.239	19498.35		4 L	Ce I?	VE72
5069.00	19722.37		1	I I	LU75	5127.295	19498.140	0.01	20	Ce III	LI72
5069.10	19721.99	0.02	23	C I	JO65	5127.43	19497.62		313	Br I	TE63
5069.97	19718.59	0.10	4	Zr	TA76	5128.55	19493.38	0.02	13	Si I	LI65
5071.492	19712.680		6	Kr I	KA69	5129.050	19491.467	0.08	6 L	Sm I	BL69
5072.11	19710.27	0.05	2 W	Zr I	TA76	5130.707	19485.171	0.06	5 L	Gd I	BL71
5072.642	19708.213	0.08	4 L	Gd I	BL71	5130.903	19484.43	0.10	1 W	Fe	LI76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5134.552	19470.58		2 B	Ar I?	HU73	5195.638	19241.66		6	Se I	MO74
5134.606	19470.37		7	Cm I?	CO76	5196.343	19239.05		6	Se I?	MO74
5134.606	19470.37		7	Cm I?	CO76	5196.343	19239.05		6	Se I?	MO74
5134.732	19469.90		2 B	Ar I?	HU73	5196.98	19236.693	0.07	5 L	Nd I	BL70
5135.722	19466.140	0.01	26	Ce III	LI72	5197.47	19234.879	0.07	5 L	Nd I	BL70
5137.901	19457.89		4 L	Ce II	VE72	5198.286	19231.86		3	Se I	MO74
5137.98	19457.60	0.10	1	Hf I	GO70	5198.927	19229.49		3	Se I?	MO74
5138.910	19454.068	0.05	6 L	Gd I	BL71	5198.927	19229.49		3	Se I?	MO74
5139.195	19452.99		49	Ca I	RI68	5199.414	19227.688		30	Kr I	KA69
5139.20	19452.98	0.50	2	Hf	GO70	5200.062	19225.290	0.08	7 L	Gd I	BL71
5140.133	19449.438	0.06	6 L	Gd I	BL71	5200.46	19223.82	0.20	1 L	Tm I	CA69
5140.31	19448.770	0.10	3 L	Nd I	BL70	5201.720	19219.16	0.01	1	Fe I	LI76
5140.729	19447.186	0.06	6 L	Gd I	BL71	5202.569	19216.027	0.10	5 L	Sm I	BL69
5141.76	19443.3		6	Cl I	RA69	5203.33	19213.21	0.02	40	Zr I	TA76
5142.06	19442.151	0.10	3 L	Nd	BL70	5204.20	19210.00		1	I I	LU75
5142.070	19442.113	0.10	5 L	Sm I	BL69	5209.28	19191.27	0.05	6 L	Tm I	CA69
5142.80	19439.37	0.10	1	Hf	GO70	5209.349	19191.016		13	Kr I	KA69
5144.22	19434.0	0.50	2	Hf	GO70	5211.48	19183.17		266 B	Br I?	TE63
5144.483	19432.993	0.07	5 L	Gd I	BL71	5211.80	19181.99		266 B	Br I?	TE63
5144.49	19432.97	0.02	48	Si I	LI65	5212.499	19179.419		3 L	Th II	GI74
5144.588	19432.597		3 L	Th II	GI74	5212.82	19178.24		1	I I	LU75
5144.767	19431.92		6	Cm I	CO76	5213.213	19176.793		12 B	Ar I?	HU73
5146.081	19426.959		30	Ar I	HU73	5213.389	19176.15	0.01	1	Fe I	LI76
5146.32	19426.05	0.02	75	Zr I	TA76	5213.610	19175.332		12 B	Ar I?	HU73
5146.32	19426.0	0.50	1	Hf	GO70	5213.612	19175.325		12 B	Ar I?	HU73
5146.40	19425.76		6	I I	LU75	5213.93	19174.17			Hf	GO70
5146.942	19423.71		5	Te	MO75	5213.96	19174.04	0.02	240	Zr I	TA76
5147.329	19422.25		6 L	Ce II	VE72	5214.08	19173.60	0.20	1 L	Tm	CA69
5149.03	19415.82	0.02	2 W	Hf	GO70	5214.500	19172.06		3 L	Ce II?	VE72
5149.15	19415.38	0.20	1 L	Tm I	CA69	5214.500	19172.06		3 L	Ce I?	VE72
5152.29	19403.54	0.10	3	Zr	TA76	5216.41	19165.04	0.20	1 L	Tm I	CA69
5153.105	19400.479		3 L	Th I	GI74	5217.55	19160.85	0.20	1 L	Tm	CA69
5156.69	19386.98	0.10	3	Zr I	TA76	5217.85	19159.77			Hf	GO70
5156.97	19385.94	0.02	15	Si I	LI65	5218.14	19158.70			Hf	GO70
5159.24	19377.41	0.05	5 L	Tm I	CA69	5218.80	19156.26	0.20	1 L	Tm	CA69
5159.308	19377.150	0.01	27	Ce III	LI72	5220.012	19151.815		4 L	Th I	GI74
5159.448	19376.630	0.06	6 L	Gd I	BL71	5220.244	19150.965	0.08	4 L	Gd	BL71
5159.48	19376.50	0.10	1	Hf	GO70	5220.67	19149.39	0.05	4	Zr	TA76
5161.119	19370.354	0.07	5 L	Gd I	BL71	5221.094	19147.846		3 L	Th I	GI74
5161.13	19370.3		227	Cl I	RA69	5221.706	19145.601		7 L	Th II	GI74
5161.207	19370.02		52	I I	LU75	5222.882	19141.290	0.01	38	Ce III	LI72
5161.47	19369.03	0.05	30	Hf I	GO70	5223.11	19140.456	0.10	3 L	Nd I	BL70
5166.978	19348.39		5	Se	MO74	5224.46	19135.50	0.20	4	Zr	TA76
5169.493	19338.976		7 L	Th II	GI74	5225.487	19131.750	0.07	5 L	Gd I	BL71
5170.90	19333.72	0.20	2 L	Tm	CA69	5227.10	19125.83			Hf I	GO70
5173.06	19325.65			Hf	GO70	5227.657	19123.807		5	Ar I	HU73
5174.27	19321.11	0.10	5	Zr	TA76	5227.83	19123.16			Hf	GO70
5175.137	19317.885		3 L	Th I	GI74	5228.25	19121.63			Hf	GO70
5175.37	19317.02		120	Br I	TE63	5229.691	19116.37		3 L	Ce	VE72
5175.411	19316.86		11	Te I	MO75	5230.008	19115.21		17	Ca I	RI68
5177.466	19309.20		48	Ca I	RI68	5230.426	19113.68	0.01	25	Fe I	LI76
5178.223	19306.374	0.10	5 L	Sm	BL69	5231.182	19110.921	0.07	5 L	Gd I	BL71
5178.57	19305.08	0.10	3 L	Tm	CA69	5231.504	19109.745	0.07	5 L	Gd I	BL71
5181.098	19295.65		7	Cm I	CO76	5232.723	19105.29		2	Se I	MO74
5181.298	19294.916		25	Ar I	HU73	5232.77	19105.12		108	I I	LU75
5182.045	19292.13		2	Se	MO74	5234.723	19097.993	0.05	5 L	Gd I	BL71
5183.029	19288.47		3 L	Ce I	VE72	5235.94	19093.55			Hf	GO70
5184.42	19283.29	0.02	8	Si I	LI65	5236.389	19091.92		91	Te I	MO75
5185.509	19279.245		625	Ge I	HU64	5237.084	19089.38	0.01	110	He I	LT70
5186.23	19276.57	0.25	1 L	Tm	CA69	5237.296	19088.610		3 L	Th I	GI74
5186.710	19274.78	0.02	4	Li I	JO59	5237.75	19086.96	0.25	1 L	Tm	CA69
5189.979	19262.64		3 L	Ce I	VE72	5238.963	19082.536		3 L	Th II	GI74
5190.116	19262.13		6	Cm I	CO76	5241.196	19074.406		3 L	Th I	GI74
5190.568	19260.46	0.01	2	Fe I	LI76	5242.36	19070.17		35	I I	LU75
5190.761	19259.740	0.12	4 L	Sm I	BL69	5244.95	19060.75		3	I I	LU75
5192.886	19251.85		7	Cm I	CO76	5246.462	19055.260	0.06	5 L	Gd I	BL71

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5247.844	19050.243		9	Kr I	KA69	5309.418	18829.31		4	Te I?	MO75
5248.975	19046.14		30	Ca I	RI68	5309.418	18829.31		4	Te I?	MO75
5249.27	19045.07		547	Br I	TE63	5310.31	18826.14	0.05	24	Zr I	TA76
5251.451	19037.15		8	Cm I	CO76	5312.149	18819.63		21	Se I	MO74
5251.901	19035.526		7	Kr I	KA69	5314.339	18811.879		7 L	Th I	GI74
5253.21	19030.79	0.02	5	Si I	LI65	5314.344	18811.863		700	Ge I	HU64
5254.34	19026.71			Hf	GO70	5316.45	18804.40	0.02	8	Zr	TA76
5255.044	19024.142		6	Ar I	HU73	5316.66	18803.67			Hf I	GO70
5255.696	19021.78		17	Ca I	RI68	5317.014	18802.414		3 L	Th I	GI74
5255.98	19020.74			Hf I	GO70	5317.43	18800.95			Hf I	GO70
5260.89	19003.00		1	I I	LU75	5318.347	18797.703		20	Kr I	KA69
5261.692	19000.106	0.05	7 L	Gd I?	BL71	5321.057	18788.128		350	Xe I	HU73
5261.692	19000.106	0.05	7 L	Gd I?	BL71	5321.174	18787.716		50	Kr I	KA69
5262.88	18995.82		30	Br I	HU72	5321.813	18785.460		170	Kr I	KA69
5263.15	18994.83			Hf	GO70	5322.629	18782.58	0.10	2 W	Fe I	LI76
5263.291	18994.333	0.01	560 B	B I	LI70	5322.705	18782.311	0.08	5 L	Gd I	BL71
5265.321	18987.01	0.01	47	Fe I	LI76	5323.56	18779.29		313	Br I	TE63
5265.41	18986.68			Hf	GO70	5323.629	18779.05		5 L	Ce I	VE72
5265.64	18985.86	0.15	2 L	Tm I	CA69	5324.126	18777.30		394	Te I	MO75
5266.597	18982.41		13	I I	LU75	5324.865	18774.692	0.08	4 L	Gd I	BL71
5267.05	18980.78	0.20	1 L	Tm	CA69	5325.160	18773.65	0.10	2 W	Fe	LI76
5267.33	18979.76	0.02	5	Zr I	TA76	5325.502	18772.446		3 L	Th I	GI74
5269.61	18971.6		21	Cl I	RA69	5325.890	18771.08		3	Te	MO75
5270.004	18970.14		24	Ca I	RI68	5327.87	18764.11		100	Ge I	HU64
5270.318	18969.01		2	Se	MO74	5328.020	18763.575	0.15	3 L	Sm	BL69
5272.070	18962.706	0.02	5	S I	JA67	5329.051	18759.94		48	Te I	MO75
5273.23	18958.53	0.01	80 B	S I	JA67	5329.95	18756.78	0.20	1 L	Tm	CA69
5273.58	18957.29	0.01	80 B	S I	JA67	5330.85	18753.60			Hf I	GO70
5274.116	18955.35		69	Te I	MO75	5331.59	18751.01	0.02	2 B	N I	ER61
5275.414	18950.684	0.10	3 L	Gd I	BL71	5331.60	18750.98		1	I	LU75
5275.685	18949.711	0.01	55	S I	JA67	5331.68	18750.69	0.20	3	Zr	TA76
5277.223	18944.188	0.01	335	S I	JA67	5332.545	18747.653	0.08	4 L	Gd I	BL71
5277.812	18942.07	0.01	4	Fe I	LI76	5333.298	18745.005		40	Ar I	HU73
5279.072	18937.551		15	Ne I	HU73	5333.605	18743.926	0.08	5 L	Gd	BL71
5279.59	18935.70			Hf	GO70	5333.94	18742.8		22	Cl I	RA69
5281.07	18930.388	0.05	7 L	Nd I	BL70	5334.30	18741.49	0.25	1 L	Tm I	CA69
5281.378	18929.285	0.01	635	S I	JA67	5335.491	18737.30		3 L	Ce	VE72
5282.14	18926.54	0.02	3	C I	JO65	5335.587	18736.964	0.08	5 L	Gd	BL71
5282.444	18925.47		20	Ca I	RI68	5336.69	18733.092	0.07	5 L	Nd II	BL70
5284.070	18919.640	0.07	5 L	Gd I	BL71	5337.011	18731.963	0.10	3 L	Gd	BL71
5285.005	18916.291	0.08	3 L	Gd I	BL71	5339.59	18722.90	0.02	26	Si I	LI65
5285.385	18914.93		7	Se	MO74	5339.91	18721.79	0.10	4	Zr	TA76
5285.51	18914.48	0.02	8	Si I	LI65	5340.08	18721.19			Hf	GO70
5285.58	18914.24		2	Se	MO74	5340.11	18721.10	0.25	1 L	Tm	CA69
5286.84	18909.74			Hf I	GO70	5340.474	18719.82		2	Se	MO74
5287.98	18905.65	0.10	4 L	Tm I	CA69	5341.90	18714.821	0.05	5 L	Nd I	BL70
5293.290	18886.685		6 L	Th I	GI74	5343.612	18708.82		8	Cm I	CO76
5295.32	18879.43			Hf	GO70	5345.251	18703.09	0.02	7	Li I	JO59
5295.68	18878.16	0.20	1 L	Tm II	CA69	5346.925	18697.23	0.01	230	He I	LT70
5296.03	18876.90			Hf	GO70	5347.193	18696.294		300	Kr I	KA69
5299.210	18865.586		3 L	Th I	GI74	5347.34	18695.78	0.25	1 L	Tm	CA69
5300.71	18860.24			Hf I	GO70	5348.056	18693.27		4	Cm I	CO76
5300.968	18859.330	0.06	7 L	Sm II	BL69	5349.99	18686.52			Hf	GO70
5301.722	18856.65	0.01	105	Fe I	LI76	5350.328	18685.34	0.01	530	He I	LT70
5301.887	18856.06		8	Cm I?	CO76	5351.03	18682.89	0.25	1 L	Tm II	CA69
5301.887	18856.06		8	Cm I?	CO76	5351.206	18682.274		20	Ne I	HU73
5302.30	18854.59		1	I I	LU75	5351.74	18680.41	0.25	1 L	Tm	CA69
5302.66	18853.31	0.20	2 L	Tm	CA69	5353.050	18675.84		3 L	Ce	VE72
5302.891	18852.49		3 L	Ce II	VE72	5354.72	18670.00	0.02	4 B	N I	ER61
5303.402	18850.673	0.08	4 L	Gd I	BL71	5356.85	18662.60			Hf	GO70
5305.16	18844.42	0.02	2 B	C I	JO65	5358.12	18658.16	0.02	32	N I	ER61
5306.09	18841.13	0.25	1 L	Tm	CA69	5359.62	18652.95	0.01	2	Gd III	LI73
5307.039	18837.76		3	Te I?	MO75	5359.72	18652.60	0.15	3 L	Tm	CA69
5307.039	18837.76		3	Te I?	MO75	5360.576	18649.620	0.15	3 L	Sm	BL69
5308.33	18833.17		1	I I	LU75	5361.458	18646.550	0.08	4 L	Gd I	BL71
5308.76	18831.65		10	Br I	HU72	5361.792	18645.390		3	Ce III	LI72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5362.430	18643.172	0.08	4 L	Gd I	BL71	5408.124	18485.653		22 B	Ar I?	HU73
5363.531	18639.34		4	Te I?	MO75	5409.165	18482.095	0.07	5 L	Gd I	BL71
5363.531	18639.34		4	Te I?	MO75	5409.721	18480.20		2	I I	LU75
5364.01	18637.68	0.01	3	Fe I	LI76	5410.072	18478.996	0.10	7 L	Gd I	BL71
5364.84	18634.80		2	I I	LU75	5411.011	18475.79		80	Ne I	JO63
5365.46	18632.64	0.15	3 L	Tm	CA69	5412.41	18471.01			Hf	GO70
5365.562	18632.289		60	Ar I	HU73	5413.160	18468.454		3 L	Th I	GI74
5366.109	18630.390	0.12	4 L	Sm I	BL69	5414.06	18465.39	0.01	B	Na I	JO61
5366.17	18630.19	0.02	13 B	N I	ER61	5415.078	18461.91		16	Te	MO75
5366.87	18627.749	0.05	5 L	Nd	BL70	5416.040	18458.64		20 B	Ne I	JO63
5367.235	18626.48		5	Se I	MO74	5417.738	18452.84		4	Cm I	CO76
5367.617	18625.16		40 B	Ne I	JO63	5418.858	18449.04	0.10	1 W	Fe	LI76
5368.33	18622.68	0.01	25 B	Mg II	RI65	5419.01	18448.51	0.02	70	Zr	TA76
5369.418	18618.91		30 B	Ne I	JO63	5419.142	18448.07	0.10	1 W	Fe	LI76
5370.744	18614.312	0.10	7 L	Gd I	BL71	5419.599	18446.51		2	Se	MO74
5371.22	18612.65			Hf	GO70	5420.40	18443.79			Hf I	GO70
5372.038	18609.827	0.10	7 L	Gd I	BL71	5420.91	18442.052	0.10	3 L	Nd I	BL70
5372.12	18609.54	0.25	1 L	Tm I	CA69	5420.993	18441.77	0.10	1 W	Fe	LI76
5373.100	18606.15		5 L	Ce I?	VE72	5421.368	18440.493		4 L	Th I	GI74
5373.100	18606.15		5 L	Ce I?	VE72	5422.178	18437.740	0.10	4 L	Gd I	BL71
5373.100	18606.15		5 L	Ce I?	VE72	5422.551	18436.47		4	Cm I	CO76
5375.541	18597.70		180 B	Ne I	JO63	5422.61	18436.27	0.20	2 L	Tm	CA69
5376.069	18595.874		3 L	Th I	GI74	5424.615	18429.455		200 B	Ar I?	HU73
5377.035	18592.533	0.08	4 L	Gd I	BL71	5424.928	18428.392		200 B	Ar I?	HU73
5377.322	18591.54		120	Ne I	JO63	5424.95	18428.30		160	Ge	HU64
5378.015	18589.147	0.10	7 L	Gd I	BL71	5425.110	18427.775		4 L	Th I	KL70
5378.57	18587.24	0.02	13	N I	ER61	5425.113	18427.765		120	Ar I	HU73
5380.40	18580.905	0.10	4 L	Nd	BL70	5426.60	18422.72	0.02	7	Si I	LI65
5380.403	18580.896		150	Kr I	KA69	5426.640	18422.577	0.08	4 L	Gd I	BL71
5380.406	18580.88	0.10	1 W	Fe	LI76	5426.695	18422.39		140 B	Ne I	JO63
5380.57	18580.32		1	I	LU75	5427.854	18418.457		20	Kr I	KA69
5380.714	18579.820	0.01	42	Ce III	LI72	5427.937	18418.176		90 B	Ar I?	HU73
5381.299	18577.80		3 L	Ce II?	VE72	5427.975	18418.047		90 B	Ar I?	HU73
5381.299	18577.80		3 L	Ce I?	VE72	5429.009	18414.54	0.01	7	Fe I	LI76
5382.17	18574.80	0.01	20 B	Mg II	RI65	5431.869	18404.843	0.06	5 L	Gd I	BL71
5383.097	18571.596		24 B	Ar I?	HU73	5432.457	18402.85		100	Ne I	JO63
5383.496	18570.219		24 B	Ar I?	HU73	5433.362	18399.786		100	Kr I	KA69
5383.59	18569.89	0.02	4	Zr	TA76	5435.52	18392.48	0.01	2	Fe I	LI76
5384.05	18568.31		500	Br I	TE63	5436.270	18389.95		190 B	Ne I	JO63
5384.10	18568.14		1	I	LU75	5436.833	18388.040	0.05	6 L	Gd I	BL71
5384.50	18566.75	0.02	4 B	N I	ER61	5437.188	18386.839	0.06	6 L	Gd I	BL71
5384.80	18565.723	0.05	7 L	Nd I	BL70	5437.777	18384.85		130	Ne I	JO63
5385.236	18564.219		26	Ar I	HU73	5438.54	18382.3		40	Cl I	RA69
5387.046	18557.981		3 L	Th I	GI74	5438.829	18381.291		3 L	Th II	GI74
5387.13	18557.70			Hf I	GO70	5439.27	18379.80	0.10	3 W	Fe	LI76
5387.88	18555.11		1	I I	LU75	5444.741	18361.332		9	Ar I	HU73
5388.07	18554.45	0.02	2	Si I	LI65	5444.797	18361.144	0.10	3 L	Gd I	BL71
5388.87	18551.701	0.05	5 L	Nd I	BL70	5445.397	18359.12		30 B	Ne I	JO63
5390.027	18547.718		3 L	Th II	GI74	5447.35	18352.54	0.05	5 L	Tm I	CA69
5390.93	18544.61		1	I I	LU75	5448.544	18348.52		22	I I	LU75
5391.87	18541.4		74	Cl I	RA69	5448.696	18348.006		14	Ar I	HU73
5396.170	18526.603	0.10	5 L	Gd	BL71	5450.13	18343.17	0.02	75	Zr	TA76
5396.678	18524.858	0.08	4 L	Gd I	BL71	5450.27	18342.707	0.10	4 L	Nd I	BL70
5396.96	18523.89	0.01	1	Fe I	LI76	5451.39	18338.93			Hf I	GO70
5397.36	18522.53			Hf I	GO70	5452.01	18336.85			Hf	GO70
5399.12	18516.50			Hf	GO70	5452.03	18336.78	0.02	120	Zr I	TA76
5400.651	18511.23		6	Cm I	CO76	5452.40	18335.54		1	I I	LU75
5400.87	18510.48		180	Br I	TE63	5455.115	18326.41		3	Cm I	CO76
5401.222	18509.27		7	Te	MO75	5455.26	18325.93			Hf I	GO70
5405.233	18495.541		350	Ge I	HU64	5455.83	18324.01		1	I I	LU75
5405.887	18493.303	0.10	3 L	Gd	BL71	5456.148	18322.94		8	Cm I	CO76
5406.664	18490.644		4 L	Th I	GI74	5456.660	18321.23		2	Se	MO74
5406.922	18489.762	0.10	3 L	Gd	BL71	5456.83	18320.67	0.02	8 B	C I	JO65
5407.062	18489.284	0.10	5 L	Sm	BL69	5457.02	18320.02	0.01	1	Fe I	LI76
5407.811	18486.723		22 B	Ar I?	HU73	5458.604	18314.701	0.08	4 L	Gd I	BL71
5408.121	18485.663		22 B	Ar I?	HU73	5458.64	18314.58	0.25	1 L	Tm I	CA69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5458.91	18313.67		1	I I	LU75	5495.70	18191.08		60	Br I	TE63
5461.72	18304.24	0.05	5	Zr	TA76	5496.113	18189.711	0.10	3 L	Gd I	BL71
5461.800	18303.98		130 B	Ne I	JO63	5496.564	18188.22		43	Te I	MO75
5461.987	18303.357	0.06	5 L	Gd I	BL71	5496.986	18186.821	0.10	3 L	Gd I	BL71
5462.53	18301.54			Hf I	GO70	5497.310	18185.749		18	Ar I	HU73
5462.79	18300.67	0.10	3 L	Tm I	CA69	5497.526	18185.036		90	Kr I	KA69
5465.015	18293.215	0.08	4 L	Gd I	BL71	5497.618	18184.73		8	Cm I	CO76
5465.29	18292.30	0.25	1 L	Tm I	CA69	5497.97	18183.57			Hf	GO70
5465.500	18291.59		2782	Te I	MO75	5500.282	18175.92		4	Te	MO75
5465.68	18291.00	0.25	1 L	Tm	CA69	5501.59	18171.60	0.02	13	N I	ER61
5465.740	18290.791	0.08	4 L	Gd I	BL71	5502.15	18169.74	0.02	13	N I	ER61
5465.86	18290.389	0.10	3 L	Nd	BL70	5502.35	18169.09		2	I I	LU75
5465.91	18290.21	0.05	9	Zr	TA76	5502.370	18169.030	0.01	6	Ce III	LI72
5466.039	18289.79		3 L	Ce I	VE72	5502.50	18168.60		100	Br I	HU72
5466.959	18286.71		3 L	Ce I	VE72	5502.888	18167.315		2600 I	Kr I	KA69
5467.62	18284.51	0.02	3	Si I	LI65	5505.098	18160.02		3 L	Ce II	VE72
5468.181	18282.62		200	Ne I	JO63	5505.211	18159.65		3 L	Ce	VE72
5469.961	18276.68		250 B	Ne I	JO63	5507.34	18152.629	0.07	6 L	Nd I	BL70
5470.25	18275.71		17	I I	LU75	5508.665	18148.262	0.08	4 L	Gd I	BL71
5471.550	18271.367		5 L	Th II	GI74	5508.85	18147.65		2	I I	LU75
5472.048	18269.704		3 L	Th II	GI74	5509.767	18144.63		6	Cm I	CO76
5474.01	18263.16		1	I I	LU75	5510.10	18143.54	0.02	6 L	Be I	JH62
5476.944	18253.373		6 B	Ne I?	HU73	5511.24	18139.80	0.02	13	C I	JO65
5476.957	18253.330		6 B	Ne I?	HU73	5513.02	18133.93		2	I I	LU75
5477.48	18251.58	0.02	11 B	N I	ER61	5513.919	18130.970	0.15	3 L	Sm I	BL69
5477.50	18251.51			Hf	GO70	5514.10	18130.38		25	Hg I	HU53
5477.63	18251.08	0.05	3	Zr	TA76	5514.376	18129.467	0.12	4 L	Sm	BL69
5478.718	18247.463		10	Ne I	HU73	5515.440	18125.969		5 L	Th I	GI74
5479.09	18246.22	0.10	4 L	Tm I	CA69	5515.685	18125.165	0.08	4 L	Gd	BL71
5479.40	18245.19		1	I I	LU75	5518.39	18116.27	0.02	6	N I	ER61
5479.641	18244.39		3 L	Ce I?	VE72	5519.08	18114.02	0.15	3 L	Tm I	CA69
5479.641	18244.39		3 L	Ce I?	VE72	5519.152	18113.78		7	Cm I	CO76
5479.641	18244.39		3 L	Ce I?	VE72	5519.26	18113.42	0.10	15	Zr	TA76
5479.867	18243.63	0.01	22 LB	O I	EI63	5519.516	18112.58		10	Te	MO75
5480.54	18241.396	0.05	7 L	Nd I	BL70	5520.73	18108.61	0.02	12 B	N I	ER61
5480.80	18240.54	0.02	13 B	N I	ER61	5523.545	18099.372		80	Kr I	KA69
5481.00	18239.865	0.10	4 L	Nd	BL70	5524.05	18097.71	0.02	10 B	N I	ER61
5481.137	18239.409		5 L	Th II	GI74	5524.23	18097.13	0.15	2 L	Tm	CA69
5482.10	18236.21		1	I I	LU75	5524.46	18096.37	0.10	1 W	Fe	LI76
5482.6	18234.5	0.50	100	Lu I	BO56	5524.906	18094.913	0.08	4 L	Gd	BL71
5482.87	18233.63			Hf	GO70	5526.62	18089.29	0.05	4	Zr	TA76
5482.89	18233.57	0.02	75	Zr I	TA76	5528.482	18083.21		120 B	Ne I	JO63
5483.536	18231.430	0.15	3 L	Sm	BL69	5528.590	18082.856		4 L	Th II	GI74
5483.560	18231.349		15	Ar I	HU73	5530.869	18075.41	0.01	1	Fe	LI76
5484.07	18229.66	0.02	60 B	N I	ER61	5531.517	18073.29		11	Te	MO75
5484.198	18229.23	0.02	13 LB	O I	IS68	5531.74	18072.56			Hf	GO70
5484.456	18228.371		4 L	Th II	GI74	5531.807	18072.340		4 L	Th I	GI74
5484.85	18227.06		1	I I	LU75	5531.89	18072.069	0.10	3 L	Nd II	BL70
5484.859	18227.03		20 B	Ne I	JO63	5532.824	18069.01		9	Cm I	CO76
5485.71	18224.20	0.01	4	Fe	LI76	5533.064	18068.23		6	Te	MO75
5485.88	18223.640	0.10	3 L	Nd	BL70	5536.725	18056.288	0.15	3 L	Sm	BL69
5486.00	18223.24		1	I I	LU75	5536.911	18055.68	0.01	1	Fe	LI76
5486.64	18221.12	0.02	8	C I	JO65	5537.686	18053.15		6	Te	MO75
5486.642	18221.11		30 B	Ne I	JO63	5538.79	18049.56	0.02	33 UB	N I	ER61
5488.477	18215.017	0.10	3 L	Gd I	BL71	5539.27	18047.98	0.02	6	Zr	TA76
5489.17	18212.72		10	Br I	TE63	5539.63	18046.83			Hf I	GO70
5489.51	18211.590	0.10	3 L	Nd I	BL70	5539.63	18045.26			Hf	GO70
5489.621	18211.22		6 L	Ce II	VE72	5539.811	18046.23	0.03	12 L	O I	ER68
5489.82	18210.56	0.02	32 UB	N I?	ER61	5541.051	18042.19	0.03	12 L	O I	ER68
5489.82	18210.56	0.02	32 UB	N I?	ER61	5541.269	18041.48	0.03	12 L	O I	ER68
5489.890	18210.330		5	Ne I	HU73	5543.008	18035.82		40	Ne I	JO63
5490.29	18209.00	0.20	1 L	Tm	CA69	5543.30	18034.86	0.02	5	C I	JO65
5490.43	18208.53	0.05	4	Zr I	TA76	5544.65	18030.47	0.02	2	C I	JO65
5493.27	18199.13	0.02	8	N I	ER61	5544.81	18029.95	0.02	30 B	N I	ER61
5493.72	18197.63	0.15	2 L	Tm	CA69	5544.903	18029.657		15	Ne I	HU73
5495.60	18191.41		1	I I	LU75	5547.240	18022.061		6 B	Ar I?	HU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5547.27	18021.964	0.10	3 L	Nd	BL70	5598.63	17856.63	0.01	3 L	Be I	HO69
5547.501	18021.21	0.01	23 LB	O I	EI63	5599.02	17855.38	0.01	2 LB	Be I	HO69
5547.639	18020.765		6 B	Ar I?	HU73	5599.28	17854.56	0.25	1 L	Tm I	CA69
5548.63	18017.54	0.02	18	Zr	TA76	5599.85	17852.74	0.05	2 U	Hf	GO70
5549.26	18015.501	0.10	3 L	Nd I	BL70	5600.00	17852.26	0.02	50	Zr I	TA76
5549.950	18013.26		5 L	Ce II	VE72	5600.06	17852.09	0.02	10 B	N I	ER61
5550.71	18010.80	0.25	1 L	Tm	CA69	5601.105	17848.745	0.10	3 L	Gd I	BL71
5551.401	18008.553	0.15	3 L	Sm	BL69	5601.521	17847.42		4 L	Ce II	VE72
5551.89	18006.95			Hf	GO70	5601.969	17845.99	0.01	2	Fe I	LI76
5553.351	18002.229		700 I	Kr I	KA69	5602.991	17842.737		650 I	Kr I	KA69
5554.81	17997.49	0.50	1 U	Hf	GO70	5606.941	17830.167		5 L	Th II	GI74
5555.49	17995.29	0.02	7	Zr I	TA76	5607.002	17829.973	0.10	3 L	Gd	BL71
5555.962	17993.769		3 L	Th I	GI74	5607.89	17827.14	0.02	28	Zr I	TA76
5557.701	17988.14		3 L	Ce	VE72	5608.15	17826.33	0.02	4 B	C I	JO65
5557.91	17987.46	0.05	130	Hf I	GO70	5608.291	17825.875		5 L	Th I	GI74
5559.60	17982.00		40	Br I	TE63	5608.33	17825.8		5	Cl I	RA69
5560.25	17979.89	0.02	51 B	N I	ER61	5608.43	17825.434	0.05	7 L	Nd I	BL70
5560.410	17979.38	0.01	1	Fe	LI76	5608.506	17825.19		4	I I	LU75
5561.151	17976.979		4 L	Th I	GI74	5608.534	17825.100	0.01	5	Ce III	LI72
5561.25	17976.65	0.02	30	Zr	TA76	5608.668	17824.678	0.10	3 L	Gd I	BL71
5562.581	17972.35		8	Cm I	CO76	5608.73	17824.47	0.05	9	Zr I	TA76
5562.79	17971.683	0.05	5 L	Nd I	BL70	5608.884	17823.991		150	Ar I	HU73
5562.79	17971.67	0.02	20	Zr I	TA76	5609.67	17821.50	0.02	1	Hf	GO70
5564.333	17966.70	0.03	12 L	O I	ER68	5610.569	17818.638	0.15	3 L	Sm II	BL69
5564.51	17966.12	0.02	2	C I	JO65	5611.707	17815.02		7	Cm I	CO76
5564.884	17964.920		6 L	Th I	GI74	5612.02	17814.03	0.02	3 B	C I	JO65
5566.059	17961.127	0.08	4 L	Gd I	BL71	5613.861	17808.19		3 L	Ce I	VE72
5566.64	17959.24	0.02	3	C I	JO65	5613.998	17807.755	0.08	4 L	Gd II	BL71
5568.039	17954.74		6 L	Ce II	VE72	5615.526	17802.908	0.08	4 L	Gd I	BL71
5570.53	17946.71	0.25	1 L	Tm	CA69	5615.97	17801.50		330	Br I	TE63
5570.71	17946.12	0.02	23	Zr	TA76	5617.05	17798.07	0.02	10	Zr	TA76
5570.820	17945.777		3 L	Th	GI74	5617.831	17795.604		3 L	Th II	GI74
5573.290	17937.82	0.01	3	Fe I	LI76	5619.08	17791.66	0.05	1	Hf	GO70
5573.63	17936.730	0.05	6 L	Nd	BL70	5620.46	17787.27	0.02	8 UB	N I	ER61
5573.69	17936.55	0.02	17	N I	ER61	5620.54	17787.02	0.10	6 W	Zr	TA76
5573.722	17936.434		7 L	Th II	GI74	5621.739	17783.230		4	Ce III	LI72
5573.856	17936.00		3	Cm	CO76	5621.759	17783.170		4 L	Th I	GI74
5573.92	17935.80	0.02	3	Hf	GO70	5622.86	17779.67	0.10	1	Hf	GO70
5575.667	17930.18	0.01	5	Fe I	LI76	5625.558	17771.16	0.01	5	Fe	LI76
5577.06	17925.70	0.02	8	N I	ER61	5625.693	17770.736		4	Kr I	KA69
5578.31	17921.68		3	I I	LU75	5626.26	17768.94	0.02	3	C I	JO65
5579.34	17918.38	0.02	4	C I	JO65	5626.53	17768.08	0.10	1	Hf	GO70
5579.44	17918.06	0.02	7 B	N I	ER61	5626.67	17767.7		7	Cl I	RA69
5580.476	17914.726		1500 B	Ar I?	HU73	5627.77	17764.17	0.10	1	Hf	GO70
5580.506	17914.629		1500 B	Ar I?	HU73	5628.77	17761.0	0.50	1	Hf	GO70
5581.018	17912.98		6	Cm I	CO76	5629.50	17758.73		15 B	Ge I?	HU64
5583.49	17905.07	0.05	2	Hf	GO70	5629.50	17758.73		15 B	Ge I?	HU64
5583.546	17904.87		5	Cm I	CO76	5629.76	17757.91	0.02	2 L	Ga I	JO67
5583.633	17904.598	0.10	8 L	Gd I	BL71	5630.33	17756.09	0.02	1	Hf	GO70
5584.00	17903.42	0.25	1 L	Tm	CA69	5630.37	17755.973	0.05	7 L	Nd I	BL70
5584.971	17900.307		4 L	Th II	GI74	5630.60	17755.25		1	I I	LU75
5585.33	17899.157	0.10	3 L	Nd	BL70	5633.104	17747.36	0.01	1	Fe I	LI76
5585.61	17898.25	0.05	3	Zr I	TA76	5633.884	17744.898		5 L	Th I	GI74
5586.18	17896.43	0.25	1 L	Tm	CA69	5635.844	17738.72		4	Cm I	CO76
5586.997	17893.82		2	Se	MO74	5636.021	17738.17		3 L	Ce I	VE72
5588.758	17888.178		35 B	Ar I?	HU73	5636.51	17736.63	0.02	1	Hf I	GO70
5588.819	17887.982		3 L	Th I	GI74	5636.930	17735.31		3 L	Ce I	VE72
5588.84	17887.90	0.20	2	Hf I	GO70	5638.599	17730.06		4 L	Ce I	VE72
5589.071	17887.176		35 B	Ar I?	HU73	5639.2	17728.2	0.10	1 W	Fe	LI76
5591.86	17878.26	0.02	100	N I?	ER61	5641.37	17721.35	0.10	1 W	Fe	LI76
5591.86	17878.26	0.02	100	N I?	ER61	5641.445	17721.115		4 L	Th II	GI74
5591.911	17878.09	0.01		La III	JO71	5641.45	17721.10		1	I I	LU75
5592.49	17876.23	0.05	2	Hf	GO70	5642.080	17719.12		6	Se	MO74
5593.98	17871.47	0.02	6	Zr	TA76	5642.53	17717.72	0.01	15 B	Mg II	RI65
5594.77	17868.96	0.02	1 L	Ga I	JO67	5643.73	17713.94	0.25	1 L	Tm I	CA69
5595.730	17865.89		3 L	Ce I	VE72	5643.73	17713.93	0.02	23	Zr	TA76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5645.876	17707.208	0.15	3 L	Sm I	BL69	5688.06	17575.88	0.05	14 U	Zr	TA76
5646.098	17706.51	0.01	1	Fe	LI76	5688.63	17574.13		1	I I	LU75
5646.528	17705.162		3 L	Th II	GI74	5688.957	17573.115		3 L	Th I	GI74
5646.58	17705.0		3	Cl I	RA69	5690.60	17568.04		1	I I	LU75
5646.85	17704.15	0.20	1 L	Tm I	CA69	5690.879	17567.18		3 L	Ce	VE72
5647.003	17703.673		3 L	Th I	GI74	5690.95	17566.96		1	I I	LU75
5647.706	17701.469	0.08	4 L	Gd I	BL71	5690.963	17566.921	0.15	3 L	Gd I	BL71
5647.86	17700.987	0.07	6 L	Nd I	BL70	5691.439	17565.451	0.15	3 L	Gd I?	BL71
5649.09	17697.13	0.25	1 L	Tm	CA69	5691.439	17565.451	0.15	3 L	Gd I?	BL71
5649.381	17696.22		3 L	Ce I	VE72	5691.439	17565.451	0.15	3 L	Gd I?	BL71
5649.474	17695.93	0.01	1	Fe I	LI76	5691.93	17563.937	0.10	3 L	Nd I	BL70
5652.24	17687.28	0.02	9	Hf I	GO70	5692.90	17560.94	0.15	2 L	Tm I	CA69
5653.294	17683.97	0.10	1 W	Fe	LI76	5693.49	17559.1		3	Cl	RA69
5653.346	17683.810		3 L	Th I	GI74	5693.854	17558.001	0.08	4 L	Gd I	BL71
5653.70	17682.72	0.05	1	Hf I	GO70	5694.17	17557.01	0.05	2	Hf	GO70
5653.79	17682.422	0.07	5 L	Nd II	BL70	5695.583	17552.671		4 L	Th I	GI74
5655.370	17677.481		3 L	Th I	GI74	5696.820	17548.86		6 L	Ce II	VE72
5656.52	17673.90	0.05	1 U	Hf I	GO70	5696.911	17548.58	0.01	1	Fe I	LI76
5657.02	17672.32	0.02	5 W	Zr	TA76	5697.733	17546.05	0.02	7	Li I	JO59
5657.148	17671.93		2	Se	MO74	5697.790	17545.87		6	Se I	MO74
5657.888	17669.614		3 L	Th I	GI74	5699.05	17541.98	0.02	10	Hf I	GO70
5658.41	17667.984	0.07	6 L	Nd I	BL70	5700.139	17538.64	0.01	1	Fe I	LI76
5658.90	17666.45	0.20	1 L	Tm I	CA69	5701.484	17534.504		5 L	Th II	GI74
5659.351	17665.046	0.15	3 L	Sm	BL69	5701.81	17533.49	0.02	12	Zr	TA76
5659.36	17665.02	0.20	1 L	Tm II	CA69	5702.30	17531.99	0.02	18 B	N I	ER61
5662.161	17656.278	0.10	3 L	Gd I	BL71	5702.74	17530.64	0.25	1 L	Tm I	CA69
5663.091	17653.38		3 L	Ce I	VE72	5703.47	17528.39	0.02	70	Hf I	GO70
5666.01	17644.29	0.01	1	Fe	LI76	5704.846	17524.170		3	Ce III	LI72
5666.11	17643.98	0.02	42 B	N I	ER61	5706.29	17519.7		4	Cl	RA69
5666.25	17643.53	0.05	3	Hf I	GO70	5706.500	17519.09		6 L	Ce	VE72
5666.590	17642.48		3 L	Ce I	VE72	5707.13	17517.15	0.02	8 W	Zr	TA76
5668.23	17637.38	0.02	3 B	C I	JO65	5707.32	17516.58	0.02	125 UB	N I	ER61
5668.379	17636.912	0.08	8 L	Gd I	BL71	5708.992	17511.445	0.12	4 L	Sm	BL69
5668.41	17636.83	0.02	8 B	N I	ER61	5709.289	17510.534	0.10	3 L	Gd I	BL71
5669.208	17634.332		4 L	Th I	GI74	5709.939	17508.54		7 L	Ce II	VE72
5669.63	17633.01		20	Ge	HU64	5710.53	17506.73		1	I I	LU75
5669.96	17631.993	0.07	6 L	Nd I	BL70	5710.89	17505.64	0.02	3 B	C I	JO65
5670.425	17630.547		4	Kr I	KA69	5712.56	17500.51	0.05	2	Hf I	GO70
5670.49	17630.34	0.05	15 U	Zr	TA76	5712.692	17500.10		3	Cm I	CO76
5671.873	17626.046		3 L	Th I	GI74	5712.732	17499.98	0.01	1	Fe I	LI76
5671.939	17625.84		3 L	Ce I	VE72	5713.242	17498.42		2	Se I	MO74
5672.823	17623.094		6 L	Th I	GI74	5713.433	17497.832	0.08	4 L	Gd I?	BL71
5672.831	17623.07		4 L	Ce	VE72	5713.433	17497.832	0.08	4 L	Gd I?	BL71
5673.55	17620.84		45	Ge I	HU64	5713.70	17497.02		50	Ge I	HU64
5674.050	17619.28		9	Cm I	CO76	5714.50	17494.57		1	I I	LU75
5674.782	17617.01		6	Cm I	CO76	5714.863	17493.45		4	Cm I	CO76
5674.79	17617.00	0.02	3	Si I	LI65	5716.637	17488.026	0.12	4 L	Sm	BL69
5674.833	17616.854		150	Kr I	KA69	5718.18	17483.31	0.20	1 U	Hf I	GO70
5675.858	17613.67		6 L	Ce I	VE72	5718.921	17481.041		7 L	Th I	GI74
5677.463	17608.69	0.10	1 W	Fe	LI76	5719.13	17480.41	0.02	27	N I	ER61
5677.53	17608.49	0.05	6 L	Tm I	CA69	5720.32	17476.76	0.02	7	Zr	TA76
5677.79	17607.68		1	I I	LU75	5720.97	17474.78	0.01	10	Gd III	LI73
5679.16	17603.43	0.10	2	Hf I	GO70	5721.17	17474.16	0.02	32	N I	ER61
5679.23	17603.21	0.05	7 L	Tm I	CA69	5721.182	17474.13		7	Cm I	CO76
5681.971	17594.72		6 L	Ce II	VE72	5721.50	17473.16	0.05	4 L	Tm I	CA69
5682.03	17594.539	0.15	3 L	Nd I	BL70	5722.088	17471.366	0.06	7 L	Sm II	BL69
5682.36	17593.517	0.15	3 L	Nd I	BL70	5723.417	17467.31	0.01	1	Fe I	LI76
5682.518	17593.028	0.08	4 L	Gd I	BL71	5723.55	17466.92	0.02	4	Si I	LI65
5682.75	17592.32	0.10	2	Hf I	GO70	5724.21	17464.890	0.10	3 L	Nd I?	BL70
5684.38	17587.26	0.05	3	Zr	TA76	5724.21	17464.890	0.10	3 L	Nd I?	BL70
5684.65	17586.4		60	Cl I	RA69	5724.216	17464.871	0.10	3 L	Gd I	BL71
5685.16	17584.86	0.02	100 UB	N I?	ER61	5725.072	17462.260		3 L	Th II	GI74
5685.16	17584.86	0.02	100 UB	N I?	ER61	5725.30	17461.56		1	I I	LU75
5685.268	17584.517		7 L	Th I	GI74	5725.93	17459.644	0.10	3 L	Nd I	BL70
5686.32	17581.26	0.02	11	Zr	TA76	5727.13	17455.97	0.02	2	C I	JO65
5686.94	17579.36		12	Ge	HU64	5728.052	17453.17		9	Cm I	CO76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5729.21	17449.65	0.20	2 L	Tm	CA69	5781.50	17291.81	0.02	6 B	N I	ER61
5729.56	17448.60	0.02	11	C I	JO65	5781.70	17291.228	0.10	3 L	Nd II	BL70
5729.894	17447.564		3 L	Th II	GI74	5782.629	17288.45		3 L	Ce II	VE72
5730.655	17445.248		300 B	Ar I?	HU73	5783.48	17285.91	0.25	1 L	Tm	CA69
5730.768	17444.903		300 B	Ar I?	HU73	5783.754	17285.088	0.12	4 L	Sm I	BL69
5731.09	17443.9		46	Cl I	RA69	5783.979	17284.42		5	Se I	MO74
5733.62	17436.22	0.02	24	N I	ER61	5784.689	17282.29	0.01	1	Fe	LI76
5733.64	17436.18		15	Hg I	HU53	5784.77	17282.04	0.02	4 B	N I	ER61
5734.41	17433.82	0.05	4 W	Zr	TA76	5784.800	17281.961	0.08	4 L	Gd I	BL71
5735.65	17430.055	0.07	5 L	Nd I	BL70	5785.27	17280.558	0.08	4 L	Nd I	BL70
5735.92	17429.23	0.02	16 UB	N I	ER61	5787.14	17274.99	0.02	3	C I	JO65
5736.30	17428.07	0.10	3	Hf	GO70	5788.05	17272.25	0.05	2	Zr I	TA76
5736.747	17426.72	0.01	1	Fe	LI76	5789.08	17269.17	0.02	11 B	N I	ER61
5737.528	17424.35		28	Te I	MO75	5789.19	17268.85	0.02	120	Zr I	TA76
5737.612	17424.095	0.07	5 L	Gd I	BL71	5789.500	17267.932		3 L	Th I	GI74
5738.61	17421.065	0.10	3 L	Nd	BL70	5790.399	17265.25		3 L	Ce II	VE72
5738.687	17420.83	0.01	1	Fe I	LI76	5790.761	17264.172		3 L	Th I	GI74
5740.14	17416.41	0.02	11	Zr I	TA76	5792.417	17259.236	0.08	4 L	Gd I	BL71
5741.62	17411.93	0.02	2	Hf	GO70	5793.00	17257.50	0.01	1	Fe	LI76
5743.769	17405.417		3 L	Th II	GI74	5794.16	17254.05		105	Br I	TE63
5744.090	17404.443		120	Kr I	KA69	5794.658	17252.56		5	Cm I	CO76
5744.127	17404.332		4 L	Th I	GI74	5795.60	17249.77	0.02	1	Hf	GO70
5744.927	17401.908		22	Ar I	HU73	5797.85	17243.06		60	Ge I	HU64
5745.784	17399.313	0.08	4 L	Gd I	BL71	5798.360	17241.55		11	Se I	MO74
5746.90	17395.93		1	I I	LU75	5800.74	17234.48	0.02	2	C I	JO65
5747.77	17393.301	0.10	3 L	Nd	BL70	5801.184	17233.152		30 B	Kr I?	KA69
5749.618	17387.71		3 L	Ce	VE72	5801.999	17230.731		30 B	Kr I?	KA69
5749.678	17387.53		3	Cm I	CO76	5803.04	17227.63	0.02	13	Zr	TA76
5750.392	17385.370		4 L	Th I	GI74	5803.391	17226.60		4 L	Ce II	VE72
5750.47	17385.13	0.02	12	N I	ER61	5803.49	17226.3		27	Cl I	RA69
5751.537	17381.909		7 L	Th I	GI74	5803.704	17225.670		3 L	Th I	GI74
5751.967	17380.610		5 L	Th I	GI74	5803.71	17225.64	0.02	4	Si I	LI65
5756.274	17367.606		700 I	Kr I	KA69	5803.950	17224.94		3	Se I	MO74
5756.28	17367.59		2	I I	LU75	5804.601	17223.01		3 L	Ce I	VE72
5756.29	17367.55	0.02	23	N I	ER61	5804.887	17222.16	0.01	1	Fe	LI76
5756.54	17366.80	0.20	1 L	Tm	CA69	5805.65	17219.90		2	Se	MO74
5756.927	17365.63		3	Cm	CO76	5805.77	17219.55	0.02	10	N I	ER61
5757.109	17365.086		50	Xe I	HU73	5807.169	17215.39		11	Te I	MO75
5757.89	17362.73		45	Ge I	HU64	5807.525	17214.337		1350	Ge I	HU64
5758.59	17360.62	0.25	1 L	Tm	CA69	5807.91	17213.20		7	Hg I	HU53
5759.90	17356.63	0.02	10	Hf	GO70	5809.239	17209.258	0.15	3 L	Gd I	BL71
5760.489	17354.90		6	Se	MO74	5809.591	17208.215		8 L	Th II	GI74
5760.64	17354.44		2	Se	MO74	5810.064	17206.81		4	Cm I	CO76
5761.32	17352.39	0.20	2 L	Tm	CA69	5810.29	17206.15		5	Hg I	HU53
5761.44	17352.033	0.10	3 L	Nd	BL70	5810.39	17205.85	0.25	1 L	Tm II	CA69
5763.037	17347.22		3	Cm I	CO76	5810.904	17204.33	0.01	2	Fe	LI76
5763.68	17345.29	0.20	1 L	Tm	CA69	5812.81	17198.67		12	Hg I	HU53
5763.729	17345.14		3	Cm I	CO76	5812.846	17198.578		4	Ne I	HU73
5764.93	17341.54	0.05	3	Hf	GO70	5813.640	17196.23		3 L	Ce	VE72
5765.92	17338.56	0.02	10 B	C I	JO65	5814.357	17194.110	0.10	3 L	Gd I	BL71
5766.83	17335.81		25	Br I	TE63	5814.360	17194.10		3 L	Ce I	VE72
5768.96	17329.41		35	Hg I	HU53	5814.42	17193.92	0.02	90	Zr I	TA76
5769.67	17327.29	0.02	28	Si I	LI65	5815.21	17191.58	0.10	2 W	Hf	GO70
5769.81	17326.86	0.02	16	N I	ER61	5815.574	17190.51		3	Se	MO74
5770.174	17325.767		1500	Xe I	HU73	5816.708	17187.16		3 L	Ce II?	VE72
5770.93	17323.51	0.02	2 B	C I	JO65	5816.708	17187.16		3 L	Ce I?	VE72
5771.299	17322.39		5 L	Ce I	VE72	5817.669	17184.321		150 B	Ne I?	HU73
5771.382	17322.140	0.10	3 L	Gd I	BL71	5818.286	17182.499		150 B	Ne I?	HU73
5772.42	17319.03	0.20	2 L	Tm I	CA69	5818.36	17182.28	0.10	2 W	Hf	GO70
5776.210	17307.662		7 L	Th I	GI74	5818.406	17182.14		30	Te I	MO75
5776.58	17306.55	0.25	1 L	Tm	CA69	5818.547	17181.727		150 B	Ne I?	HU73
5776.797	17305.903	0.06	6 L	Gd I	BL71	5820.748	17175.23		3 L	Ce I?	VE72
5777.586	17303.54		1958	Te I	MO75	5820.748	17175.23		3 L	Ce I?	VE72
5777.994	17302.32	0.01	5	Fe	LI76	5821.80	17172.13	0.10	4 L	Tm I	CA69
5778.35	17301.25	0.05	1	Hf I	GO70	5821.894	17171.851	0.10	3 L	Gd I	BL71
5780.070	17296.104		8	Ar I	HU73	5822.24	17170.83	0.25	1 L	Tm	CA69

Section II. Wavenumber Table (Finding List)—Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5823.35	17167.56		22	Ge I	HU64	5870.99	17028.26	0.05	8 W	Hf	GO70
5823.61	17166.79	0.20	1 U	Hf	GO70	5871.06	17028.04	0.02	150	Zr I	TA76
5823.819	17166.17		6	Cm I	CO76	5871.344	17027.225	0.10	3 L	Gd I	BL71
5823.819	17166.17	0.01	1	Fe I	LI76	5871.408	17027.04		6	Cm I	CO76
5825.260	17161.930		400	Ne I	HU73	5873.315	17021.511	0.08	5 L	Gd I	BL71
5825.27	17161.90	0.10	1	Hf	GO70	5873.947	17019.68		3	Cm I?	CO76
5825.535	17161.12	0.01	3	Fe I	LI76	5873.947	17019.68		3	Cm I?	CO76
5827.32	17155.85	0.02	14	Zr I	TA76	5875.36	17015.60	0.05	1	Hf	GO70
5827.761	17154.563	0.10	3 L	Gd I	BL71	5876.35	17012.72		1	Se I	MO74
5829.447	17149.60		7	Cm I	CO76	5876.47	17012.37	0.25	1 L	Tm I	CA69
5829.918	17148.21		9	Cm I	CO76	5876.47	17012.37	0.02	9	Zr I	TA76
5830.20	17147.38	0.02	9	Zr	TA76	5876.907	17011.11	0.01	4	Fe	LI76
5830.23	17147.31	0.05	2	Hf	GO70	5878.855	17005.47	0.01	3	Fe	LI76
5831.148	17144.601		10	Ne I	HU73	5879.122	17004.697		3 L	Th I	GI74
5832.505	17140.611		5 B	Xe I?	HU73	5879.489	17003.64		2	Se	MO74
5833.024	17139.084		5 B	Xe I?	HU73	5879.592	17003.34		2	Se	MO74
5834.302	17135.330		4 L	Th I	GI74	5879.723	17002.960	0.15	3 L	Sm	BL69
5834.698	17134.167		4 L	Th I	GI74	5879.894	17002.47	0.01	230	He I	LT70
5834.851	17133.72		3	Cm I	CO76	5880.470	17000.80		69	Se I	MO74
5834.92	17133.52		2	I I	LU75	5880.91	16999.528	0.15	3 L	Nd	BL70
5836.59	17128.61		2	I I	LU75	5881.267	16998.50		2	Se I	MO74
5836.69	17128.320	0.07	6 L	Nd I	BL70	5881.397	16998.12		14	Se I	MO74
5837.101	17127.114	0.15	3 L	Sm I	BL69	5882.113	16996.051	0.15	3 L	Sm II	BL69
5837.247	17126.687	0.07	5 L	Gd I	BL71	5882.361	16995.33		32	Se I	MO74
5839.077	17121.318		3 L	Th I	GI74	5882.648	16994.505		10	Kr I	KA69
5839.28	17120.72	0.25	1 L	Tm	CA69	5883.49	16992.074	0.10	3 L	Nd I	BL70
5839.70	17119.51	0.05	3 U	Hf I	GO70	5885.69	16985.72	0.02	15	Zr	TA76
5839.83	17119.1		28	Cl I	RA69	5888.80	16976.75		1	I I	LU75
5840.64	17116.75		10	Hg I	HU53	5889.674	16974.232	0.15	3 L	Sm I	BL69
5842.33	17111.77	0.05	5	Hf I	GO70	5890.092	16973.03		32	Se I	MO74
5842.96	17109.93		200	Hg I	HU53	5890.201	16972.71		133	Se I	MO74
5843.151	17109.38		4 L	Ce I	VE72	5890.230	16972.63		3 L	Ce	VE72
5843.396	17108.66	0.01	30	Mg I	RI65	5890.25	16972.57	0.02	66	Zr	TA76
5843.88	17107.246	0.07	5 L	Nd	BL70	5890.725	16971.20		2	Se I	MO74
5843.929	17107.10		8	Cm I	CO76	5891.169	16969.92	0.01	3	Fe I	LI76
5844.090	17106.63		4 L	Ce I	VE72	5892.557	16965.927	0.15	3 L	Sm I	BL69
5844.56	17105.25	0.02	2	Hf I	GO70	5893.03	16964.56	0.02	35	Zr	TA76
5846.777	17098.771		600 I	Kr I	KA69	5893.409	16963.474	0.15	3 L	Sm II	BL69
5847.22	17097.48	0.25	1 L	Tm I	CA69	5893.709	16962.61		3 L	Ce I	VE72
5848.65	17093.29	0.25	1 L	Tm I	CA69	5894.850	16959.33		23	Se I	MO74
5848.94	17092.447	0.08	4 L	Nd I	BL70	5895.43	16957.65	0.02	12	Zr	TA76
5852.795	17081.188	0.08	4 L	Gd I	BL71	5898.08	16950.04		1	I I	LU75
5852.949	17080.74		3 L	Ce II	VE72	5899.60	16945.7		3	Cl	RA69
5853.04	17080.47	0.20	4 W	Hf	GO70	5900.88	16942.00		150	Hg I	HU53
5853.614	17078.798		3 L	Th I	GI74	5900.92	16941.88	0.10	3 L	Tm II	CA69
5854.069	17077.47		5 L	Ce II	VE72	5901.07	16941.4		10	Cl I	RA69
5854.07	17077.47	0.20	1 L	Tm	CA69	5901.20	16941.07	0.02	190	Zr I	TA76
5854.241	17076.97		4 L	Ce II?	VE72	5901.372	16940.584		5000 I	Ar I	HU73
5854.241	17076.97		4 L	Ce II?	VE72	5901.47	16940.31	0.05	1	Hf	GO70
5854.659	17075.750		3 L	Th I	GI74	5902.018	16938.730		3 L	Th I	GI74
5855.68	17072.79		250	Hg I	HU53	5903.037	16935.808	0.08	4 L	Gd I	BL71
5856.629	17070.008		40	Kr I	KA69	5903.037	16935.806		1800 I	Kr I	KA69
5857.40	17067.75	0.02	160	Zr I	TA76	5903.21	16935.32	0.05	1	Hf I	GO70
5860.449	17058.88		7 L	Ce II	VE72	5903.53	16934.39	0.10	3 L	Tm	CA69
5863.22	17050.82	0.25	1 L	Tm	CA69	5903.92	16933.27		4	Hg I	HU53
5863.439	17050.180	0.06	6 L	Gd I	BL71	5904.472	16931.69		79	Se I	MO74
5863.68	17049.48	0.25	1 L	Tm I	CA69	5905.545	16928.61	0.01	1	Fe I	LI76
5864.498	17047.10		3 L	Ce I	VE72	5905.80	16927.88	0.05	4 U	Zr	TA76
5865.720	17043.55		3 W	Cm	CO76	5905.94	16927.48	0.25	1 L	Tm	CA69
5866.830	17040.325	0.08	4 L	Gd I	BL71	5908.22	16920.94	0.02	33	Zr I	TA76
5866.863	17040.230	0.12	4 L	Sm II	BL69	5908.50	16920.16		200	Hg I	HU53
5866.931	17040.03		3 W	Cm I	CO76	5909.47	16917.36	0.02	12	Zr	TA76
5867.583	17038.140	0.08	4 L	Gd I	BL71	5909.76	16916.54	0.25	1 L	Tm I	CA69
5867.96	17037.05		55	Ge I	HU64	5911.229	16912.337	0.10	3 L	Gd I	BL71
5869.046	17033.891	0.08	4 L	Gd I	BL71	5913.52	16905.79	0.25	1 L	Tm	CA69
5870.311	17030.220		3 L	Th II	GI74	5916.037	16898.592	0.15	3 L	Sm	BL69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
5916.388	16897.588	0.08	4 L	Gd I?	BL71	5967.08	16754.04	0.05	6 L	Tm I	CA69
5916.388	16897.588	0.08	4 L	Gd I?	BL71	5967.433	16753.05	0.10	1 W	Fe	LI76
5916.681	16896.752		1600 I	Kr I	KA69	5968.22	16750.84	0.05	3	Hf I	GO70
5916.71	16896.67	0.25	1 L	Tm I	CA69	5968.318	16750.56	0.01	12 L	Al I	ER63
5918.052	16892.84		7	Se I	MO74	5969.077	16748.433		5 L	Th I	GI74
5918.25	16892.26	0.10	2	Hf	GO70	5969.21	16748.07	0.02	1 L	In I	JO67
5918.289	16892.161	0.08	4 L	Gd I	BL71	5970.043	16745.724		50	Xe I	HU73
5918.892	16890.441		2400 I	Kr I	KA69	5972.056	16740.078		300	Ar I	HU73
5918.92	16890.38	0.02	50	C I	JO65	5972.084	16740.001	0.10	3 L	Gd I?	BL71
5919.023	16890.066		5 L	Th II	GI74	5972.084	16740.001	0.10	3 L	Gd I?	BL71
5919.325	16889.20		5	Se I	MO74	5973.502	16736.026	0.08	4 L	Gd I	BL71
5921.476	16883.069		40	Xe I	HU73	5974.351	16733.65		4	Cm I	CO76
5922.03	16881.48		50	Hg I	HU53	5974.858	16732.23		7	Cm I	CO76
5923.766	16876.543	0.15	3 L	Sm	BL69	5975.23	16731.19		1800	Br I	TE63
5925.400	16871.89		5 L	Ce I	VE72	5975.644	16730.028		3 L	Th I	GI74
5925.44	16871.8		18	Cl I	RA69	5976.06	16728.87	0.02	2	Hf	GO70
5926.989	16867.37		69	Se I	MO74	5976.315	16728.150		1500	Xe I	HU73
5927.278	16866.54		421	Se I	MO74	5976.900	16726.513		200	Kr I	KA69
5928.499	16863.07		5 L	Ce	VE72	5977.072	16726.032	0.10	3 L	Gd I	BL71
5928.860	16862.043	0.07	5 L	Gd I	BL71	5978.046	16723.31	0.01	2	Fe I	LI76
5929.002	16861.640		20	Ne I	HU73	5978.330	16722.51		7 L	Ce II	VE72
5929.547	16860.088		14	Ar I	HU73	5978.47	16722.13	0.02	4 U	Hf	GO70
5930.993	16855.979	0.07	5 L	Gd I	BL71	5979.550	16719.10	0.01	1	Fe I	LI76
5931.22	16855.33	0.25	1 L	Tm	CA69	5979.601	16718.96	0.01	11 L	Al I	ER63
5931.869	16853.488		1000 I	Kr I	KA69	5979.861	16718.23		4 L	Ce I	VE72
5932.07	16852.92	0.20	1 U	Hf I	GO70	5979.912	16718.088	0.10	3 L	Gd I	BL71
5933.442	16849.022	0.10	3 L	Gd II	BL71	5981.931	16712.444		3 L	Th I	GI74
5933.708	16848.27		2	Se I	MO74	5982.10	16711.973	0.10	3 L	Nd I	BL70
5934.515	16845.97		7	Cm I?	CO76	5983.20	16708.90	0.25	1 L	Tm	CA69
5934.515	16845.97		7	Cm I?	CO76	5984.726	16704.639		3 L	Th I	GI74
5934.595	16845.748	0.10	3 L	Gd I	BL71	5984.78	16704.50	0.02	7	Hf	GO70
5934.61	16845.70	0.02	8	Zr I	TA76	5986.643	16699.291		700	Ge I	HU64
5935.681	16842.666	0.15	3 L	Sm I	BL69	5987.45	16697.03	0.02	3	Hf	GO70
5936.121	16841.42		5	Cm I	CO76	5988.71	16693.53	0.25	1 L	Tm II	CA69
5936.18	16841.24	0.02	12	Zr	TA76	5989.21	16692.12	0.02	1 W	Hf I	GO70
5937.383	16837.84	0.01	1	Fe	LI76	5990.119	16689.60		8	Se I	MO74
5937.930	16836.28		6	Cm I	CO76	5990.935	16687.328	0.08	4 L	Gd I?	BL71
5938.546	16834.541		15	Xe I	HU73	5990.935	16687.328	0.08	4 L	Gd I?	BL71
5938.65	16834.25		15	Ne I	HU73	5991.77	16685.00	0.05	5 L	Tm I	CA69
5940.47	16829.08	0.02	5	Zr	TA76	5993.29	16680.77	0.02	29	Si I	LI65
5940.79	16828.18	0.02	3	Si I	LI65	5993.873	16679.15	0.01	1	Fe I	LI76
5941.263	16826.84		10	Se I	MO74	5993.90	16679.06	0.02	1 U	Hf I	GO70
5942.054	16824.602	0.10	3 L	Gd I	BL71	5996.072	16673.03		8	Cm I	CO76
5942.46	16823.45	0.05	3	Zr I	TA76	5996.67	16671.4		55	Cl I	RA69
5944.470	16817.76		275	Se I	MO74	5998.039	16667.56		7	Se	MO74
5945.87	16813.8		14	Cl I	RA69	5998.13	16667.30	0.05	3 U	Zr	TA76
5945.878	16813.78		2557	Se I	MO74	5998.791	16665.47	0.01	3	Fe	LI76
5945.91	16813.69	0.25	1 L	Tm I	CA69	6000.277	16661.35	0.10	1 W	Fe	LI76
5948.29	16806.964	0.10	3 L	Nd	BL70	6000.964	16659.44		1295	Se I	MO74
5949.635	16803.165	0.08	4 L	Gd I	BL71	6001.52	16657.89		10	Br I	TE63
5950.50	16800.7		10	Cl I	RA69	6002.48	16655.22	0.05	3 U	Zr	TA76
5950.878	16799.65	0.01	2	Fe I	LI76	6003.087	16653.55	0.01	2	Fe	LI76
5951.16	16798.86	0.25	1 L	Tm I	CA69	6003.925	16651.221	0.10	3 L	Gd	BL71
5953.498	16792.26		3 L	Ce II	VE72	6005.847	16645.89	0.01	3	Fe	LI76
5954.60	16789.15	0.25	1 L	Tm	CA69	6006.03	16645.39		3	I I	LU75
5954.615	16789.110		40 B	Ne I?	HU73	6006.058	16645.31		8	Cm I	CO76
5954.732	16788.771		40 B	Ne I?	HU73	6006.56	16643.92		70	Ge I	HU64
5956.028	16785.128		2000 I	Kr I	KA69	6007.059	16642.536	0.07	5 L	Gd I	BL71
5956.26	16784.47		1	I I	LU75	6009.11	16636.86	0.20	2	Hf I	GO70
5956.709	16783.21		3 L	Ce I	VE72	6009.817	16634.90		3	Cm I	CO76
5957.36	16781.37	0.02	7	Zr	TA76	6009.88	16634.724	0.10	3 L	Nd	BL70
5961.916	16768.550		6 L	Th I	GI74	6010.122	16634.054		25	Ne I	HU73
5963.763	16763.36	0.01	9 L	Al I	ER63	6010.68	16632.51	0.02	3 U	Hf I	GO70
5965.033	16759.789		1500	Ge I	HU64	6012.584	16627.24		6	Cm I	CO76
5965.06	16759.7		6	Cl	RA69	6012.80	16626.64		120	Ge I?	HU64
5965.93	16757.27	0.05	10	Hf I	GO70	6012.80	16626.64		120	Ge I?	HU64

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6013.002	16626.087	0.10	7 L	Gd I?	BL71	6058.88	16500.18	0.02	3	Hf	GO70
6013.002	16626.087	0.10	7 L	Gd I?	BL71	6059.477	16498.568	0.10	3 L	Gd I	BL71
6013.26	16625.37		10	Br I	TE63	6059.53	16498.42		1500	Yb II	ME67
6013.48	16624.8		4	Cl I	RA69	6060.86	16494.79	0.05	6	Hf I	GO70
6013.51	16624.682	0.10	3 L	Nd I	BL70	6061.897	16491.98	0.02		Zn I	JO68
6015.212	16619.98		5	Cm I	CO76	6062.098	16491.43		3	Se	MO74
6017.061	16614.87		3 L	Ce II	VE72	6063.842	16486.69	0.01	20	Fe I	LI76
6017.99	16612.30	0.05	2	Zr I	TA76	6065.028	16483.468	0.10	3 L	Gd I	BL71
6019.031	16609.433		60 B	Ne I?	HU73	6065.034	16483.45	0.02		Zn I	JO68
6019.909	16607.009		60 B	Ne I?	HU73	6066.504	16479.457	0.15	3 L	Sm I	BL69
6021.85	16601.657	0.10	3 L	Nd I	BL70	6067.28	16477.34	0.05	1	Hf	GO70
6022.687	16599.350		3 L	Th I	GI74	6068.240	16474.742		40	Ne I	HU73
6023.453	16597.23	0.02	3	S I	JA67	6068.31	16474.55	0.02	3	Hf	GO70
6023.617	16596.788	0.10	3 L	Gd I	BL71	6068.492	16474.06	0.01	2	Fe	LI76
6024.200	16595.18		7 L	Ce II	VE72	6068.98	16472.74		55	Ge I	HU64
6024.922	16593.191	0.01	7	S I	JA67	6069.49	16471.35	0.25	1 L	Tm I	CA69
6025.734	16590.956	0.02	4	S I	JA67	6070.362	16468.982		12	Ne I	HU73
6026.409	16589.099	0.08	4 L	Gd I	BL71	6071.116	16466.94	0.10	1 W	Fe	LI76
6026.875	16587.815		3 L	Th I	GI74	6071.470	16465.977	0.10	3 L	Gd I	BL71
6027.128	16587.118	0.01	7	S I?	JA67	6071.517	16465.851		70	Kr I	KA69
6027.128	16587.118	0.01	7	S I?	JA67	6072.061	16464.37		3	Cm I	CO76
6027.518	16586.046	0.08	4 L	Gd I	BL71	6072.25	16463.863	0.10	3 L	Nd	BL70
6028.02	16584.66		250	Br I	TE63	6073.296	16461.03		44	Te I	MO75
6030.943	16576.63	0.02	4	S I	JA67	6073.96	16459.23	0.10	1	Hf	GO70
6031.27	16575.728	0.10	3 L	Nd I	BL70	6074.69	16457.24	0.05	3	Zr I	TA76
6032.246	16573.044		70	Kr I	KA69	6075.547	16454.93	0.01	1	Fe I	LI76
6032.48	16572.40	0.25	1 L	Tm	CA69	6078.71	16446.37	0.10	10	Hf I	GO70
6035.139	16565.10		19	Se I	MO74	6079.272	16444.845	0.08	4 L	Gd I	BL71
6036.364	16561.74	0.01	2	Fe	LI76	6079.283	16444.82	0.01	13	Fe	LI76
6036.832	16560.457	0.07	5 L	Gd I	BL71	6080.583	16441.301	0.08	4 L	Gd	BL71
6037.14	16559.60		35	Ge I	HU64	6082.307	16436.64	0.01	2	Fe	LI76
6037.64	16558.240	0.10	3 L	Nd	BL70	6082.331	16436.575		400 I	Ar I	HU73
6039.008	16554.489		125	Xe I	HU73	6082.352	16436.52		1	I I	LU75
6039.923	16551.98	0.01	1	Fe	LI76	6082.418	16436.339		3 L	Th	GI74
6040.500	16550.400		250 B	Ar I?	HU73	6082.92	16434.98	0.02	1	Si I	LI65
6040.899	16549.306		250 B	Ar I?	HU73	6084.01	16432.04	0.25	1 L	I I	VE69
6042.25	16545.60	0.02	60	Zr I	TA76	6084.21	16431.499	0.08	4 L	Nd I	BL70
6042.369	16545.28		3 L	Ce I	VE72	6086.70	16424.77		140	Ge I?	HU64
6043.325	16542.665	0.01	25	S I	JA67	6086.70	16424.77		140	Ge I?	HU64
6043.778	16541.42	0.01	2	Fe I	LI76	6087.96	16421.39	0.10	1 U	Hf	GO70
6044.143	16540.424		5 L	Th I	GI74	6088.669	16419.467	0.06	5 L	Gd I	BL71
6044.610	16539.15	0.01	1	Fe	LI76	6088.87	16418.92		3	I I	LU75
6044.883	16538.399		3 L	Th I	GI74	6089.32	16417.70	0.05	2	Zr	TA76
6045.28	16537.314	0.07	5 L	Nd I	BL70	6091.133	16412.823		3 L	Th I	GI74
6047.258	16531.90	0.01	1	Fe	LI76	6093.034	16407.70	0.10	1 W	Fe	LI76
6048.658	16528.079		20	Ne I	HU73	6093.948	16405.242		80	Ne I	HU73
6049.982	16524.46	0.01	4	Fe I	LI76	6094.188	16404.60	0.10	2 W	Fe	LI76
6050.840	16522.12	0.01	1	Fe	LI76	6094.445	16403.90		3761	Te I	MO75
6051.279	16520.919		3 L	Th II	GI74	6094.640	16403.38	0.01	2	Fe	LI76
6051.664	16519.867		500	Ar I	HU73	6096.568	16398.19	0.01	4	Fe	LI76
6051.918	16519.17		85	Se I	MO74	6097.630	16395.336	0.06	6 L	Gd I	BL71
6052.068	16518.765		3 L	Th II	GI74	6097.967	16394.43	0.01	5	Fe	LI76
6052.406	16517.842	0.15	3 L	Gd I	BL71	6099.138	16391.281	0.08	4 L	Gd I	BL71
6052.635	16517.22	0.01	4	Fe I	LI76	6100.313	16388.12		4	Cm I	CO76
6053.125	16515.88		2	Se	MO74	6101.22	16385.7		7	Cl I	RA69
6053.63	16514.50		14	Ge I	HU64	6102.24	16382.950	0.08	4 L	Nd	BL70
6053.727	16514.24		3	Cm I	CO76	6102.497	16382.26	0.01	2	Fe	LI76
6053.74	16514.203	0.10	3 L	Nd	BL70	6102.76	16381.55	0.02	16	Si I	LI65
6053.957	16513.61		6	Cm I	CO76	6103.004	16380.898		6 L	Th II	GI74
6054.49	16512.16	0.25	1 L	Tm I	CA69	6103.30	16380.12	0.02	8	Si I	LI65
6056.637	16506.30	0.01	1	Fe	LI76	6103.66	16379.14	0.05	7 L	Tm I	CA69
6056.753	16505.99		5	Se I	MO74	6103.91	16378.47	0.20	2 L	Tm II	CA69
6057.031	16505.23	0.02		Zn I	JO68	6104.651	16376.48		7 L	Ce II	VE72
6057.37	16504.31	0.02	2 L	In I	JO67	6105.62	16373.87	0.01		Na I	JO61
6057.559	16503.791		4 L	Th I	GI74	6105.67	16373.746	0.07	5 L	Nd I	BL70
6058.26	16501.88	0.02	9	Zr	TA76	6107.642	16368.46		3 L	Ce I	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6111.60	16357.86	0.05	1	Hf	GO70	6165.90	16213.80		5	I I	LU75
6112.488	16355.482	0.08	4 L	Gd	BL71	6165.966	16213.55	0.01	1	Fe	LI76
6114.44	16350.26	0.10	1 U	Hf I	GO70	6166.564	16212.06	0.03	14 L	O I	ER68
6114.97	16348.844	0.10	3 L	Nd I	BL70	6167.366	16209.95		3	Cm I	CO76
6115.387	16347.729		20 B	Ne I?	HU73	6168.214	16207.72	0.01	3	Fe	LI76
6115.689	16346.920		5	Kr I	KA69	6168.51	16206.95		90	Ge I?	HU64
6115.689	16346.923		20 B	Ne I?	HU73	6168.51	16206.95		90	Ge I?	HU64
6117.183	16342.93		6	Se	MO74	6168.980	16205.71		8	Cm I	CO76
6118.14	16340.37	0.02	31	Zr I	TA76	6169.558	16204.19	0.01	1	Fe	LI76
6121.416	16331.63		3	Cm I	CO76	6169.604	16204.07		16	Ca I	RI68
6121.442	16331.56	0.01	1	Fe	LI76	6171.715	16198.53	0.01	7	Fe I	LI76
6121.68	16330.92		70	Ge I	HU64	6171.74	16198.5		259	Cl I	RA69
6123.031	16327.32		4 L	Ce II	VE72	6172.280	16197.04		21	Ca I	RI68
6124.096	16324.48	0.01	6	Fe I	LI76	6172.849	16195.551	0.12	4 L	Sm II	BL69
6126.274	16318.68	0.01	2	Fe I	LI76	6172.98	16195.20	0.02	31	Zr I	TA76
6126.996	16316.756	0.06	5 L	Gd I	BL71	6173.041	16195.05	0.01	2	Fe	LI76
6127.163	16316.31	0.01	8	Fe	LI76	6174.089	16192.30		2	I I	LU75
6127.439	16315.576	0.10	3 L	Gd	BL71	6174.550	16191.09		8	Cm I	CO76
6127.561	16315.249		50	Kr I	KA69	6175.01	16189.9		14	Cl I	RA69
6129.269	16310.703		3 L	Th I	GI74	6175.263	16189.22		4	Cm I	CO76
6130.425	16307.63		5	Cm I	CO76	6176.562	16185.81	0.01	1	Fe	LI76
6131.733	16304.149		3 L	Th I	GI74	6176.913	16184.89		4 W	Cm	CO76
6131.84	16303.865	0.05	5 L	Nd II	BL70	6178.441	16180.89	0.01	1	Fe	LI76
6132.242	16302.80		2	Se	MO74	6178.773	16180.023		90	Ar I	HU73
6134.211	16297.562	0.08	4 L	Gd I	BL71	6178.942	16179.58	0.01	1	Fe	LI76
6134.670	16296.344	0.15	3 L	Sm I	BL69	6179.12	16179.1		10	Cl I	RA69
6134.83	16295.91	0.05	220 W	Hf I	GO70	6180.243	16176.175	0.10	5 L	Sm II	BL69
6134.853	16295.86		2	Se I	MO74	6180.399	16175.766	0.07	5 L	Gd I	BL71
6135.015	16295.426	0.06	5 L	Gd I	BL71	6180.698	16174.98	0.01	1	Fe	LI76
6135.78	16293.4		15	Cl I	RA69	6182.120	16171.264	0.08	4 L	Gd I	BL71
6135.983	16292.86	0.01	2	Fe I	LI76	6183.754	16166.989	0.08	4 L	Gd I	BL71
6136.25	16292.14	0.02	15	Zr I	TA76	6184.511	16165.01	0.01	6	Fe	LI76
6137.739	16288.200		3	Ce III	LI72	6185.009	16163.71		6	Cm I	CO76
6138.50	16286.2		39	Cl I	RA69	6185.01	16163.71	0.02	60	Si I	LI65
6139.25	16284.2		7	Cl I	RA69	6185.155	16163.327		3 L	Th II	GI74
6140.112	16281.899	0.10	3 L	Gd I	BL71	6186.75	16159.15		90	Ge	HU64
6140.722	16280.282		3 L	Th I	GI74	6187.30	16157.72	0.01	5 LB	Be I	HO69
6141.381	16278.53		3	Cm I	CO76	6187.440	16157.36		22	Ca I	RI68
6142.28	16276.15	0.02	5	Hf	GO70	6187.736	16156.59	0.01	1	Fe I	LI76
6142.63	16275.23	0.25	1 L	Tm	CA69	6188.243	16155.26		16	Ca I	RI68
6143.071	16274.058	0.15	3 L	Sm II	BL69	6188.79	16153.84	0.10	3	Hf	GO70
6144.930	16269.133		3 L	Th II	GI74	6189.007	16153.27	0.01	5	Fe	LI76
6145.294	16268.170	0.12	4 L	Sm I	BL69	6189.964	16150.77		20	Ca I	RI68
6145.438	16267.79		3	Cm I	CO76	6191.00	16148.07		2	Se	MO74
6146.843	16264.070		16	Ar I	HU73	6191.179	16147.600		3 L	Th I	GI74
6147.58	16262.121	0.05	5 L	Nd II	BL70	6192.300	16144.678	0.15	3 L	Sm I	BL69
6150.78	16253.66		90	Br I	TE63	6192.821	16143.32		3 L	Ce II	VE72
6151.850	16250.834	0.08	4 L	Gd I	BL71	6193.346	16141.95		6	Cm II	CO76
6154.173	16244.70		14	Te I	MO75	6194.03	16140.17	0.10	8	Hf	GO70
6154.184	16244.670	0.01	650 B	B I	LI70	6194.072	16140.06		3 L	Ce	VE72
6155.26	16241.84	0.02	7	Si I	LI65	6194.740	16138.319	0.15	3 L	Sm I	BL69
6155.299	16241.73		3	Cm I	CO76	6195.298	16136.87		17	Ca I	RI68
6155.812	16240.375	0.01	400	B I	LI70	6197.388	16131.423	0.15	3 L	Sm II	BL69
6156.668	16238.115		3 L	Th I	GI74	6198.414	16128.750	0.01	87	Ce III	LI72
6157.47	16236.01	0.05	1	Hf	GO70	6198.881	16127.538	0.05	7 L	Gd I	BL71
6157.477	16235.98	0.01	2	Fe	LI76	6199.512	16125.90	0.01	4	Fe I	LI76
6158.601	16233.02		4 L	Ce	VE72	6200.758	16122.656		12	Ar I	HU73
6159.125	16231.64	0.01	2	Fe	LI76	6201.39	16121.00	0.02	3	Hf I	GO70
6160.255	16228.661	0.07	5 L	Gd I	BL71	6202.41	16118.37	0.05	2	Hf I	GO70
6160.451	16228.145		5 L	Tb I	KL70	6203.342	16115.94	0.01	1	Fe	LI76
6161.089	16226.46		7	Cm I	CO76	6203.763	16114.85		5	Cm I	CO76
6161.393	16225.66	0.01	1	Fe I	LI76	6204.346	16113.333	0.08	4 L	Gd I	BL71
6163.263	16220.740		3 L	Th I	GI74	6204.994	16111.649	0.10	3 L	Gd I	BL71
6163.81	16219.30	0.02	8	Zr I	TA76	6205.707	16109.798		5 L	Th I	GI74
6165.19	16215.68	0.02	11	Si I	LI65	6205.880	16109.350		3	Kr I	KA69
6165.45	16215.0		10	Cl I	RA69	6207.400	16105.405	0.15	3 L	Sm II	BL69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6208.543	16102.44	0.01	9	Fe	LI76	6259.632	15971.02		2	Se I	MO74
6210.072	16098.476		15	Ne I	HU73	6259.84	15970.5		283	Cl I	RA69
6211.49	16094.80	0.02	20	Si I	LI65	6259.93	15970.25	0.05	3	Zr I	TA76
6213.300	16090.111	0.07	5 L	Gd I	BL71	6260.45	15968.93	0.10	1	Hf	GO70
6215.29	16084.95	0.02	1	Hf	GO70	6260.942	15967.67	0.01	1	Fe I	LI76
6218.13	16077.6		129	Cl I	RA69	6262.034	15964.89	0.01	4	Fe I	LI76
6218.75	16076.01	0.10	1 W	Fe	LI76	6262.53	15963.63	0.10	1	Hf	GO70
6219.699	16073.56		5	Cm I	CO76	6263.722	15960.590	0.01	12	Ce III	LI72
6219.98	16072.83	0.10	1	Hf	GO70	6263.94	15960.04	0.02	40	Si I	LI65
6219.998	16072.786	0.08	4 L	Gd	BL71	6263.96	15960.0		735	Cl I	RA69
6220.073	16072.590		3 L	Th	GI74	6264.581	15958.40		6 L	Ce II	VE72
6220.525	16071.42		2	Se	MO74	6265.211	15956.790	0.01	80	Ce III	LI72
6220.526	16071.42	0.01	1	Fe	LI76	6265.91	15955.01		8	Br I	TE63
6221.32	16069.36	0.02	17	Zr	TA76	6266.132	15954.449		4 L	Th I	GI74
6222.10	16067.3		10	Cl I	RA69	6267.161	15951.830	0.10	3 L	Gd I	BL71
6222.37	16066.66	0.10	1	Hf	GO70	6268.51	15948.40		20	Br I	TE63
6224.79	16060.4		10	Cl I	RA69	6268.674	15947.980	0.15	3 L	Sm II	BL69
6224.94	16060.03	0.02	95	Si I	LI65	6271.081	15941.858	0.10	3 L	Gd I	BL71
6226.70	16055.48		1	Se I	MO74	6271.081	15941.86	0.01	2	Fe I	LI76
6227.38	16053.732	0.07	5 L	Nd II	BL70	6273.239	15936.374		4 L	Th II	GI74
6227.555	16053.281		1000	Xe I	HU73	6273.359	15936.069		3 L	Th I	GI74
6228.236	16051.526	0.08	4 L	Gd I	BL71	6274.800	15932.409		6 L	Th II	GI74
6228.279	16051.415		2	Kr I	KA69	6275.10	15931.64	0.05	5	Zr	TA76
6230.67	16045.25		1	I I	LU75	6276.18	15928.9		342	Cl I	RA69
6231.662	16042.70	0.01	1	Fe	LI76	6276.485	15928.13	0.01	1	Fe	LI76
6232.455	16040.66	0.01	7	Fe I	LI76	6277.418	15925.764		6	Kr I	KA69
6232.605	16040.273	0.12	4 L	Sm II	BL69	6277.694	15925.066	0.15	3 L	Sm I	BL69
6232.748	16039.905		100	Xe I	HU73	6278.851	15922.130		4 L	Th I	GI74
6233.287	16038.518		3 L	Th I	GI74	6278.981	15921.80		3 L	Ce I	VE72
6233.558	16037.82	0.01	1	Fe I	LI76	6279.042	15921.647	0.12	4 L	Sm I	BL69
6233.75	16037.33		150	I I	LU75	6279.445	15920.62	0.01	2	Fe	LI76
6234.16	16036.28	0.20	1	Hf	GO70	6280.338	15918.36		4 L	Ce I	VE72
6235.591	16032.59		6	Se	MO74	6280.75	15917.32		2	Se	MO74
6235.64	16032.47	0.25	1 L	Tm II	CA69	6282.138	15913.799		2	Ar I	HU73
6235.75	16032.18		2	Se	MO74	6282.71	15912.351	0.07	5 L	Nd	BL70
6236.012	16031.509	0.08	4 L	Gd I	BL71	6283.127	15911.29	0.01	5	Fe I	LI76
6236.37	16030.60	0.20	3	Hf	GO70	6283.50	15910.34	0.02	3	Hf	GO70
6238.56	16025.0		25	Cl I	RA69	6284.867	15906.889	0.08	4 L	Gd I	BL71
6239.416	16022.763		50 B	Ne I?	HU73	6285.205	15906.03	0.01	7	Fe I	LI76
6239.428	16022.732		50 B	Ne I?	HU73	6285.87	15904.35	0.10	2 W	Fe	LI76
6239.815	16021.739	0.07	5 L	Gd I?	BL71	6286.325	15903.201	0.08	4 L	Gd I	BL71
6239.815	16021.739	0.07	5 L	Gd I?	BL71	6286.987	15901.53	0.01	1	Fe	LI76
6239.86	16021.64	0.02	3 B	C I	JO65	6287.27	15900.80	0.02	125	Zr I	TA76
6241.38	16017.71	0.10	4	Hf	GO70	6287.42	15900.43	0.10	1	Hf	GO70
6242.437	16015.010	0.10	3 L	Gd I	BL71	6287.714	15899.687		240 I	Ar I	HU73
6244.533	16009.63	0.01	6	Fe	LI76	6287.767	15899.553		3 L	Th I	GI74
6244.864	16008.786	0.10	3 L	Gd I	BL71	6288.369	15898.03	0.10	1 W	Fe I	LI76
6245.012	16008.40		9	Cm I	CO76	6288.670	15897.270	0.15	3 L	Sm I	BL69
6245.049	16008.311		3 L	Th I	GI74	6289.482	15895.22	0.01	2	Fe	LI76
6245.137	16008.09	0.01	1	Fe	LI76	6290.362	15892.99	0.01	1	Fe	LI76
6245.663	16006.74	0.01	3	Fe I	LI76	6290.41	15892.87	0.05	2	Hf	GO70
6246.043	16005.763		4 L	Th I	GI74	6290.594	15892.41	0.01	2	Fe I	LI76
6246.42	16004.81	0.02	2	C I	JO65	6290.674	15892.21		2	Se	MO74
6246.565	16004.43		3	Cm I	CO76	6290.813	15891.854		3 L	Th I	GI74
6247.450	16002.16		3	Cm I	CO76	6290.928	15891.564		4 L	Th I	GI74
6249.183	15997.72	0.01	2	Fe I	LI76	6291.42	15890.32		2	Br I	TE63
6252.400	15989.491		400	Ar I	HU73	6292.18	15888.39	0.02	190	Si I	LI65
6253.180	15987.496	0.10	7 L	Gd I	BL71	6292.432	15887.77	0.01	1	Fe I	LI76
6255.834	15980.71	0.01	8	Fe	LI76	6293.76	15884.41	0.02	5	Si I	LI65
6256.295	15979.536		250	Xe I	HU73	6294.19	15883.3		277	Cl I	RA69
6256.89	15978.016	0.07	5 L	Nd II	BL70	6294.255	15883.164		40	Ar I	HU73
6257.00	15977.73		47	Br I	TE63	6295.674	15879.584	0.07	5 L	Gd I	BL71
6257.052	15977.60		3	Cm I	CO76	6296.124	15878.45	0.01	4	Fe I	LI76
6257.241	15977.12		6 L	Ce II	VE72	6296.423	15877.70		2	Se I	MO74
6258.41	15974.17	0.05	2	Hf I	GO70	6296.75	15876.87		45	Ge I	HU64
6259.30	15971.86		5	I I	LU75	6297.87	15874.04	0.02	30	Zr I	TA76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6299.57	15869.76		1	I	LU75	6341.653	15764.452	0.08	4 L	Gd I	BL71
6299.61	15869.7		2780	Cl I	RA69	6342.909	15761.33	0.10	1 W	Fe	LI76
6299.649	15869.56		3	Se	MO74	6343.07	15760.931	0.07	5 L	Nd I	BL70
6300.062	15868.52	0.01	9	Fe I	LI76	6343.928	15758.799	0.08	4 L	Gd I	BL71
6300.875	15866.476		5	Xe I	HU73	6343.94	15758.76	0.02	3	Zr I	TA76
6301.97	15863.72	0.10	1 W	Fe	LI76	6344.561	15757.23		9	Cm I	CO76
6305.122	15855.790	0.15	3 L	Sm I	BL69	6345.92	15753.85	0.05	6 L	Tm II	CA69
6307.814	15849.02		43	Te I	MO75	6346.912	15751.390	0.08	4 L	Gd I	BL71
6308.327	15847.733		3 L	Th I	GI74	6347.645	15749.57		5	Cm I?	CO76
6308.388	15847.580	0.01	80	Ce III	LI72	6347.645	15749.57		5	Cm I?	CO76
6310.021	15843.48		3 L	Ce I	VE72	6347.815	15749.15	0.01	1	Fe I	LI76
6310.79	15841.56	0.10	2	Hf	GO70	6347.880	15748.99	0.01	8	Mg I	RI65
6311.327	15840.20	0.01	1	Fe	LI76	6349.90	15743.97	0.02	15	Zr	TA76
6312.354	15837.62	0.01	1	Fe	LI76	6350.730	15741.92	0.01	5	Fe I	LI76
6312.476	15837.316	0.08	4 L	Gd I	BL71	6351.217	15740.71	0.01	6	Mg I	RI65
6313.345	15835.14	0.01	4	Fe	LI76	6351.816	15739.229		6 L	Tb I	KL70
6313.97	15833.58	0.02	7	Si I	LI65	6353.52	15735.00		50	Ge I	HU64
6314.540	15832.14		5 L	Ce	VE72	6353.560	15734.909		8	Ar I	HU73
6314.695	15831.752		7 L	Th I	GI74	6355.52	15730.1		1487	Cl I	RA69
6315.462	15829.83		6 L	Ce II?	VE72	6355.629	15729.79	0.01	1	Fe I	LI76
6315.462	15829.83		6 L	Ce I?	VE72	6358.133	15723.59	0.01	14	Fe I	LI76
6318.234	15822.884		2	Kr I	KA69	6358.36	15723.02	0.02	95	Zr	TA76
6318.242	15822.863	0.08	4 L	Gd I	BL71	6358.523	15722.628		5	Xe I	HU73
6318.263	15822.81	0.01	8	Fe I	LI76	6360.52	15717.7		4	Cl I	RA69
6318.705	15821.71	0.01	1	Fe	LI76	6362.006	15714.02		7	I I	LU75
6319.350	15820.089		120	Kr I	KA69	6362.358	15713.149		4 L	Th I	GI74
6319.739	15819.12	0.01	1	Fe	LI76	6362.659	15712.41		8	Cm I	CO76
6320.02	15818.4		193	Cl I	RA69	6364.21	15708.57	0.05	1	Hf	GO70
6320.05	15818.34	0.25	1 L	Tm I	CA69	6364.246	15708.488	0.10	3 L	Gd I	BL71
6320.132	15818.13	0.01	28	Fe I	LI76	6364.74	15707.35	0.05	9	Hf	GO70
6320.674	15816.777		18	Ar I	HU73	6365.351	15705.76		3 L	Ce I	VE72
6320.728	15816.64	0.01	1	Fe I	LI76	6366.41	15703.15	0.20	30 U	Hf	GO70
6321.187	15815.492		6 L	Th II	GI74	6367.157	15701.306		3 L	Th I	GI74
6322.59	15811.98	0.02	40	Zr	TA76	6367.901	15699.473	0.07	5 L	Gd I	BL71
6322.759	15811.56		3 L	Ce I	VE72	6367.99	15699.25	0.15	3 L	Tm I	CA69
6323.318	15810.16	0.01	2	Fe I	LI76	6368.49	15698.02	0.05	2	Zr	TA76
6323.97	15808.5		25	Cl I	RA69	6369.446	15695.663	0.08	4 L	Gd I	BL71
6325.39	15804.98		7	Br I	TE63	6369.798	15694.80		2	Se	MO74
6326.52	15802.161	0.05	5 L	Nd I	BL70	6370.621	15692.77	0.01	6	Fe I	LI76
6327.45	15799.84	0.05	7 L	Tm I	CA69	6370.995	15691.85	0.01	4	Fe	LI76
6327.72	15799.16	0.10	1	Hf	GO70	6373.197	15686.43	0.01	1	Fe I	LI76
6327.963	15798.56	0.01	2	Fe I	LI76	6374.65	15682.86	0.02	54	N I	ER61
6328.101	15798.21	0.01	1	Fe I	LI76	6374.90	15682.24		1	I I	LU75
6329.22	15795.42	0.10	2	Hf	GO70	6375.27	15681.3	0.02		Zn I	JO68
6330.065	15793.31		9	Cm I	CO76	6375.395	15681.018		180	Kr I	KA69
6330.127	15793.157		5	Ar I	HU73	6375.43	15680.92	0.02		Zn I	JO68
6330.348	15792.60		7	Cm I	CO76	6376.574	15678.12		5	Cm I	CO76
6330.59	15792.0		21	Cl I	RA69	6376.816	15677.52	0.01	2	Fe	LI76
6331.614	15789.447	0.12	4 L	Sm I	BL69	6377.368	15676.166		3 L	Th I	GI74
6331.74	15789.13		1	I I?	LU75	6377.75	15675.23		1	I I	LU75
6331.74	15789.13		1	I I?	LU75	6378.19	15674.15	0.15	3 L	Tm I	CA69
6331.793	15789.00	0.01	2	Fe	LI76	6379.73	15670.363	0.10	3 L	Nd	BL70
6333.498	15784.75		7 L	Ce II	VE72	6380.16	15669.307	0.10	3 L	Nd I	BL70
6336.02	15778.468	0.10	3 L	Nd I	BL70	6380.43	15668.6		7	Cl I	RA69
6336.764	15776.614		2	Ar I	HU73	6380.656	15668.09		3	Cm I	CO76
6337.784	15774.08	0.01	2	Fe	LI76	6381.813	15665.25	0.01	1	Fe	LI76
6338.246	15772.926	0.05	7 L	Gd I	BL71	6383.129	15662.02	0.01	9	Fe	LI76
6338.60	15772.05		5	I I	LU75	6384.00	15659.882	0.10	3 L	Nd	BL70
6338.682	15771.842		1	Kr I	KA69	6386.126	15654.667	0.08	4 L	Gd I	BL71
6338.98	15771.10	0.02	22	N I	ER61	6386.329	15654.17		4 L	Ce I	VE72
6339.175	15770.61	0.01	1	Fe	LI76	6386.33	15654.169	0.08	4 L	Nd	BL70
6339.42	15770.01	0.05	2	Hf	GO70	6386.33	15654.18	0.02	2	Hf	GO70
6339.656	15769.42	0.01	41	Fe I	LI76	6386.853	15652.89	0.01	1	Fe	LI76
6340.405	15767.555		3 L	Th II	GI74	6387.96	15650.174	0.10	3 L	Nd	BL70
6341.094	15765.84	0.01	10	Mg I	RI65	6388.51	15648.82	0.05	5	Zr	TA76
6341.32	15765.28		1	I I	LU75	6388.628	15648.54	0.01	4	Fe	LI76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6389.30	15646.892	0.10	3 L	Nd	BL70	6425.22	15559.40	0.20	20	Hf I	GO70
6391.055	15642.59		9	Cm I?	CO76	6425.45	15558.85	0.20	20	Hf I	GO70
6391.055	15642.59		9	Cm I?	CO76	6425.88	15557.81	0.02	7	Si I	LI65
6391.110	15642.46		5 L	Ce	VE72	6426.166	15557.128		150	Xe I	HU73
6391.566	15641.344		3 L	Th I	GI74	6426.855	15555.460		6	Ar I	HU73
6391.704	15641.006	0.08	4 L	Gd I	BL71	6426.914	15555.316	0.10	3 L	Gd I	BL71
6391.936	15640.438		5 L	Th II	GI74	6427.974	15552.75		6	Cm I?	CO76
6393.172	15637.41		8	Cm I	CO76	6427.974	15552.75		6	Cm I?	CO76
6393.276	15637.160		3 L	Th II	GI74	6428.417	15551.679		4 L	Th I	GI74
6393.962	15635.482		40 B	Kr I?	KA69	6428.93	15550.44	0.01	1	Fe	LI76
6394.726	15633.614		40 B	Kr I?	KA69	6429.48	15549.10	0.20	8 U	Hf	GO70
6395.01	15632.91	0.20	1 W	Hf	GO70	6430.561	15546.49		3	Cm I	CO76
6395.399	15631.97	0.01	25	Fe I	LI76	6430.669	15546.23		2430	Te I	m075
6396.17	15630.08	0.02	7	Zr I	TA76	6430.825	15545.857	0.08	4 L	Gd I	BL71
6396.582	15629.080	0.01	150	B I	LI70	6432.382	15542.09	0.01	3	Fe	LI76
6396.76	15628.64	0.20	6	Hf	GO70	6433.56	15539.25		3	Br I	TE63
6396.912	15628.272		3 L	Th I	GI74	6433.80	15538.67		1	I I	LU75
6397.562	15626.68		14	Se I	MO74	6435.335	15534.961	0.08	4 L	Gd I	BL71
6398.002	15625.611	0.06	7 L	Gd I	BL71	6435.634	15534.24	0.01	6	Fe I	LI76
6398.368	15624.715	0.01	70	B I	LI70	6436.668	15531.74	0.01	4	Fe I	LI76
6398.47	15624.47		24 B	Br I?	TE63	6437.911	15528.75		11	Se I	MO74
6398.60	15624.15		24 B	Br I?	TE63	6437.95	15528.65		106	I I	LU75
6399.039	15623.078	0.08	4 L	Gd I	BL71	6438.92	15526.31		22	I I	LU75
6399.616	15621.67	0.01	30	Fe I	LI76	6441.137	15520.97		703	Se I	MO74
6399.97	15620.80	0.10	1	Hf	GO70	6441.223	15520.76		6	Cm I	CO76
6400.033	15620.65		4	Te	MO75	6441.42	15520.3		1094	Cl I	RA69
6400.143	15620.38		135	Se I	MO74	6442.47	15517.75		44	Ge I	HU64
6400.957	15618.40		1550	Se I?	MO74	6442.499	15517.69		7	Te I	m075
6400.957	15618.40		1550	Se I?	MO74	6443.018	15516.436		6 L	Th I	GI74
6401.92	15616.05	0.10	1	Hf	GO70	6445.196	15511.194	0.15	3 L	Sm II	BL69
6402.29	15615.2		7	Cl I	RA69	6447.19	15506.40	0.10	20	Hf	GO70
6403.50	15612.19		1	I I	LU75	6448.05	15504.34		200	Ge I	HU64
6405.19	15608.1		18	Cl I	RA69	6449.3	15501.3	0.10	1 W	Fe	LI76
6405.52	15607.27	0.02	5	Zr I	TA76	6449.481	15500.887		20 B	Ne I?	HU73
6405.71	15606.81		48	Ge	HU64	6449.68	15500.41	0.05	3	Zr I	TA76
6406.001	15606.100	0.06	5 L	Gd I	BL71	6450.064	15499.487		20 B	Ne I?	HU73
6406.10	15605.86		2	I I	LU75	6451.46	15496.13	0.02	34	N I	ER61
6406.11	15605.83	0.20	1	Hf I	GO70	6453.610	15490.971		45	Xe I	HU73
6406.542	15604.781	0.08	4 L	Gd I	BL71	6453.676	15490.33	0.01	2	Fe I	LI76
6406.779	15604.20	0.01	3	Fe I	LI76	6455.684	15485.99		6	Cm I	CO76
6406.779	15604.203		30	Ne I	HU73	6455.78	15485.77		60	Ge I	HU64
6407.81	15601.693	0.08	4 L	Nd I	BL70	6456.92	15483.04	0.10	2	Hf	GO70
6408.78	15599.33		18	Br I	TE63	6458.40	15479.48	0.05	2	Zr	TA76
6408.995	15598.808		4 L	Th I	GI74	6458.746	15478.652	0.15	3 L	Sm II	BL69
6409.049	15598.676		4 L	Th I	GI74	6458.816	15478.485	0.01	145	S I	JA67
6409.197	15598.32		4	Cm I	CO76	6459.11	15477.8		15	Cl I	RA69
6410.181	15595.922	0.15	3 L	Sm I	BL69	6460.014	15475.615	0.01	35	S I	JA67
6411.38	15593.01		37	Br I	TE63	6460.677	15474.026		200	Kr I	KA69
6412.003	15591.49	0.01	6	Fe	LI76	6461.162	15472.846		3 L	Th I	GI74
6413.318	15588.29	0.01	2	Fe	LI76	6461.65	15471.70		2	I I	LU75
6414.579	15585.229		3 L	Th I	GI74	6461.942	15471.00		1031	Se I	MO74
6415.702	15582.50		40	I I	LU75	6462.436	15469.813	0.01	95	S I	JA67
6415.80	15582.27	0.02	200	N I	ER61	6462.753	15469.06		129	Se I	MO74
6415.92	15581.97	0.20	2 L	I I	VE69	6463.37	15467.6		169	Cl I	RA69
6416.46	15580.7		5	Cl I	RA69	6463.39	15467.51	0.10	2	Hf I	GO70
6417.09	15579.13	0.25	1 L	Tm I	CA69	6463.487	15467.299	0.15	3 L	Sm I	BL69
6417.59	15577.92	0.25	1 L	Tm II	CA69	6463.933	15466.232		10	Ne I	HU73
6418.139	15576.584		6 L	Th I	GI74	6464.42	15465.1		381	Cl I	RA69
6418.449	15575.83		7	Cm I	CO76	6469.696	15452.45		1480	Te I	m075
6418.457	15575.813	0.15	3 L	Sm II	BL69	6469.90	15451.967	0.10	3 L	Nd	BL70
6419.980	15572.117		4 L	Th I	GI74	6470.211	15451.225		40 B	Ne I?	HU73
6420.84	15570.03		219	Br I	TE63	6470.308	15450.992	0.05	7 L	Gd I	BL71
6421.055	15569.510		3 L	Th I	GI74	6470.351	15450.890		40 B	Ne I?	HU73
6421.36	15568.78	0.10	2	Hf I	GO70	6472.076	15446.772		10	Ar I	HU73
6422.740	15565.427	0.06	6 L	Gd I	BL71	6472.22	15446.42	0.10	1	Hf	GO70
6423.96	15562.46	0.05	8	Hf	GO70	6473.129	15444.26		3 L	Ce II	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6473.162	15444.18		2	Se	MO74	6512.59	15350.68	0.02	4	Hf	GO70
6473.239	15443.996	0.10	3 L	Gd	BL71	6513.06	15349.6			Pb I	AN68
6473.27	15443.92		2	Se	MO74	6513.195	15349.253		120 B	Ar I?	HU73
6473.54	15443.28	0.05	7	Hf	GO70	6513.508	15348.516		120 B	Ar I?	HU73
6474.85	15440.16	0.25	1 L	Tm I	CA69	6513.640	15348.21		3	Cm I	CO76
6474.867	15440.113		4 L	Th I	GI74	6513.647	15348.188		50	Ne I	HU73
6476.96	15435.1		27	Cl I	RA69	6514.15	15347.00		1	I I	LU75
6477.558	15433.700		4	Kr I	KA69	6514.461	15346.27		3 L	Ce II	VE72
6478.12	15432.36		2	I I	LU75	6515.516	15343.79	0.01	2	Fe I	LI76
6479.08	15430.07	0.20	3	Hf	GO70	6516.96	15340.39	0.10	4 L	Tm I	CA69
6479.202	15429.783		7 L	Th I	GI74	6518.29	15337.25	0.05	7 U	Zr I	TA76
6479.321	15429.50		4 L	Ce	VE72	6519.077	15335.40	0.01	16	Fe	LI76
6480.776	15426.036	0.10	3 L	Gd	BL71	6519.267	15334.958		1500 I	Kr I	KA69
6482.32	15422.36		28	Br I	TE63	6520.93	15331.0			Pb I	AN68
6482.365	15422.255	0.01	210 B	S I	JA67	6521.654	15329.344		150	Ar I	HU73
6483.28	15420.08	0.25	1 L	Tm	CA69	6521.917	15328.73		7	Cm I	CO76
6483.988	15418.394		2500 I	Xe I	HU73	6522.38	15327.6			Pb I	AN68
6484.97	15416.1		32	Cl I	RA69	6522.873	15326.480		130	Kr I	KA69
6485.20	15415.51		1	I I	LU75	6525.43	15320.5		7	Cl I	RA69
6485.279	15415.326	0.08	4 L	Gd II	BL71	6525.46	15320.40	0.15	3 L	Tm I	CA69
6487.917	15409.057		100 B	Ne I?	HU73	6526.563	15317.814		3 L	Th II	GI74
6488.534	15407.592		100 B	Ne I?	HU73	6526.89	15317.06	0.05	8	Hf	GO70
6489.452	15405.412	0.06	6 L	Gd I	BL71	6527.366	15315.929		5 L	Th II	GI74
6490.147	15403.762	0.01	130 B	S I	JA67	6527.85	15314.8			Pb I	AN68
6490.268	15403.476	0.06	7 L	Sm II	BL69	6529.30	15311.39		63	Br I	TE63
6490.620	15402.640		120	Ar I	HU73	6529.89	15310.01	0.02	7	Zr	TA76
6491.708	15400.057	0.01	75	S I	JA67	6530.29	15309.1		28	Cl I?	RA69
6492.979	15397.043	0.10	3 L	Gd	BL71	6530.29	15309.1		28	Cl I?	RA69
6493.40	15396.06	0.05	2	Hf	GO70	6530.61	15308.32	0.15	3 L	Tm I	CA69
6493.539	15395.72	0.01	6	Fe I	LI76	6531.046	15307.300		6 L	Th I	GI74
6493.79	15395.12	0.05	7 L	Tm I	CA69	6531.504	15306.23		14	Te	MO75
6493.980	15394.67	0.01	8	Fe	LI76	6531.662	15305.857	0.12	4 L	Sm II?	BL69
6494.43	15393.6		1	Cl	RA69	6531.662	15305.857	0.12	4 L	Sm I?	BL69
6495.09	15392.04	0.05	6	Zr I	TA76	6531.662	15305.857	0.12	4 L	Sm II?	BL69
6496.389	15388.962	0.10	5 L	Sm II	BL69	6532.25	15304.49	0.05	1	Hf I	GO70
6496.54	15388.61		40	Ge I	HU64	6533.321	15301.970		500 B	Ar I?	HU73
6496.71	15388.20	0.05	4 W	Zr	TA76	6533.359	15301.881		500 B	Ar I?	HU73
6497.67	15385.9		3	Cl	RA69	6533.501	15301.55	0.01	1	Fe I	LI76
6499.16	15382.40	0.20	2 L	Tm	CA69	6535.882	15295.973		I	Hg I	PE62
6499.20	15382.3		17	Cl I	RA69	6536.479	15294.58	0.01	94	Fe	LI76
6499.336	15381.98	0.01	1	Fe	LI76	6537.202	15292.89		4	Se	MO74
6499.556	15381.464	0.08	4 L	Gd I	BL71	6537.654	15291.827		5	Xe I	HU73
6499.80	15380.89		1	I I	LU75	6538.656	15289.48	0.01		Rb I	JO61
6500.02	15380.36	0.02	5	Zr	TA76	6538.897	15288.921		4 L	Th II	GI74
6501.026	15377.99		6	Cm I	CO76	6539.107	15288.43	0.01		Rb I	JO61
6501.043	15377.944	0.08	4 L	Gd I	BL71	6540.462	15285.26		3	Cm I	CO76
6501.49	15376.88	0.02	4	Si I	LI65	6540.54	15285.07		17	Ge I	HU64
6501.85	15376.04		2	I I	LU75	6540.78	15284.520	0.05	6 L	Nd	BL70
6501.96	15375.77		48	Ge	HU64	6541.013	15283.976	0.10	5 L	Sm I	BL69
6502.76	15373.9		23	Cl I	RA69	6541.270	15283.375	0.15	3 L	Gd I	BL71
6503.19	15372.86	0.05	3	Zr I	TA76	6541.968	15281.743		17	Kr I	KA69
6503.541	15372.037		700	Kr I	KA69	6542.28	15281.016	0.05	5 L	Nd I	BL70
6504.369	15370.081		30	Ne I	HU73	6543.721	15277.65		5 L	Ce II?	VE72
6504.779	15369.113	0.06	6 L	Gd I	BL71	6543.721	15277.65		5 L	Ce I?	VE72
6505.14	15368.260	0.05	5 L	Nd II	BL70	6544.54	15275.73	0.10	8 U	Zr I	TA76
6506.00	15366.23	0.20	2 L	Tm	CA69	6544.972	15274.730		3 B	Ar I?	HU73
6508.27	15360.87	0.10	2	Hf	GO70	6545.371	15273.799		3 B	Ar I?	HU73
6508.30	15360.8		3	Cl I	RA69	6545.66	15273.125	0.10	3 L	Nd	BL70
6508.535	15360.24	0.01	1	Fe	LI76	6547.07	15269.8		8	Cl I	RA69
6508.713	15359.82		1	I I	LU75	6547.47	15268.903	0.10	3 L	Nd	BL70
6508.76	15359.71		22	Br I	TE63	6548.526	15266.440		4 L	Th II	GI74
6509.511	15357.94		3 L	Ce II	VE72	6549.49	15264.193	0.10	3 L	Nd II	BL70
6510.463	15355.694		5 L	Th I	GI74	6550.01	15263.0		150	Cl I	RA69
6510.83	15354.829	0.05	7 L	Nd I	BL70	6550.76	15261.234	0.08	4 L	Nd	BL70
6511.551	15353.128		60	Ar I	HU73	6551.98	15258.39		10	Br I	TE63
6512.28	15351.4		2	Cl I	RA69	6553.193	15255.57		4	Cm I	CO76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6554.19	15253.25	0.25	1 L	Tm II	CA69	6598.85	15150.02		1	I I	LU75
6555.740	15249.64		16	Te I	MO75	6598.90	15149.901	0.10	3 L	Nd	BL70
6555.871	15249.34		7	Cm I	CO76	6600.10	15147.14	0.05	2	Zr I	TA76
6556.434	15248.03		13	Se I	MO74	6600.31	15146.66	0.02	75	N I	ER61
6557.750	15244.97	0.01	10	Fe I	LI76	6600.56	15146.09		30	Br I	TE63
6559.783	15240.242		7 L	Th II	GI74	6601.458	15144.03	0.01	2	Fe I	LI76
6559.87	15240.04		1	I I	LU75	6601.73	15143.41		1	I I	LU75
6560.053	15239.615		1700 I	Kr I	KA69	6602.54	15141.55	0.20	3 L	Tm I	CA69
6560.193	15239.289		4 L	Th I	GI74	6602.88	15140.76	0.02	13	Zr I	TA76
6561.49	15236.277	0.10	3 L	Nd I	BL70	6603.171	15140.101		50	Ne I	HU73
6563.428	15231.778	0.05	7 L	Gd I	BL71	6603.46	15139.43	0.05	7	Zr I	TA76
6563.887	15230.714		800	Ne I	HU73	6604.41	15137.26	0.05	1	Zr I	TA76
6564.518	15229.250	0.10	3 L	Gd I	BL71	6604.905	15136.13	0.01	1	Fe I	LI76
6566.04	15225.7		13	Cl I	RA69	6610.911	15122.38	0.01	4	Fe I	LI76
6566.470	15224.72	0.01	2	Fe	LI76	6611.35	15121.37		1	I I	LU75
6566.50	15224.65		1	I I	LU75	6611.713	15120.54	0.01	1	Fe I	LI76
6566.851	15223.84		30	Te I	MO75	6613.78	15115.816	0.08	4 L	Nd II	BL70
6567.526	15222.27		9	Cm I	CO76	6614.24	15114.765	0.10	3 L	Nd	BL70
6567.55	15222.22	0.15	2 L	Tm II	CA69	6617.18	15108.0		269	Cl I	RA69
6568.671	15219.62	0.01	10	Fe I	LI76	6618.19	15105.74		45	Ge I	HU64
6569.439	15217.84		4 L	Ce I	VE72	6619.188	15103.47		4	Cm I	CO76
6573.030	15209.526		140	Kr I	KA69	6619.70	15102.29	0.02	26	N I	ER61
6573.885	15207.55	0.01	28	Fe	LI76	6619.77	15102.14	0.25	1 L	Tm I	CA69
6574.34	15206.49	0.02	8 U	Zr I	TA76	6620.828	15099.725		100	Xe I	HU73
6574.689	15205.69		3 L	Ce II	VE72	6620.998	15099.336		4 L	Th I	GI74
6575.65	15203.5		15	Cl I	RA69	6622.92	15094.96	0.02	75	N I	ER61
6575.808	15203.103	0.08	4 L	Gd I?	BL71	6623.023	15094.72	0.01	3	Fe	LI76
6575.808	15203.103	0.08	4 L	Gd I?	BL71	6623.170	15094.390		4	Ce III	LI72
6576.177	15202.249	0.10	3 L	Gd I	BL71	6623.29	15094.1		48	Cl I	RA69
6577.172	15199.95		5	I I	LU75	6624.42	15091.54		42	Ge I	HU64
6577.30	15199.7		22	Cl I	RA69	6626.75	15086.23	0.10	1	Hf	GO70
6577.548	15199.08		3 L	Ce I	VE72	6627.155	15085.308		20 B	Ne I?	HU73
6579.013	15195.696	0.08	4 L	Gd I	BL71	6627.772	15083.904		20 B	Ne I?	HU73
6579.538	15194.48	0.01	2	Fe I	LI76	6627.888	15083.64	0.01	12	He I	LT70
6580.360	15192.585		70 B	Ne I?	HU73	6629.055	15080.985	0.15	3 L	Sm II	BL69
6580.720	15191.754		70 B	Ne I?	HU73	6630.018	15078.79		6	Te	MO75
6580.92	15191.29	0.05	1	Hf I	GO70	6630.682	15077.28	0.01	6	Fe I	LI76
6581.078	15190.928		70 B	Ne I?	HU73	6630.72	15077.198	0.08	4 L	Nd I	BL70
6581.143	15190.777		3 L	Th I	GI74	6631.373	15075.71		10	Te	MO75
6581.238	15190.558		70 B	Ne I?	HU73	6631.692	15074.990		40 B	Ne I?	HU73
6581.598	15189.727		70 B	Ne I?	HU73	6631.82	15074.70		18	I I	LU75
6581.976	15188.855		5 L	Th II	GI74	6632.052	15074.171		40 B	Ne I?	HU73
6582.86	15186.82		188 B	Br I?	TE63	6632.65	15072.81	0.10	5 L	Tm I	CA69
6583.46	15185.43		188 B	Br I?	TE63	6633.990	15069.766	0.10	7 L	Gd I	BL71
6583.52	15185.29		188 B	Br I?	TE63	6634.48	15068.7		1	Cl I	RA69
6584.09	15184.0		8	Cl I	RA69	6634.50	15068.61		10	I I	LU75
6584.98	15181.9		5	Cl I	RA69	6634.82	15067.88	0.02	140	Zr I	TA76
6585.63	15180.42	0.05	2	Zr	TA76	6635.19	15067.05	0.05	1	Hf	GO70
6586.04	15179.48		5	I I	LU75	6635.40	15066.564	0.10	3 L	Nd	BL70
6586.572	15178.26	0.01	1	Fe	LI76	6636.981	15062.98		7	Cm I	CO76
6586.803	15177.724		4	Ar I	HU73	6638.212	15060.181		10	Xe I	HU73
6588.283	15174.314		4	Ne I	HU73	6639.64	15056.95	0.20	3	Hf	GO70
6588.75	15173.24		1	I I	LU75	6641.40	15052.95		10	Br I	TE63
6588.988	15172.691		300	Ar I	HU73	6641.570	15052.567		12	Ar I	HU73
6589.565	15171.363	0.08	4 L	Gd I	BL71	6641.60	15052.50		1	I I	LU75
6590.85	15168.40	0.01		K I	JO61	6641.923	15051.77	0.01	37	Fe I	LI76
6592.285	15165.10		9	Se	MO74	6642.00	15051.6		4	Cl I	RA69
6592.87	15163.757	0.08	4 L	Nd II	BL70	6642.31	15050.88	0.02	80	N I	ER61
6592.93	15163.62	0.05	7 L	Tm I	CA69	6643.716	15047.70	0.01	25	Mg I	RI65
6593.16	15163.08	0.01		K I	JO61	6644.247	15046.503		700	Ar I	HU73
6593.478	15162.358	0.10	3 L	Gd I	BL71	6644.728	15045.413		3 L	Th I	GI74
6594.00	15161.2		145	Cl I	RA69	6645.10	15044.57		1	I	LU75
6597.438	15153.26		4	Cm I	CO76	6645.87	15042.82	0.02	20	Zr I	TA76
6597.541	15153.022	0.08	6 L	Sm	BL69	6646.081	15042.351	0.10	5 L	Sm II	BL69
6597.74	15152.57	0.05	5 L	Tm I	CA69	6646.59	15041.21		130	Ge I	HU64
6598.230	15151.44		2480	Se I	MO74	6647.012	15040.24	0.01	30	Mg I	RI65

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6647.016	15040.235	0.10	3 L	Gd I	BL71	6688.15	14947.7		43	Cl I	RA69
6647.626	15038.854	0.06	6 L	Gd I	BL71	6688.323	14947.35	0.01	1	Fe	LI76
6648.266	15037.406	0.10	3 L	Gd I	BL71	6689.619	14944.45		4 L	Ce	VE72
6648.41	15037.07	0.50	10	Hf	GO70	6689.64	14944.40	0.05	6 L	Tm I	CA69
6648.770	15036.267	0.12	4 L	Sm	BL69	6689.826	14943.987		6 L	Th I	GI74
6649.742	15034.068		3 L	Th II	GI74	6690.35	14942.81	0.02	23	Zr	TA76
6650.407	15032.57		225	I I	LU75	6691.362	14940.557	0.07	7 L	Gd I?	BL71
6651.023	15031.174		30 B	Ar I	HU73	6691.362	14940.557	0.07	7 L	Gd I?	BL71
6651.28	15030.59	0.02	30	Zr I	TA76	6691.391	14940.492		7 L	Th II	GI74
6651.315	15030.513		30 B	Ar I	HU73	6692.45	14938.1		108	Cl I	RA69
6652.45	15027.95		1	I	LU75	6694.910	14932.64		3 L	Ce	VE72
6653.02	15026.66	0.15	2 L	Tm I	CA69	6695.33	14931.7		294	Cl I	RA69
6653.470	15025.645	0.12	4 L	Sm II	BL69	6695.565	14931.179		20 B	Ne I?	HU73
6653.65	15025.23	0.20	7	Hf	GO70	6696.182	14929.803		20 B	Ne I?	HU73
6653.758	15024.99	0.01	35	Mg I	RI65	6696.244	14929.67		3 W	Cm	CO76
6655.171	15021.804		3 L	Th I	GI74	6696.519	14929.051		3 L	Th	GI74
6655.99	15019.957	0.15	3 L	Nd I	BL70	6696.773	14928.485		4 L	Th I	GI74
6656.800	15018.13		9	Cm I	CO76	6697.50	14926.86		1	I	LU75
6657.62	15016.28	0.10	2	Hf	GO70	6698.36	14925.0		7	Cl	RA69
6658.14	15015.10	0.05	3	Zr I	TA76	6699.04	14923.43		12	Br I	TE63
6660.36	15010.10	0.20	2 W	Hf	GO70	6699.505	14922.40		1	I I	LU75
6660.391	15010.031		3 L	Th I	GI74	6699.70	14921.97		160	Ge I	HU64
6661.204	15008.20		6	Cm I	CO76	6700.359	14920.495		3 L	Th II	GI74
6661.62	15007.26	0.02	6	Hf I	GO70	6701.099	14918.849	0.08	4 L	Gd I	BL71
6661.711	15007.057	0.15	3 L	Sm II	BL69	6701.117	14918.808	0.15	3 L	Sm II	BL69
6662.488	15005.307		120	Kr I	KA69	6701.18	14918.7		6	Cl I	RA69
6663.15	15003.82		35	Br I	TE63	6701.717	14917.47		1687	Se I	MO74
6664.07	15001.75		150	Ge I	HU64	6703.03	14914.35	0.20	3	Hf	GO70
6665.58	14998.35	0.05	1	Hf	GO70	6703.81	14912.81		18	Ge I	HU64
6666.34	14996.64	0.02	6 LB	Ga I	JO67	6704.190	14911.970	0.10	3 L	Gd I	BL71
6666.73	14995.760	0.10	3 L	Nd I	BL70	6705.90	14908.17	0.02	3	Hf	GO70
6667.03	14995.09	0.10	3 L	Tm I	CA69	6707.678	14904.216	0.06	7 L	Sm	BL69
6667.221	14994.654		3 L	Th I	GI74	6708.82	14903.02	0.02	4	Hf	GO70
6667.44	14994.17	0.02	1	Hf I	GO70	6708.98	14901.3		10	Cl I	RA69
6668.14	14992.58	0.05	4	Zr	TA76	6709.35	14900.50	0.20	1 L	Tm I	CA69
6668.43	14991.94		89	Br I	TE63	6709.54	14900.09	0.10	8	Hf	GO70
6669.38	14989.81	0.05	20	Hf I	GO70	6710.415	14898.136		2	Ar I	HU73
6669.913	14988.603		4 L	Th I	GI74	6710.697	14897.51		8	Se	MO74
6670.32	14987.7		29	Cl I	RA69	6711.21	14896.37		55	Br I	TE63
6670.933	14986.312		100 B	Ne I?	HU73	6713.03	14892.3		3	Cl I	RA69
6671.569	14984.882		4 L	Th I	GI74	6713.55	14891.19	0.02	2	Hf	GO70
6671.581	14984.856		100 B	Ne I?	HU73	6714.67	14888.70		1250	Br I	TE63
6672.18	14983.5		95	Cl I	RA69	6716.56	14884.50	0.05	1 W	Hf	GO70
6672.31	14983.22		65	Ge I	HU64	6718.69	14879.787	0.05	5 L	Nd I	BL70
6672.52	14982.75	0.02	5 L	Ga I	JO67	6719.25	14878.547	0.08	4 L	Nd II	BL70
6672.69	14982.36	0.02	30	Zr I	TA76	6719.668	14877.62	0.02	28 B	Mg I	RI65
6674.932	14977.332		3 L	Th I	GI74	6719.759	14877.420		11 B	Ar I	HU73
6676.164	14974.568		3	Ar I	HU73	6720.158	14876.537		11 B	Ar I	HU73
6676.440	14973.950		8	Kr I	KA69	6720.68	14875.38	0.02	23	Zr I	TA76
6678.50	14969.33		85 B	Br I?	TE63	6720.861	14874.98		5 L	Ce II	VE72
6678.729	14968.817	0.06	6 L	Gd I	BL71	6721.12	14874.40	0.20	3	Hf	GO70
6678.82	14968.61		85 B	Br I?	TE63	6723.33	14869.51		21	Ge I	HU64
6679.561	14966.953		6	Ar I	HU73	6723.62	14868.87	0.02	100	N I	ER61
6679.72	14966.60	0.02	180	N I	ER61	6724.53	14866.86	0.10	1	Hf	GO70
6679.870	14966.26		17	Te	MO75	6724.63	14866.64	0.02	20	Zr I	TA76
6681.820	14961.894		400	Kr I	KA69	6724.871	14866.111	0.12	4 L	Sm I?	BL69
6682.00	14961.48	0.05	140	Hf I	GO70	6724.871	14866.111	0.12	4 L	Sm I?	BL69
6683.63	14957.84	0.20	1 L	Tm I	CA69	6726.04	14863.5		5	Cl I	RA69
6683.792	14957.478	0.07	7 L	Gd I	BL71	6728.815	14857.398	0.08	4 L	Gd I	BL71
6684.199	14956.57	0.01	3	Fe	LI76	6729.07	14856.83	0.05	5	Zr	TA76
6684.387	14956.15	0.01	11	Fe I	LI76	6729.972	14854.843	0.10	3 L	Gd I	BL71
6684.75	14955.3		78	Cl I	RA69	6730.47	14853.74	0.05	1	Zr	TA76
6686.21	14952.07	0.02	15	N I	ER61	6731.753	14850.91		6	Cm I	CO76
6686.976	14950.36		3	Cm I?	CO76	6732.150	14850.038		20	Xe I	HU73
6686.976	14950.36		3	Cm I?	CO76	6733.12	14847.90		60	Ge	HU64
6687.30	14949.63		1	I I	LU75	6733.18	14847.77	0.25	1 L	I I	VE69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6734.206	14845.504	0.10	7 L	Gd I	BL71	6785.12	14734.10	0.02	7	Zr	TA76
6738.36	14836.35	0.05	5	Zr	TA76	6785.719	14732.805		3000 I	Xe I	HU73
6739.575	14833.677	0.08	4 L	Gd I	BL71	6786.135	14731.90		5	Cm I	CO76
6739.664	14833.480		5	Ar I	HU73	6786.38	14731.4		45	Cl I	RA69
6740.190	14832.32		6	Sc	MO74	6786.70	14730.68		1	I I	LU75
6741.148	14830.215		3 L	Th I	GI74	6787.14	14729.705	0.06	7 L	Gd I	BL71
6741.79	14828.80	0.25	1 L	Tm	CA69	6790.32	14722.8			Pb I	AN68
6742.870	14826.43	0.01	40	Fe I	LI76	6790.689	14722.02		8	Cm I	CO76
6744.31	14823.27	0.02	20	Hf	GO70	6791.767	14719.69	0.01	6	Fe	LI76
6744.714	14822.375		4700	Ge I	HU64	6791.832	14719.546		6	Ar I	HU73
6746.264	14818.969	0.15	3 L	Sm I	BL69	6792.05	14719.08	0.02	7 LB	In I	JO67
6746.738	14817.93		1001	Se I	MO74	6792.176	14718.799		5 L	Th I	GI74
6747.67	14815.89	0.20	3	Hf	GO70	6793.365	14716.220		2	Kr I	KA69
6748.191	14814.74	0.01	4	Fe I	LI76	6793.95	14714.95	0.02	47	Zr I	TA76
6748.416	14814.244	0.08	4 L	Gd I	BL71	6795.778	14710.997	0.10	3 L	Gd I	BL71
6748.849	14813.293	0.06	7 L	Sm II	BL69	6796.508	14709.42	0.01	2	Fe	LI76
6748.96	14813.06	0.10	20	Hf I	GO70	6797.42	14707.44	0.10	40 U	Zr	TA76
6749.051	14812.85		3 L	Ce II	VE72	6799.484	14702.98	0.01	11	Fe	LI76
6749.650	14811.534		10	Xe I	HU73	6800.88	14699.96	0.25	1 L	Tm I	CA69
6749.75	14811.32	0.25	1 L	Tm	CA69	6802.034	14697.469	0.10	3 L	Gd I	BL71
6749.99	14810.79	0.25	1 L	Tm	CA69	6802.908	14695.579		3 L	Th I	GI74
6750.04	14810.680	0.08	4 L	Nd I	BL70	6803.21	14694.93	0.01		Cs I	JO61
6750.11	14810.53	0.25	1 L	Tm	CA69	6803.48	14694.344	0.10	3 L	Nd II	BL70
6751.83	14806.7		82	Cl I	RA69	6803.786	14693.683		90 B	Ar I?	HU73
6751.965	14806.456		5 L	Th I	GI74	6804.08	14693.05	0.25	1 L	Tm I	CA69
6752.440	14805.415		3 L	Th I	GI74	6804.099	14693.007		90 B	Ar I?	HU73
6753.30	14803.53		1	I I	LU75	6804.358	14692.447	0.10	7 L	Gd I	BL71
6753.550	14802.982	0.10	3 L	Gd I	BL71	6805.500	14689.983	0.07	6 L	Gd I	BL71
6754.15	14801.67		1	I	LU75	6806.01	14688.88	0.02	4	Hf	GO70
6755.60	14798.5		5	Cl I	RA69	6807.117	14686.49		2	Te	MO75
6758.30	14792.58		2	I	LU75	6807.280	14686.14		19	Te I	MO75
6758.43	14792.3		50	Cl I	RA69	6807.973	14684.646		2 B	Ar I?	HU73
6761.046	14786.57		8	Cm I	CO76	6808.82	14682.8		6	Cl I	RA69
6761.277	14786.064		40 B	Ar I?	HU73	6809.187	14682.028		2 B	Ar I?	HU73
6761.590	14785.380		40 B	Ar I?	HU73	6809.64	14681.04	0.02	55	N I	ER61
6762.268	14783.897		8 B	Ar I?	HU73	6810.09	14680.08	0.02	3	Zr	TA76
6762.667	14783.025		8 B	Ar I?	HU73	6811.404	14677.249		5 L	Th I	GI74
6762.69	14782.98	0.02	4	C I	JO65	6813.755	14672.186	0.08	4 L	Gd I	BL71
6763.041	14782.207	0.07	5 L	Gd I	BL71	6813.87	14671.94		55	Ge I	HU64
6763.233	14781.79		7	Cm I	CO76	6815.39	14668.66	0.02	6 L	In I	JO67
6764.17	14779.75	0.01		Na I	JO61	6815.92	14667.52		125	Ge I	HU64
6765.785	14776.21		2	Se	MO74	6816.226	14666.866		2	Ar I	HU73
6767.13	14773.27	0.05	2	Hf I	GO70	6816.77	14665.696	0.05	6 L	Nd	BL70
6767.700	14772.031		3 L	Th I	GI74	6817.15	14664.88	0.02	7	Zr	TA76
6768.280	14770.77		15	Te I	MO75	6818.958	14660.991	0.07	5 L	Gd I	BL71
6768.494	14770.298	0.07	5 L	Gd I	BL71	6819.044	14660.806		140	Xe I	HU73
6769.76	14767.54	0.01		Na I	JO61	6821.785	14654.914		7 L	Th I	GI74
6770.706	14765.472		450	Kr I	KA69	6822.723	14652.90	0.01	2	Fe	LI76
6771.990	14762.672		550	Kr I	KA69	6822.836	14652.657	0.05	7 L	Gd I	BL71
6774.56	14757.07	0.02	300	N I	ER61	6823.11	14652.08	0.50	2	Hf	GO70
6774.763	14756.630		3 L	Th I	GI74	6823.383	14651.482		3 L	Th I	GI74
6776.699	14752.41	0.01		Rb I	JO61	6823.60	14651.02	0.01	1	Fe	LI76
6776.75	14752.30	0.20	2 L	Tm I	CA69	6823.912	14650.346		450	Ar I	HU73
6777.33	14751.05	0.02	80	Hf I	GO70	6824.76	14648.52	0.02	5	Zr I	TA76
6777.905	14749.79	0.10	2 W	Fe	LI76	6826.52	14644.75	0.02	5 LB	Be I	JH62
6778.977	14747.46		6	Cm I	CO76	6826.91	14643.92	0.02	6 L	Be I	JH62
6779.18	14747.016	0.08	4 L	Nd II	BL70	6827.979	14641.62		3 L	Ce II	VE72
6780.67	14743.78	0.20	2 L	Tm II	CA69	6828.50	14640.50		1	I I	LU75
6781.01	14743.0			Pb I	AN68	6829.508	14638.343	0.10	3 L	Gd I	BL71
6781.344	14742.310		25	Xe I	HU73	6830.12	14637.03	0.02	2	C I	JO65
6781.45	14742.1			Pb I	AN68	6831.299	14634.504		500 B	Ar I?	HU73
6781.795	14741.329		5 L	Th I	GI74	6831.341	14634.414		500 B	Ar I?	HU73
6782.803	14739.139		75	Ar I	HU73	6831.374	14634.343	0.10	3 L	Gd I	BL71
6783.18	14738.33	0.02	2	Hf	GO70	6831.961	14633.086		3 L	Th II	GI74
6783.516	14737.59	0.01	2	Fe I	LI76	6834.395	14627.874		4 L	Th II	GI74
6784.968	14734.436		1600 I	Kr I	KA69	6834.921	14626.75		5	Cm I	CO76

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6835.059	14626.455	0.08	4 L	Gd I	BL71	6886.195	14517.839		100	Kr I	KA69
6835.11	14626.3		9	Cl I	RA69	6887.521	14515.04		76	Te I	MO75
6836.937	14622.436	0.06	7 L	Sm II	BL69	6888.247	14513.51		1052	Te I	MO75
6838.555	14618.976		7 L	Th I	GI74	6888.859	14512.23	0.01	72	Fe	LI76
6838.910	14618.218	0.10	3 L	Gd I	BL71	6890.57	14508.6		16	Cl I	RA69
6839.35	14617.278	0.05	6 L	Nd	BL70	6891.08	14507.55	0.05	5 L	Tm I	CA69
6843.07	14609.33	0.05	4 L	Tm I	CA69	6892.03	14505.56	0.20	110	Hf	GO70
6843.65	14608.093	0.05	5 L	Nd	BL70	6892.35	14504.88	0.50	1	Hf	GO70
6843.79	14607.80		21	Br I	TE63	6892.791	14503.95		4	Te I	MO75
6845.27	14604.64	0.02	27	N I	ER61	6893.049	14503.404		10	Xe I	HU73
6845.775	14603.558		3 L	Th I	GI74	6893.129	14503.235		6 L	Th II	GI74
6845.89	14603.31	0.10	3 L	Tm I	CA69	6894.703	14499.925		4	Ne I	HU73
6847.57	14599.73		338	Br I	TE63	6895.692	14497.84	0.01	5	Fe	LI76
6848.18	14598.42	0.02	17	N I	ER61	6895.90	14497.4		60	Cl I	RA69
6849.099	14596.471		300 B	Ar I?	HU73	6896.280	14496.609	0.10	3 L	Gd I	BL71
6849.445	14595.733		300 B	Ar I?	HU73	6897.96	14493.078	0.10	3 L	Nd II	BL70
6849.76	14595.07	0.05	3	Hf	GO70	6898.573	14491.79		9	Te I	MO75
6853.577	14586.94		7	Cm I	CO76	6899.42	14490.01	0.20	2 L	Tm I	CA69
6853.97	14586.098	0.05	6 L	Nd I	BL70	6900.28	14488.21		105	Br I	TE63
6854.54	14584.88	0.02	13	Zr	TA76	6900.66	14487.40	0.05	4	Hf	GO70
6854.77	14584.40	0.05	8	Hf I	GO70	6901.77	14485.08	0.05	5 L	Tm I	CA69
6856.02	14581.73	0.02	28	Zr	TA76	6903.05	14482.39	0.05	6 L	Tm I	CA69
6856.11	14581.545	0.05	5 L	Nd II	BL70	6906.176	14475.836		4 L	Th I	GI74
6856.730	14580.23		9	Cm I	CO76	6906.674	14474.79		7	Cm I	CO76
6856.74	14580.21	0.05	7	Hf	GO70	6908.18	14471.637	0.10	3 L	Nd	BL70
6856.961	14579.735		6 L	Th II	GI74	6908.741	14470.462	0.06	7 L	Sm	BL69
6858.032	14577.458		15	Ar I	HU73	6910.00	14467.82	0.05	1 W	Hf	GO70
6858.35	14576.8		3	Cl I	RA69	6911.670	14464.330	0.10	7 L	Gd I	BL71
6858.68	14576.08	0.05	4 L	Tm I	CA69	6913.741	14460.00		100	I I	LU75
6859.98	14573.31	0.10	2	Hf	GO70	6914.190	14459.06		5	I I	LU75
6861.378	14570.349		3 L	Th I	GI74	6914.43	14458.56		1	I I	LU75
6861.618	14569.840		400	Ge I?	HU64	6916.31	14454.62	0.02	29	N I	ER61
6861.618	14569.840		400	Ge I?	HU64	6917.682	14451.758		4 L	Th I	GI74
6862.32	14568.35	0.05	4 L	Tm I	CA69	6918.31	14450.4		95	Cl I	RA69
6863.04	14566.82	0.02	33	Zr	TA76	6920.198	14446.50	0.01	1	Fe	LI76
6863.448	14565.95	0.01	14	Fe	LI76	6921.001	14444.828		4	Ar I	HU73
6864.19	14564.38	0.10	4 L	Tm	CA69	6921.54	14443.71			Hf	GO70
6864.646	14563.41		9	Cm I	CO76	6922.220	14442.28	0.01	20	Fe	LI76
6865.00	14562.66	0.02	15	Zr I	TA76	6922.24	14442.24	0.02	13	C I	JO65
6866.70	14559.06		1	I I	LU75	6923.629	14439.35	0.01	2	Fe I	LI76
6867.475	14557.42		8	Cm I	CO76	6923.73	14439.14		344	Br I	TE63
6867.668	14557.004		4 L	Th II	GI74	6923.891	14438.799		3 L	Th I	GI74
6867.698	14556.94		6 L	Ce II	VE72	6924.48	14437.58			Hf	GO70
6867.83	14556.7		25	Cl I	RA69	6924.484	14437.56	0.01	3	Fe I	LI76
6868.001	14556.299	0.07	7 L	Gd I	BL71	6925.11	14436.3		13	Cl I	RA69
6868.586	14555.06	0.01	50	Fe	LI76	6927.46	14431.361	0.10	3 L	Nd	BL70
6868.763	14554.68		129	Te I	MO75	6928.30	14429.61	0.02	18	Zr I	TA76
6869.583	14552.95		26	Te I	MO75	6928.58	14429.03	0.02	12	C I	JO65
6869.627	14552.85	0.01	2	Fe	LI76	6929.653	14426.793		2000 I	Kr I	KA69
6871.66	14548.55	0.02	20	N I	ER61	6929.770	14426.55		1	I I	LU75
6872.67	14546.41	0.10	5	Hf I	GO70	6930.737	14424.537		7 L	Th I	GI74
6872.71	14546.325	0.05	5 L	Nd II	BL70	6930.905	14424.187		15	Xe I	HU73
6873.719	14544.19		7	Cm I	CO76	6932.86	14420.12	0.02	61	C I	JO65
6874.27	14543.02	0.02	65	Zr I	TA76	6932.885	14420.067	0.10	3 L	Gd I	BL71
6874.52	14542.50	0.02	179	C I	JO65	6933.172	14419.47		2	Se	MO74
6874.83	14541.8		3	Cl	RA69	6933.30	14419.20	0.02	3 L	In I	JO67
6875.05	14541.37	0.10	9	Hf	GO70	6934.138	14417.46		220	Te I	MO75
6877.49	14536.21	0.10	120	Hf	GO70	6934.610	14416.48		3 L	Ce II	VE72
6878.813	14533.419		4 L	Th I	GI74	6936.508	14412.536		4 L	Th I	GI74
6880.25	14530.38	0.05	5 L	Tm I	CA69	6937.20	14411.11		39	Ge I	HU64
6880.84	14529.1		4	Cl I	RA69	6939.44	14406.447	0.05	5 L	Nd I	BL70
6883.384	14523.768	0.10	7 L	Gd I	BL71	6940.05	14405.18		38	Ge I	HU64
6883.455	14523.62	0.01	2	Fe I	LI76	6940.567	14404.11		1	I I	LU75
6883.84	14522.81	0.02	36	N I	ER61	6940.97	14403.27			Hf	GO70
6883.95	14522.58	0.20	130	Hf I	GO70	6940.98	14403.25	0.02	16	C I	JO65
6884.183	14522.08		3	Cm I	CO76	6941.476	14402.222		180	Kr I	KA69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
6942.277	14400.56	0.01	96	Fe	LI76	7010.170	14261.091	0.15	3 L	Sm I	BL69
6942.72	14399.65	0.02	38	C I	JO65	7010.68	14260.05			Hf	GO70
6948.244	14388.19		6	Se	MO74	7011.078	14259.243		5 L	Th I	GI74
6949.70	14385.18	0.05	4	Zr	TA76	7011.758	14257.86		7 L	Ce II	VE72
6949.749	14385.078	0.06	6 L	Gd I	BL71	7012.246	14256.868		450 B	Ar I?	HU73
6949.805	14384.961		35	Xe I	HU73	7012.302	14256.76		3	Se	MO74
6949.82	14384.9		4	Cl I	RA69	7012.78	14255.8		3	Cl I	RA69
6952.46	14379.47		6	I I	LU75	7013.242	14254.844		450 B	Ar I?	HU73
6955.13	14373.948	0.07	4 L	Nd II	BL70	7013.306	14254.713		5 L	Th I	GI74
6956.53	14371.06	0.15	2 L	Tm	CA69	7013.588	14254.140		450 B	Ar I?	HU73
6957.18	14369.7		148	Cl I	RA69	7015.001	14251.27	0.01	3	Fe I	LI76
6957.743	14368.55		5	Te I	MO75	7015.64	14249.972	0.10	3 L	Nd I	BL70
6959.468	14364.987		375	Xe I	HU73	7016.023	14249.193		120	Ar I	HU73
6960.68	14362.49			Hf	GO70	7018.820	14243.52		4	Cm I	CO76
6962.933	14357.839		3 L	Th I	GI74	7020.080	14240.959		800	Xe I	HU73
6964.215	14355.20		76	Te I	MO75	7022.404	14236.25	0.01	30	Fe	LI76
6964.39	14354.84	0.25	1 L	Tm	CA69	7022.533	14235.984	0.10	3 L	Gd I	BL71
6964.52	14354.57		1800	Br I	TE63	7022.885	14235.27		9	Cm I	CO76
6965.100	14353.371		4	Ne I	HU73	7024.831	14231.327		4 L	Th I	GI74
6966.60	14350.28		1	I I	LU75	7025.24	14230.499	0.05	5 L	Nd II	BL70
6967.562	14348.300	0.06	5 L	Gd I	BL71	7025.69	14229.59	0.05	4 L	Tm II	CA69
6968.620	14346.122	0.15	3 L	Sm I	BL69	7028.19	14224.54	0.02	6	Si I	LI65
6970.010	14343.260		6 L	Th II	GI74	7028.699	14223.495	0.06	4 L	Gd I	BL71
6970.543	14342.163		18	Ne I	HU73	7029.65	14221.57	0.02	5	Zr	TA76
6971.315	14340.576		30	Kr I	KA69	7029.69	14221.5		2	Cl I	RA69
6971.73	14339.72	0.05	4 L	Tm I	CA69	7029.76	14221.36	0.02	2	Si I	LI65
6973.165	14336.77		73	Te I	MO75	7032.93	14215.0		5	Cl I	RA69
6973.667	14335.74		434	Te I	MO75	7033.50	14213.79		1	I I	LU75
6974.260	14334.52		9	Cm I	CO76	7035.93	14208.878	0.05	6 L	Nd	BL70
6974.793	14333.42		93	Te I	MO75	7041.19	14198.3		48	Cl I	RA69
6975.06	14332.88	0.01	25	Gd III	LI73	7041.25	14198.14		2	Se I	MO74
6975.782	14331.39	0.01	2	Fe	LI76	7041.266	14198.110	0.06	5 L	Gd I	BL71
6975.99	14330.96			Hf	GO70	7043.536	14193.54		6	Cm I	CO76
6977.29	14328.29	0.02	92	Zr I	TA76	7044.063	14192.472		1	Ar I	HU73
6977.69	14327.474	0.05	5 L	Nd II	BL70	7044.137	14192.323		4 L	Th I	GI74
6983.16	14316.25	0.02	6 L	In I	JO67	7044.671	14191.247	0.06	6 L	Gd I	BL71
6984.07	14314.39	0.15	2 L	Tm I	CA69	7044.88	14190.82			Hf I	GO70
6984.262	14313.992		4 L	Th I	GI74	7044.90	14190.78	0.02	8	Zr	TA76
6984.64	14313.21	0.02	80	N I	ER61	7046.56	14187.45		20	Ge I	HU64
6985.13	14312.21	0.02	30	Zr I	TA76	7046.967	14186.624	0.08	7 L	Gd I	BL71
6986.84	14308.69	0.01	16	Fe I	LI76	7047.76	14185.028	0.05	5 L	Nd I	BL70
6987.062	14308.256	0.06	6 L	Gd I	BL71	7047.909	14184.728	0.12	4 L	Sm II	BL69
6990.690	14300.830		20	Ne I	HU73	7049.50	14181.53		1	I I	LU75
6991.358	14299.465		3 L	Tb I	KL70	7051.870	14176.760	0.08	7 L	Gd I	BL71
6992.30	14297.5		2	Cl I	RA69	7051.95	14176.60		15	I I	LU75
6992.489	14297.151		425	Ge I	HU64	7052.159	14176.18		5 L	Ce II	VE72
6992.580	14296.96		12	Te I	MO75	7052.159	14176.18		5 L	Ce I	VE72
6993.429	14295.230	0.06	6 L	Gd I	BL71	7052.889	14174.712		8	Ar I	HU73
6993.896	14294.27	0.01	3	Fe	LI76	7052.992	14174.505	0.06	7 L	Sm	BL69
6994.33	14293.388	0.10	3 L	Nd II	BL70	7053.33	14173.8		11	Cl I	RA69
6994.824	14292.38	0.01	14	Fe	LI76	7053.40	14173.69		2	Se I	MO74
6994.91	14292.20		68 B	Br I?	TE63	7055.672	14169.120	0.08	7 L	Gd I	BL71
6994.97	14292.1		73	Cl I	RA69	7055.896	14168.671		7 L	Th I	GI74
6995.51	14290.98		68 B	Br I?	TE63	7056.937	14166.58		4 L	Ce I	VE72
6997.448	14287.02		200	I I	LU75	7058.08	14164.28	0.02	270	Zr I	TA76
6997.537	14286.837	0.05	7 L	Gd I	BL71	7058.31	14163.82			Hf	GO70
6998.25	14285.39			Hf I	GO70	7058.34	14163.765	0.07	4 L	Nd II	BL70
6998.385	14285.11	0.01	24	Fe	LI76	7058.71	14163.0		1	Cl	RA69
6999.030	14283.79		3 L	Ce	VE72	7059.972	14160.491		7 L	Tb I	KL70
7000.403	14280.988	0.08	4 L	Gd I	BL71	7062.080	14156.264		50	Kr I	KA69
7003.329	14275.02		3	Se	MO74	7062.577	14155.268	0.10	3 L	Gd I	BL71
7003.59	14274.490	0.07	5 L	Nd II	BL70	7062.60	14155.222	0.10	3 L	Nd I?	BL70
7004.80	14272.02		36	I I	LU75	7062.60	14155.222	0.10	3 L	Nd I?	BL70
7005.689	14270.213	0.10	7 L	Gd I	BL71	7062.868	14154.68		3	Se I	MO74
7009.748	14261.950	0.12	4 L	Sm I	BL69	7064.15	14152.12			Hf	GO70
7009.902	14261.64		8	Cm I	CO76	7064.338	14151.74		4 L	Ce I	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7067.387	14145.63		7	Se	MO74	7130.209	14021.001	0.12	4 L	Sm II	BL69
7068.981	14142.444		1250 I	Xe I	HU73	7130.911	14019.620	0.01	30	S I	JA67
7070.320	14139.77		2	Te I	MO75	7131.386	14018.69		6	Cm I?	CO76
7071.80	14136.81		1	I I	LU75	7131.386	14018.69		6	Cm I?	CO76
7071.93	14136.55	0.20	2 L	Tm I	CA69	7134.064	14013.425	0.08	4 L	Gd I	BL71
7073.33	14133.76			Hf	GO70	7134.16	14013.236	0.15	3 L	Nd I	BL70
7074.368	14131.675	0.10	3 L	Gd I	BL71	7134.532	14012.505	0.02	1	S I	JA67
7075.22	14129.97	0.05	20	Zr	TA76	7137.178	14007.31	0.01	10	Fe	LI76
7075.31	14129.8		14	Cl I	RA69	7137.50	14006.68	0.02	82	Zr I	TA76
7076.172	14128.073		50	Xe I	HU73	7138.66	14004.40	0.02	80	Zr	TA76
7077.229	14125.96		6	I I	LU75	7139.51	14002.74			Hf I	GO70
7078.946	14122.54		3	Te I	MO75	7140.095	14001.588	0.05	7 L	Gd I	BL71
7078.99	14122.4		4	Cl I	RA69	7142.61	13996.66	0.20	1 L	Tm II	CA69
7079.76	14120.91	0.05	5	Zr	TA76	7143.538	13994.84		4 L	Ce II?	VE72
7080.012	14120.41		3 L	Ce I?	VE72	7143.538	13994.84		4 L	Ce I?	VE72
7080.012	14120.41		3 L	Ce I?	VE72	7143.71	13994.50	0.20	2 L	Tm II	CA69
7081.200	14118.04		2	Se	MO74	7144.575	13992.808		30	Ar I	HU73
7081.874	14116.697		425	Ge I	HU64	7146.220	13989.59		30	Te I	MO75
7082.456	14115.54		2	Se	MO74	7149.279	13983.60		28	Se I	MO74
7084.31	14111.84			Hf	GO70	7149.42	13983.3		4	Cl	RA69
7086.00	14108.48		2	Se	MO74	7150.032	13982.130		4	Ce III?	LI72
7086.92	14106.64	0.02	55	Zr I	TA76	7150.032	13982.130		4	Ce III?	LI72
7086.94	14106.61	0.25	1 L	I II	VE69	7152.07	13978.1		120	Cl I	RA69
7087.44	14105.61	0.05	6 L	Tm I	CA69	7153.202	13975.932		4 L	Th I	GI74
7087.484	14105.52		2	Se I	MO74	7153.413	13975.520		150 B	Kr I?	KA69
7088.100	14104.297		140	Kr I	KA69	7153.418	13975.51		4 L	Ce II	VE72
7088.960	14102.59		7	Cm I	CO76	7153.82	13974.725	0.10	3 L	Nd	BL70
7089.558	14101.396		3 L	Th I	GI74	7154.177	13974.027		150 B	Kr I?	KA69
7090.051	14100.416	0.05	7 L	Gd I	BL71	7154.96	13972.50	0.05	4 L	Tm I	CA69
7092.182	14096.18	0.01		La III	JO71	7154.97	13972.5		1	Cl I	RA69
7093.460	14093.640		2000	Ar I	HU73	7155.48	13971.48			Hf	GO70
7093.575	14093.41		5	Se I	MO74	7155.486	13971.472	0.15	3 L	Sm II	BL69
7094.07	14092.428	0.15	3 L	Nd	BL70	7155.57	13971.31	0.20	275	Zr I	TA76
7094.22	14092.13	0.25	1 L	Tm I	CA69	7156.10	13970.27	0.20	1 L	I I?	VE69
7095.168	14090.246		7 L	Th I	GI74	7156.10	13970.27	0.20	1 L	I I?	VE69
7097.016	14086.577		80 B	Kr I?	KA69	7158.58	13965.43			Hf	GO70
7098.133	14084.362		80 B	Kr I?	KA69	7158.590	13965.413	0.06	6 L	Gd I	BL71
7098.98	14082.68			Hf	GO70	7159.244	13964.14		9	Cm I	CO76
7100.154	14080.353	0.10	3 L	Gd I	BL71	7159.35	13963.931	0.07	5 L	Nd II	BL70
7100.423	14079.818		5 L	Th I	GI74	7160.51	13961.67	0.20	1 L	Tm II	CA69
7101.08	14078.51		10	Br I	TE63	7160.62	13961.5		19	Cl I	RA69
7102.859	14074.99		3 L	Ce II	VE72	7162.255	13958.27		140	I I	LU75
7103.67	14073.39	0.02	3	Si I	LI65	7163.00	13956.8		2	Cl I	RA69
7104.101	14072.53		144	Te I	MO75	7164.000	13954.87		4	Cm I	CO76
7104.842	14071.06		7	Se I	MO74	7164.42	13954.05			Hf I	GO70
7105.003	14070.742		5 L	Th II	GI74	7166.22	13950.55		300	Hg I	HU53
7105.197	14070.359	0.12	4 L	Sm II	BL69	7170.01	13943.170	0.10	3 L	Nd	BL70
7105.277	14070.200		3 L	Th	GI74	7170.730	13941.77		2	Se	MO74
7106.211	14068.35		4 L	Ce	VE72	7173.320	13936.736		5 L	Th I	GI74
7107.577	14065.646	0.08	7 L	Gd I	BL71	7173.573	13936.244	0.06	6 L	Gd I	BL71
7108.348	14064.122	0.08	4 L	Gd I	BL71	7175.26	13933.0		15	Cl I	RA69
7109.425	14061.991		2	Ar I	HU73	7176.668	13930.234		3 L	Th I	GI74
7110.60	14059.67		1	I	LU75	7178.551	13926.58		3 L	Ce II?	VE72
7111.383	14058.12		8	Te I	MO75	7178.551	13926.58		3 L	Ce I?	VE72
7111.564	14057.76		17	Se I	MO74	7178.85	13926.00	0.10	3 L	Tm I	CA69
7113.43	14054.07	0.20	1 L	Tm I	CA69	7179.414	13924.907	0.06	6 L	Gd I	BL71
7115.117	14050.741		5	Xe I	HU73	7179.68	13924.40			Hf I	GO70
7117.692	14045.657		550	Kr I	KA69	7179.92	13923.9		20	Cl I	RA69
7121.220	14038.70	0.02		Zn I	JO68	7182.145	13919.611		15	Xe I	HU73
7122.039	14037.09		217	Te I	MO75	7185.795	13912.54		6	Se	MO74
7126.367	14028.560		4 L	Th I	GI74	7186.55	13911.1		2	Cl I	RA69
7126.547	14028.205		3 L	Th II	GI74	7186.820	13910.556		1200 I	Ar I	HU73
7126.94	14027.43	0.02	7 W	Zr	TA76	7187.901	13908.47		9	Cm I	CO76
7127.13	14027.04			Hf	GO70	7188.412	13907.476		100	Ar I	HU73
7127.308	14026.71		42	Te I	MO75	7188.429	13907.44	0.01	1	Fe I	LI76
7127.360	14026.605		5 L	Th I	GI74	7189.078	13906.188	0.12	4 L	Sm II	BL69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7189.955	13904.491		6 L	Th I	GI74	7259.75	13770.81	0.15	3 L	Tm I	CA69
7190.951	13902.570	0.01	6	Ce III	LI72	7262.67	13765.29	0.02	1	C I	JO65
7193.733	13897.19	0.01	10	Fe	LI76	7263.311	13764.062		6	Kr I	KA69
7194.642	13895.433		3 L	Th II	GI74	7266.07	13758.83	0.01		Cs I	JO61
7195.141	13894.47	0.01		La III	JO71	7267.622	13755.90	0.01	6	Fe	LI76
7195.85	13893.1		110	Cl I	RA69	7267.93	13755.32	0.15	3 L	Tm I	CA69
7198.84	13887.33	0.05	7 L	Tm I	CA69	7268.61	13754.02		9	Ge I	HU64
7199.115	13886.800	0.07	5 L	Gd I	BL71	7271.04	13749.43			Hf	GO70
7199.256	13886.527		4 L	Th I	GI74	7271.71	13748.17		18	Ge I	HU64
7199.97	13885.1		7	Cl I	RA69	7272.282	13747.083	0.12	4 L	Sm	BL69
7200.130	13884.842	0.06	5 L	Gd I	BL71	7272.53	13746.61	0.02	15	Zr I	TA76
7202.45	13880.37			Hf I	GO70	7273.66	13744.48	0.05	2	Zr	TA76
7206.944	13871.715	0.08	4 L	Gd I	BL71	7273.95	13743.93	0.02	3	C I	JO65
7207.27	13871.09		55	Ge I	HU64	7273.983	13743.868	0.08	4 L	Gd I?	BL71
7208.40	13868.91		26	I I	LU75	7273.983	13743.868	0.08	4 L	Gd I?	BL71
7208.827	13868.09		8	Cm I	CO76	7275.05	13741.86	0.02	1	C I	JO65
7209.395	13866.998		50 B	Ar I?	HU73	7275.979	13740.098	0.08	4 L	Gd I	BL71
7209.708	13866.396		50 B	Ar I?	HU73	7276.054	13739.956		5 L	Th I	GI74
7211.31	13863.3		13	Cl I	RA69	7276.639	13738.851		600 I	Kr I	KA69
7212.692	13860.660	0.05	7 L	Gd I?	BL71	7276.781	13738.583		3 L	Th I	GI74
7212.692	13860.660	0.05	7 L	Gd I?	BL71	7280.060	13732.396	0.12	4 L	Sm II	BL69
7213.98	13858.185	0.10	3 L	Nd	BL70	7280.55	13731.47			Hf	GO70
7217.034	13852.32		1	I I	LU75	7283.31	13726.27	0.02	16	Zr I	TA76
7218.822	13848.889	0.05	7 L	Gd I	BL71	7283.62	13725.68	0.20	1 L	Tm I	CA69
7219.30	13847.97	0.25	1 L	Tm I	CA69	7283.65	13725.628	0.07	7 L	Nd I	BL70
7223.367	13840.18		9	Cm I	CO76	7284.260	13724.477		275	Ge I	HU64
7224.456	13838.09		3	Cm I	CO76	7287.393	13718.577		10000 I	Ar I	HU73
7224.72	13837.6		125	Cl I	RA69	7287.788	13717.84		3	Cm I	CO76
7226.84	13833.52	0.02	58	Zr I	TA76	7289.423	13714.76		7	Cm I	CO76
7227.04	13833.14		750	Br I	TE63	7289.43	13714.74	0.05	5 L	Tm I	CA69
7227.740	13831.803	0.01	240	S I	JA67	7290.447	13712.83		4 L	Ce II	VE72
7229.521	13828.394		200 B	Ar I?	HU73	7291.23	13711.36	0.02	5	Si I	LI65
7229.559	13828.321		200 B	Ar I?	HU73	7291.401	13711.036		200	Kr I	KA69
7229.90	13827.7		9	Cl	RA69	7291.92	13710.1		2	Cl I	RA69
7230.921	13825.717		300	Ar I	HU73	7294.02	13706.1		5	Cl I	RA69
7231.57	13824.48	0.02	5 L	In I	JO67	7294.39	13705.41	0.02	1	C I	JO65
7232.57	13822.56		9 B	Br I?	TE63	7295.169	13703.96		3	Cm I	CO76
7232.83	13822.07		9 B	Br I?	TE63	7297.695	13699.211		3 L	Th II	GI74
7232.89	13821.95		9 B	Br I?	TE63	7298.44	13697.81	0.02	6	C I	JO65
7233.01	13821.7		525	Cl I	RA69	7300.55	13693.85	0.02	8	Si I	LI65
7236.324	13815.39	0.01	2	Fe	LI76	7301.20	13692.63			Hf	GO70
7236.839	13814.410		10	Xe I	HU73	7301.79	13691.53	0.25	1 L	Tm	CA69
7238.374	13811.481		4 L	Th II	GI74	7304.73	13686.03	0.02	14	N I	ER61
7239.96	13808.45		23 B	Br I?	TE63	7304.750	13685.98	0.02		Zn I	JO68
7240.10	13808.19		23 B	Br I?	TE63	7304.887	13685.72		46	I I	LU75
7240.664	13807.12		4	Cm	CO76	7304.938	13685.63		7	Se	MO74
7240.882	13806.70		3	Se	MO74	7306.266	13683.14	0.02		Zn I	JO68
7242.92	13802.8		11	Cl I	RA69	7307.01	13681.75	0.25	1 L	Tm II	CA69
7244.354	13800.080		3	Kr I	KA69	7308.50	13678.96		1	I I	LU75
7245.405	13798.08		8	Cm I	CO76	7308.718	13678.549		5000 I	Ar I	HU73
7245.648	13797.616	0.01	160	S I	JA67	7310.44	13675.33			Hf	GO70
7248.376	13792.422		5 L	Th I	GI74	7311.08	13674.13		300	Br I	TE63
7248.39	13792.4	0.02		Zn I	JO68	7311.42	13673.51		600	Hg I	HU53
7249.851	13789.62		3	Se	MO74	7314.04	13668.60	0.02	65	N I	ER61
7249.855	13789.61	0.02		Zn I	JO68	7314.35	13668.02	0.25	1 L	Tm I	CA69
7249.903	13789.52		9	Cm I	CO76	7314.366	13667.99	0.01	7	Fe I	LI76
7249.96	13789.41			Hf	GO70	7314.71	13667.35	0.02	3	Si I	LI65
7252.231	13785.09	0.02		Zn I	JO68	7314.82	13667.14	0.25	1 L	Tm I	CA69
7254.379	13781.01		4 L	Ce II	VE72	7315.91	13665.103	0.07	6 L	Nd	BL70
7255.481	13778.916		6 L	Th II	GI74	7315.960	13665.01	0.01		Rb I	JO61
7255.60	13778.69		1	I I	LU75	7316.03	13664.88	0.25	1 L	Tm I	CA69
7256.724	13776.556	0.01	145	S I	JA67	7316.177	13664.604		3 L	Th II	GI74
7257.783	13774.55		4	Te I	MO75	7316.68	13663.67	0.25	1 L	Tm II	CA69
7257.85	13774.42		22	I I	LU75	7317.250	13662.60		3 L	Ce I	VE72
7257.889	13774.344	0.08	6 L	Gd I	BL71	7318.620	13660.04		16	Se I	MO74
7258.87	13772.5		50	Cl I	RA69	7319.293	13658.78		8 B	Ar I?	HU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7319.493	13658.41		8 B	Ar I?	HU73	7369.536	13565.665		7 L	Th I	GI74
7319.504	13658.393		800	Kr I	KA69	7369.874	13565.04	0.01	17	Fe	LI76
7320.006	13657.46		3	Se	MO74	7371.85	13561.408	0.05	5 L	Nd II	BL70
7320.221	13657.055		2000 I	Xe I	HU73	7372.80	13559.66	0.02	12	C I	JO65
7322.505	13652.795		6	Ar I	HU73	7373.838	13557.75	0.02	4	Li I	JO59
7323.13	13651.63	0.02	60	N I	ER61	7375.850	13554.052	0.07	5 L	Gd I	BL71
7324.14	13649.74	0.02	58	N I	ER61	7376.780	13552.34		5	Se I	MO74
7325.289	13647.606		5 L	Th I	GI74	7377.98	13550.14	0.07	4 L	Tm I	CA69
7326.811	13644.77		9	Cm I	CO76	7379.696	13546.99	0.01	5	Fe I	LI76
7328.610	13641.423	0.15	3 L	Sm II	BL69	7380.466	13545.58		5	Se I	MO74
7328.76	13641.1		3	Cl	RA69	7380.99	13544.61	0.02	65	N I	ER61
7331.266	13636.48	0.02		Zn I	JO68	7381.213	13544.205		500	Ar I	HU73
7331.490	13636.063		5 L	Th II	GI74	7381.242	13544.152		250	Xe I	HU73
7332.481	13634.220		2400 I	Kr I	KA69	7382.27	13542.27	0.10	3 L	Tm I	CA69
7333.192	13632.899	0.15	3 L	Sm	BL69	7382.406	13542.02		6	Cm I	CO76
7333.71	13631.94	0.02	4	Si I	LI65	7383.097	13540.748		3 L	Th I	GI74
7334.916	13629.70		3	Cm I	CO76	7386.317	13534.847		425	Ge I	HU64
7335.446	13628.71		26	Se I	MO74	7386.43	13534.64	0.02	60	N I	ER61
7336.51	13626.73	0.25	1 L	Tm	CA69	7387.74	13532.24	0.05	75	Zr I	TA76
7336.842	13626.116		4 L	Th II	GI74	7389.70	13528.65		1	I I	LU75
7337.88	13624.18	0.02	350	N I	ER61	7390.058	13527.995	0.06	6 L	Gd I	BL71
7337.901	13624.15		3 L	Ce II	VE72	7393.51	13521.68	0.20	1 L	Tm I	CA69
7338.704	13622.659		7500 I	Ar I	HU73	7394.61	13519.67	0.02	75	Zr	TA76
7338.835	13622.415		1000 I	Kr I	KA69	7395.443	13518.143		6 L	Th I	GI74
7339.03	13622.05	0.25	1 L	Tm	CA69	7395.580	13517.894	0.15	3 L	Sm	BL69
7340.49	13619.35		22 B	Ge I?	HU64	7397.171	13514.985	0.06	6 L	Gd I	BL71
7340.49	13619.35		22 B	Ge I?	HU64	7398.48	13512.6			Pb I	AN68
7342.53	13615.56	0.02	35	N I	ER61	7401.670	13506.77		4 L	Ce II	VE72
7346.07	13609.00	0.25	1 L	Tm I	CA69	7402.32	13505.58		40	Hg I	HU53
7349.54	13602.57	0.01		Cs I	JO61	7403.085	13504.190		9500 I	Ar I	HU73
7349.55	13602.556	0.10	3 L	Nd II	BL70	7404.14	13502.27	0.02	20	C I	JO65
7349.70	13602.2		11	Cl I	RA69	7404.833	13501.001		4 L	Th I	GI74
7349.71	13602.27	0.02	190	N I	ER61	7405.708	13499.406		1200	Ar I	HU73
7350.585	13600.64	0.01	2	Fe I	LI76	7406.32	13498.3		160	Cl I	RA69
7351.092	13599.702		3 L	Th I	GI74	7406.35	13498.2			Pb I	AN68
7351.292	13599.333		1500 I	Ar I	HU73	7406.75	13497.51		1	I I	LU75
7351.688	13598.599		3 L	Th I	GI74	7406.95	13497.14	0.02	10	Zr	TA76
7352.79	13596.56	0.02	32	Zr I	TA76	7407.95	13495.3			Pb I	AN68
7354.072	13594.191	0.08	4 L	Gd I	BL71	7408.099	13495.05	0.01	3	Fe I	LI76
7354.587	13593.240	0.10	3 L	Gd I	BL71	7408.983	13493.439		4 L	Th	GI74
7356.335	13590.01		9	Cm I	CO76	7409.62	13492.28		200	Ge I	HU64
7356.999	13588.783		4 L	Th I	GI74	7410.697	13490.32		2	Se I	MO74
7357.12	13588.55	0.02	115	N I	ER61	7413.502	13485.214	0.10	5 L	Sm II	BL69
7357.25	13588.31	0.01		Cs I	JO61	7413.69	13484.87		9	Br I	TE63
7357.57	13587.73	0.02	200	N I	ER61	7414.002	13484.304		3 L	Th I	GI74
7357.70	13587.49	0.25	1 L	Tm I	CA69	7414.357	13483.659		3 L	Th	GI74
7358.393	13586.209	0.10	3 L	Gd I	BL71	7414.835	13482.79		6	Cm I?	CO76
7358.50	13586.0		6	Cl I	RA69	7414.835	13482.79		6	Cm II?	CO76
7359.33	13584.48		30	Br I	TE63	7416.071	13480.55		9	Cm I	CO76
7361.03	13581.35	0.02	5	C I	JO65	7416.45	13479.85		5	I I	LU75
7361.04	13581.33	0.02	1200	N I	ER61	7416.942	13478.959	0.07	5 L	Gd I	BL71
7361.768	13579.98		4	Te	MO75	7417.137	13478.610		3	Ce III	LI72
7362.077	13579.410		4 L	Th I	GI74	7419.402	13474.49		3 L	Ce II	VE72
7362.60	13578.5		28	Cl	RA69	7420.478	13472.54	0.01	1	Fe I	LI76
7362.604	13578.439	0.10	3 L	Gd I	BL71	7421.11	13471.39	0.25	1 L	Tm I	CA69
7362.83	13578.02	0.20	1 L	Tm	CA69	7421.578	13470.54		3 L	Ce II	VE72
7364.68	13574.61	0.05	4 L	Tm I	CA69	7421.89	13470.0		9	Cl I	RA69
7365.218	13573.618		750	Ar I	HU73	7422.608	13468.67		3 L	Ce	VE72
7365.976	13572.223	0.08	4 L	Gd I	BL71	7422.77	13468.38		30	Hg I	HU53
7366.512	13571.23		6	Se I	MO74	7422.831	13468.267	0.10	3 L	Gd I	BL71
7366.74	13570.81	0.05	25	Zr	TA76	7423.909	13466.31		2	Se	MO74
7366.959	13570.411		3 L	Th I	GI74	7424.56	13465.1		2	Cl I	RA69
7367.06	13570.225	0.10	3 L	Nd II	BL70	7424.89	13464.53	0.02	185	N I	ER61
7367.07	13570.21		550	Hg I	HU53	7427.310	13460.143		3 L	Th II	GI74
7367.34	13569.71	0.20	1 L	Tm I	CA69	7429.015	13457.055	0.10	3 L	Gd I	BL71
7367.64	13569.16	0.05	9	Zr I	TA76	7430.669	13454.06		3 L	Ce	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7431.46	13452.62		300	Yb II	ME67	7485.566	13355.392	0.05	7 L	Gd I	BL71
7433.355	13449.197		4 L	Th I	GI74	7485.791	13354.99		3 L	Ce I	VE72
7433.95	13448.12	0.02	21	N I	ER61	7486.379	13353.94		6 L	Ce II	VE72
7434.152	13447.755		4 L	Th I	GI74	7487.360	13352.19	0.01	6	Fe	LI76
7434.448	13447.22		6 L	Ce II	VE72	7487.403	13352.11		2	Se	MO74
7435.340	13445.607	0.05	7 L	Gd I	BL71	7488.74	13349.73		36	Br I	TE63
7436.270	13443.925		4 L	Th I	GI74	7489.747	13347.935	0.01	7	S I	JA67
7436.469	13443.57	0.01		Rb I	JO61	7491.606	13344.63		9	Cm I	CO76
7436.889	13442.81	0.01		Rb I	JO61	7492.09	13343.8		550	Cl I	RA69
7437.546	13441.62		7	Cm	CO76	7492.55	13342.942	0.07	5 L	Nd	BL70
7438.119	13440.583		4 L	Th I	GI74	7493.367	13341.488	0.01	8	S I	JA67
7438.580	13439.75		5	Se I	MO74	7493.78	13340.75	0.05	2	Hf	GO70
7441.701	13434.114	0.08	6 L	Sm	BL69	7493.95	13340.45	0.02	10	Hf I	GO70
7442.134	13433.332		3 L	Th I	GI74	7494.950	13338.67		4 L	Ce II	VE72
7444.00	13429.96	0.02	9 L	In I	JO67	7495.477	13337.74		3	Cm I	CO76
7444.20	13429.61	0.02	670	N I	ER61	7496.050	13336.712		3 L	Th I	GI74
7444.24	13429.53	0.02	310	Zr I	TA76	7497.28	13334.524	0.07	5 L	Nd I	BL70
7445.568	13427.136		3 L	Th II	GI74	7497.416	13334.29		4	Cm I	CO76
7445.62	13427.04	0.05	430	Hf	GO70	7498.774	13331.868		75	Xe I	HU73
7445.695	13426.907		3 L	Th I	GI74	7499.723	13330.180		25 B	Ar I?	HU73
7445.89	13426.57		70	Hg I	HU53	7499.761	13330.112		25 B	Ar I?	HU73
7446.24	13425.93	0.20	2 L	Tm II	CA69	7500.93	13328.04		10	Br I	TE63
7446.475	13425.501	0.10	3 L	Gd I	BL71	7502.26	13325.67	0.02	3	Si I	LI65
7447.13	13424.32	0.01		Cs I	JO61	7503.435	13323.586	0.15	3 L	Sm II	BL69
7448.812	13421.289		2	Ar I	HU73	7504.17	13322.28	0.05	5 L	Tm I	CA69
7449.59	13419.9		90	Cl I	RA69	7506.848	13317.528		20	Ar I	HU73
7449.763	13419.576		4 L	Th I	GI74	7507.129	13317.03		3 L	Ce	VE72
7450.275	13418.65		5	Te I	MO75	7507.357	13316.63		483	Te I	MO75
7453.17	13413.44	0.20	1 L	Tm II	CA69	7507.90	13315.67	0.05	1	Hf I	GO70
7453.89	13412.14	0.05	2	Hf	GO70	7509.283	13313.209		5500 I	Ar I	HU73
7454.09	13411.786	0.10	3 L	Nd II	BL70	7511.64	13309.04	0.02	5	Si I	LI65
7455.08	13410.01	0.05	5 L	Tm I	CA69	7512.102	13308.213	0.05	7 L	Gd I	BL71
7455.99	13408.37	0.10	5	Zr I	TA76	7514.291	13304.337		5	Kr I	KA69
7456.53	13407.40	0.05	30 U	Zr I	TA76	7514.57	13303.84	0.05	4 L	Tm I	CA69
7456.981	13406.586		2500 B	Ar I?	HU73	7515.435	13302.312		225	Ar I	HU73
7457.022	13406.513		2500 B	Ar I?	HU73	7516.289	13300.80		6 L	Ce II	VE72
7457.895	13404.943		4 L	Th I	GI74	7518.99	13296.0		310	Cl I	RA69
7460.239	13400.73		10	Se I	MO74	7522.490	13289.84		9	Cm I	CO76
7460.84	13399.65	0.20	2	Hf	GO70	7523.627	13287.83	0.01	7	Fe I	LI76
7462.26	13397.09	0.01		K I	JO61	7523.77	13287.58	0.02	9	Si I	LI65
7462.85	13396.0		95	Cl I	RA69	7524.195	13286.82	0.01	2	Fe I	LI76
7463.046	13395.691		4 L	Th II	GI74	7525.347	13284.79		3 L	Ce I	VE72
7464.92	13392.33		20	Br I	TE63	7527.238	13281.453		4 L	Th I	GI74
7465.036	13392.12	0.01	10	Fe	LI76	7527.720	13280.603	0.05	7 L	Gd I?	BL71
7466.531	13389.44	0.01	3	Fe	LI76	7527.720	13280.603	0.05	7 L	Gd I?	BL71
7467.31	13388.042	0.10	3 L	Nd II	BL70	7527.92	13280.250	0.05	5 L	Nd II	BL70
7467.642	13387.45		15	I I	LU75	7528.028	13280.06		3 L	Ce I	VE72
7468.753	13385.46		20	Se I	MO74	7529.512	13277.44		1	I I	LU75
7469.557	13384.015	0.10	3 L	Gd I	BL71	7530.01	13276.56	0.20	1 L	Tm	CA69
7469.60	13383.94	0.20	1 L	Tm II	CA69	7530.698	13275.351		5 L	Th I	GI74
7470.42	13382.5		30	Cl I	RA69	7531.02	13274.78	0.05	4 L	Tm I	CA69
7470.562	13382.214		4 L	Th I	GI74	7532.111	13272.86		3 L	Ce II?	VE72
7471.75	13380.09	0.05	6 L	Tm I	CA69	7532.111	13272.86		3 L	Ce I?	VE72
7471.882	13379.85		3 L	Ce II	VE72	7532.239	13272.635		6000 I	Ar I	HU73
7472.89	13378.0		33	Cl I	RA69	7533.600	13270.237	0.08	6 L	Sm II	BL69
7472.99	13377.86	0.01		K I	JO61	7533.730	13270.008	0.10	3 L	Gd I	BL71
7475.229	13373.859		3 L	Th	GI74	7537.173	13263.95		8	Cm I	CO76
7475.691	13373.033	0.07	6 L	Gd I	BL71	7538.998	13260.74	0.01	2	Fe I	LI76
7476.2	13372.1	0.70	10	Lu I	BO56	7539.83	13259.273	0.10	3 L	Nd	BL70
7478.062	13368.792		6 L	Th I	GI74	7540.452	13258.18		9	Cm I	CO76
7478.998	13367.12		3 L	Ce I	VE72	7541.076	13257.081		3 L	Th I	GI74
7479.003	13367.110		8500 I	Ar I	HU73	7542.141	13255.21		4 L	Ce I	VE72
7479.173	13366.806	0.08	7 L	Gd I	BL71	7542.489	13254.60		7	Se	MO74
7482.03	13361.70		85	Ce I	HU64	7542.907	13253.863		5 L	Th I	GI74
7482.491	13360.88		5 L	Ce	VE72	7543.188	13253.37		5 L	Ce I	VE72
7484.79	13356.77	0.05	5	Hf	GO70	7544.332	13251.36		3 L	Ce I	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7545.06	13250.082	0.10	3 L	Nd I	BL70	7603.13	13148.88	0.05	125 U	Zr	TA76
7545.86	13248.677	0.10	3 L	Nd	BL70	7604.852	13145.904		7 L	Th II	GI74
7546.385	13247.75		1577	Te I	MO75	7605.777	13144.31		3	Cm I	CO76
7546.399	13247.730		4 L	Th I	GI74	7611.195	13134.95		24	Ca I	RI68
7548.535	13243.981		12	Ar I	HU73	7613.897	13130.287		6	Ar I	HU73
7548.62	13243.8		350	Cl I	RA69	7614.26	13129.7		100	Cl I	RA69
7550.250	13240.974	0.15	3 L	Sm II	BL69	7615.268	13127.923		5 L	Th I	GI74
7550.951	13239.744		4 L	Th I	GI74	7615.470	13127.576	0.06	7 L	Sm I	BL69
7552.993	13236.164		3 L	Th I	GI74	7617.78	13123.60	0.10	9	Hf	GO70
7553.563	13235.17	0.01		Rb I	JO61	7617.863	13123.452	0.08	6 L	Sm	BL69
7553.84	13234.67	0.10	3	Hf I	GO70	7617.888	13123.41	0.01	15 L	Al I	ER63
7555.308	13232.109	0.08	4 L	Gd I	BL71	7618.36	13122.6		16	Cl I	RA69
7556.000	13230.897		1200	Ar I	HU73	7618.48	13122.39	0.05	5 U	Zr	TA76
7557.029	13229.10		8	Cm I?	CO76	7620.34	13119.19	0.25	1 L	I	VE69
7557.029	13229.10		8	Cm I?	CO76	7620.599	13118.74		3 L	Ce I	VE72
7557.565	13228.16		2	Se	MO74	7620.875	13118.27		40	I I	LU75
7557.595	13228.104		2500 I	Ar I	HU73	7621.30	13117.53	0.25	1 L	I	VE69
7558.90	13225.8		2	Cl	RA69	7621.34	13117.47		42	Ge I	HU64
7560.292	13223.385		3 L	Th II	GI74	7622.057	13116.23		3 L	Ce II	VE72
7560.85	13222.42	0.10	190	Hf	GO70	7624.37	13112.25		30	Ge I	HU64
7562.663	13219.241		700	Ne I	HU73	7625.664	13110.027	0.06	6 L	Gd I	BL71
7563.85	13217.17		1700	Br I	TE63	7626.195	13109.113		1	Ar I	HU73
7565.667	13213.991		3000	Ar I	HU73	7626.82	13108.04	0.10	3 L	Tm II	CA69
7565.706	13213.923	0.08	7 L	Gd I	BL71	7626.85	13108.0		4	Cl I	RA69
7566.00	13213.4		7	Cl I	RA69	7627.069	13107.612		2350	Ge I	HU64
7566.389	13212.73		4 L	Ce II	VE72	7627.357	13107.116		2	Ar I	HU73
7566.533	13212.48		10	Se I	MO74	7627.735	13106.47		7	Cm I	CO76
7567.585	13210.641		10	Kr I	KA69	7629.066	13104.18		400	Te I	MO75
7567.98	13209.95		60	Hg I	HU53	7630.31	13102.05	0.02	3	Si I	LI65
7568.93	13208.3		20	Cl I	RA69	7630.761	13101.27		3 L	Ce	VE72
7570.652	13205.290		6 L	Th I	GI74	7631.17	13100.57	0.05	7 L	Tm I	CA69
7571.709	13203.45		7	Cm I	CO76	7632.138	13098.91	0.01	2	Fe I	LI76
7573.445	13200.42		7	Cm I	CO76	7632.91	13097.58	0.10	3 L	Tm I	CA69
7575.36	13197.08	0.02	50	Zr I	TA76	7633.665	13096.286	0.10	3 L	Gd I	BL71
7575.632	13196.61	0.02		Zn I	JO68	7634.34	13095.1		49	Cl I	RA69
7576.659	13194.82		3 L	Ce II	VE72	7636.77	13090.96	0.15	2 L	Tm I	CA69
7577.310	13193.687	0.08	6 L	Sm II	BL69	7637.73	13089.3		3	Cl	RA69
7579.20	13190.40		1	I I	LU75	7637.93	13088.973	0.07	6 L	Nd I	BL70
7581.95	13185.61		2	I I	LU75	7637.990	13088.87		6 L	Ce II	VE72
7582.22	13185.14	0.17	2 L	Tm	CA69	7639.409	13086.44		21	Ca I	RI68
7582.300	13185.004	0.06	7 L	Sm II	BL69	7643.339	13079.71		3 L	Ce II	VE72
7582.911	13183.941		3 L	Th I	GI74	7644.353	13077.975	0.05	7 L	Gd I	BL71
7583.002	13183.783		3 L	Th I	GI74	7644.61	13077.535	0.05	6 L	Nd	BL70
7583.70	13182.6		8	Cl I	RA69	7644.976	13076.91	0.01	14 LB	O I	IS68
7584.419	13181.32		3 L	Ce II	VE72	7645.837	13075.44		2	Se	MO74
7584.890	13180.502	0.06	7 L	Sm II	BL69	7646.50	13074.31	0.05	570	Hf I	GO70
7585.92	13178.71	0.02	12	Zr	TA76	7647.225	13073.064	0.10	3 L	Gd I	BL71
7586.669	13177.412		1100 I	Kr I	KA69	7648.529	13070.834		6 L	Th I	GI74
7586.94	13176.94	0.02	15	Zr	TA76	7648.98	13070.06		15	Ge I	HU64
7586.96	13176.90	0.02	11	Si I	LI65	7649.369	13069.399		3 L	Th I	GI74
7587.926	13175.23		6	Cm I	CO76	7649.582	13069.036	0.06	6 L	Gd I?	BL71
7588.149	13174.84		4	Se I	MO74	7649.582	13069.036	0.06	6 L	Gd I?	BL71
7589.371	13172.72		3 L	Ce I	VE72	7651.10	13066.443	0.05	6 L	Nd I	BL70
7591.71	13168.9		13	Cl	RA69	7651.724	13065.377	0.15	3 L	Sm	BL69
7592.219	13167.78		18	Ca I	RI68	7652.44	13064.15		110	Br I	TE63
7593.757	13165.11	0.02	24 L	O I	EI63	7652.704	13063.71		6	Cm I	CO76
7593.905	13164.85	0.02	26 L	O I	EI63	7653.28	13062.7		5	Cl	RA69
7594.461	13163.89	0.02	25 L	O I	EI63	7653.66	13062.07	0.25	1 L	Tm II	CA69
7596.200	13160.877	0.10	3 L	Gd I	BL71	7653.79	13061.84		8	Ca I	HU51
7600.260	13153.847		4	Ar I	HU73	7654.28	13061.01	0.15	2 L	Tm I	CA69
7601.654	13151.440		4	Ce III	LI72	7654.347	13060.90		8	Cm I	CO76
7602.047	13150.76	0.01	14 L	Al I	ER63	7655.05	13059.7		4	Cl I	RA69
7602.142	13150.59	0.02		Zn I	JO68	7656.123	13057.87		17	Ca I	RI68
7602.66	13149.69	0.02	85	Zr	TA76	7656.34	13057.50	0.02	5 L	Ga I	JO67
7602.93	13149.23	0.05	80	Hf	GO70	7657.284	13055.889		6 L	Th I	GI74
7602.970	13149.16		60	I I	LU75	7657.837	13054.948	0.06	8 L	Gd I	BL71

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7658.610	13053.63	0.02		Zn I	JO68	7712.670	12962.13		14	Sc I	MO74
7660.032	13051.206		12	Ar I	HU73	7714.047	12959.819		7 L	Th I	GI74
7660.896	13049.73		6	Se	MO74	7715.607	12957.199	0.10	3 L	Gd I	BL71
7661.028	13049.51		3 L	Ce II?	VE72	7715.81	12956.86	0.02	15	Zr I	TA76
7661.028	13049.51		3 L	Ce I?	VE72	7715.929	12956.658		4000	Ar I	HU73
7661.446	13048.797	0.10	3 L	Gd I	BL71	7716.029	12956.49		3 L	Ce I	VE72
7661.79	13048.21		38	Br I	TE63	7716.480	12955.734		1200	Ge I	HU64
7664.612	13043.407		4 L	Th I	GI74	7718.655	12952.082		5 L	Th I	GI74
7664.681	13043.29		3 L	Ce II	VE72	7719.360	12950.90		6 L	Ce II?	VE72
7664.72	13043.22	0.05	6 L	Tm I	CA69	7719.360	12950.90		6 L	Ce I?	VE72
7665.41	13042.05	0.02	54	Zr I	TA76	7720.57	12948.87	0.20	1 L	Tm I	CA69
7665.692	13041.57		3 L	Ce II	VE72	7721.137	12947.92		88	Te I	MO75
7666.03	13041.0		125	Cl I	RA69	7721.941	12946.57		18	Te I	MO75
7669.35	13035.35	0.05	10 U	Zr I	TA76	7723.311	12944.275	0.10	3 L	Gd I	BL71
7669.80	13034.6		9	Cl I	RA69	7724.15	12942.87	0.02	30	Hf I	GO70
7670.399	13033.57		30	Ca I	RI68	7725.471	12940.654		7 L	Th II	GI74
7671.831	13031.133		3 L	Th I	GI74	7727.218	12937.73		3 L	Ce	VE72
7672.65	13029.74	0.20	1 L	Tm I	CA69	7728.709	12935.233		3 L	Th I	GI74
7673.30	13028.64		150	Ge I	HU64	7729.289	12934.263		1	Kr I	KA69
7673.426	13028.425		90	Ar I	HU73	7729.721	12933.539		5 L	Th II	GI74
7673.556	13028.204	0.06	6 L	Gd I	BL71	7729.926	12933.196		750	Ar I	HU73
7674.744	13026.187		6 L	Th I	GI74	7730.170	12932.79		10	Te I	MO75
7677.192	13022.035	0.08	4 L	Gd I	BL71	7732.43	12929.009	0.10	4 L	Nd	BL70
7678.04	13020.60	0.20	1	Hf	GO70	7733.44	12927.32	0.05	70	Zr I	TA76
7678.512	13019.80		6	Cm I	CO76	7733.749	12926.81		7	Cm I	CO76
7680.373	13016.640		5 L	Th II	GI74	7734.294	12925.892		3 L	Th	GI74
7680.468	13016.48		5 L	Ce II	VE72	7734.54	12925.482	0.15	3 L	Nd I	BL70
7681.866	13014.111	0.15	3 L	Sm II	BL69	7734.99	12924.730	0.15	3 L	Nd	BL70
7682.69	13012.72	0.01	5	S I	JA67	7735.61	12923.69	0.20	4 W	Zr	TA76
7683.22	13011.82	0.05	10 W	Zr I	TA76	7737.203	12921.032		3 L	Th	GI74
7684.202	13010.154		3 L	Th I	GI74	7738.241	12919.299		3 L	Th I	GI74
7684.574	13009.525	0.08	6 L	Sm II	BL69	7739.630	12916.981		4 L	Th I	GI74
7685.319	13008.264		2500	Ar I	HU73	7741.47	12913.91	0.05	6 L	Tm II	CA69
7685.431	13008.07		1	I I	LU75	7742.26	12912.59	0.02	10 L	In I	JO67
7685.574	13007.832		5 L	Th I	GI74	7742.394	12912.37		5	Se I	MO74
7686.256	13006.68	0.01	4	Fe I	LI76	7742.607	12912.014		1100	Ne I	HU73
7687.02	13005.39	0.20	1 L	Tm I	CA69	7744.09	12909.54	0.15	3 L	Tm I	CA69
7687.506	13004.57		9	Cm I	CO76	7744.355	12909.10		25	Ca I	RI68
7687.677	13004.273		4 L	Th	GI74	7744.67	12908.6		24	Cl I	RA69
7689.32	13001.49	0.02	38	Zr I	TA76	7747.880	12903.228	0.06	5 L	Gd I	BL71
7689.362	13001.42		18	Ca I	RI68	7748.002	12903.024		9	Ar I	HU73
7691.086	12998.51		19	Se I	MO74	7748.784	12901.721	0.01	55 B	B I	LI70
7692.13	12996.75	0.10	70	Hf	GO70	7749.26	12900.9		3	Cl	RA69
7692.606	12995.941	0.08	4 L	Gd I	BL71	7749.380	12900.730	0.15	3 L	Sm II?	BL69
7693.440	12994.532		3 L	Th I	GI74	7749.380	12900.730	0.15	3 L	Sm I?	BL69
7693.612	12994.242	0.07	8 L	Gd I	BL71	7749.722	12900.16		3 L	Ce II	VE72
7694.970	12991.948	0.05	7 L	Gd I	BL71	7750.500	12898.865		4 L	Th I	GI74
7695.668	12990.77	0.03	12 L	O I	ER68	7751.20	12897.70		1	I I	LU75
7696.894	12988.701		25	Ar I	HU73	7751.43	12897.32	0.02	51	N I	ER61
7697.949	12986.920		4 L	Th I	GI74	7751.55	12897.12		48	Br I	TE63
7698.917	12985.288		25	Kr I	KA69	7752.148	12896.12	0.01	1	Fe I	LI76
7699.154	12984.89	0.01	2	He I	LT70	7752.697	12895.21		3 L	Ce I	VE72
7700.048	12983.38		3 L	Ce I	VE72	7754.43	12892.33	0.10	6 U	Zr	TA76
7700.85	12982.03		1	I	LU75	7754.641	12891.98		6	Se I	MO74
7701.430	12981.05		3 L	Ce II	VE72	7754.76	12891.78	0.10	5	Zr	TA76
7702.20	12979.75	0.02	46	Zr I	TA76	7758.71	12885.21		15	Ca I	HU51
7703.269	12977.952		2	Kr I	KA69	7758.81	12885.05	0.02	4 L	Ga I	JO67
7703.97	12976.8		20	Cl I	RA69	7758.990	12884.75		6 L	Ce II	VE72
7705.173	12974.75		40	Te I	MO75	7759.286	12884.26		8	Te I	MO75
7707.29	12971.18	0.05	15	Zr	TA76	7759.97	12883.13	0.02	3	Hf	GO70
7707.718	12970.46		4 L	Ce II	VE72	7761.994	12879.76	0.01	14	Fe I	LI76
7708.19	12969.7		2	Cl I	RA69	7763.36	12877.50	0.25	1 L	Tm I	CA69
7708.916	12968.45	0.01	10	He I	LT70	7763.62	12877.067	0.10	3 L	Nd	BL70
7709.65	12967.21		1	I	LU75	7764.983	12874.81		9	Se I	MO74
7709.86	12966.86	0.02	580	Hf I	GO70	7765.831	12873.400		12	Ar I	HU73
7711.31	12964.42	0.15	2 L	Tm II	CA69	7766.252	12872.702		3 L	Th I	GI74

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7766.62	12872.1		39	Cl I	RA69	7808.694	12802.737		2500 I	Ar I	HU73
7767.107	12871.287		6 L	Tb I	KL70	7809.964	12800.655		1150	Ge I	HU64
7768.00	12869.8		4	Cl	RA69	7810.80	12799.29	0.15	2 L	Tm	CA69
7769.909	12866.644		7 L	Th I	GI74	7811.077	12798.83		6 L	Ce II	VE72
7770.46	12865.73	0.25	1 L	Tm	CA69	7812.87	12795.9		12	Cl	RA69
7770.882	12865.04		6	Cm I	CO76	7814.158	12793.785	0.06	6 L	Gd I	BL71
7770.972	12864.88		2	Se I	MO74	7814.450	12793.31	0.02	5	Li I	JO59
7772.779	12861.892		100	Kr I	KA69	7815.86	12791.0	0.50	1	Hf	GO70
7772.85	12861.776	0.10	3 L	Nd	BL70	7816.124	12790.57	0.01	20	He I	LT70
7772.87	12861.74		30	Br I	TE63	7816.580	12789.820	0.06	7 L	Sm	BL69
7772.925	12861.651		4 L	Th I	GI74	7816.64	12789.722	0.10	3 L	Nd II	BL70
7774.06	12859.77		30	Br I	TE63	7818.409	12786.83		2	Te I	MO75
7774.43	12859.2		13	Cl I	RA69	7819.530	12784.99	0.01	50	He I	LT70
7775.28	12857.75	0.05	580	Hf I	GO70	7821.47	12781.82	0.20	2 L	Tm I	CA69
7779.470	12850.83		3 L	Ce II	VE72	7821.620	12781.578		4 L	Th I	GI74
7779.898	12850.12		2	Se	MO74	7823.49	12778.5	0.02	5 M	N I	ER61
7780.022	12849.92		3	Se	MO74	7825.20	12775.73	0.15	3 L	Tm II	CA69
7781.23	12847.92		125	Ge I	HU64	7827.06	12772.70	0.50	3 W	Zr	TA76
7781.650	12847.23		3 L	Ce	VE72	7827.78	12771.51	0.02	15	N I	ER61
7781.71	12847.13	0.20	1 L	Tm	CA69	7828.23	12770.79	0.02	11	Zr	TA76
7782.34	12846.09		4	I I	LU75	7829.003	12769.525		250	Ne I	HU73
7782.417	12845.96	0.01	7	He I	LT70	7830.797	12766.60		5 L	Ce II	VE72
7783.438	12844.28		3 L	Ce II	VE72	7831.193	12765.954		12	Ar I	HU73
7783.601	12844.01		3 L	Ce II	VE72	7833.224	12762.645	0.10	3 L	Gd	BL71
7783.80	12843.68		1	I I	LU75	7833.560	12762.096		6 L	Th I	GI74
7784.950	12841.785	0.15	3 L	Sm I	BL69	7834.58	12760.44	0.25	1 L	Tm	CA69
7785.621	12840.68		9	Se I	MO74	7836.712	12756.960	0.01	15	Ce III	LI72
7785.689	12840.57	0.01	2	Fe I	LI76	7837.34	12755.94		60	Br I	TE63
7786.040	12839.99		2	Te I	MO75	7837.501	12755.68	0.10	3	Ne I	LI68
7786.47	12839.28	0.50	10	Hf	GO70	7837.75	12755.275	0.15	3 L	Nd II	BL70
7786.529	12839.18		3 L	Ce II	VE72	7839.325	12752.71	0.10	2	Ne I	LI68
7787.01	12838.39	0.02	42	Zr I	TA76	7839.744	12752.030	0.07	5 L	Gd I	BL71
7787.227	12838.03		3 L	Ce I	VE72	7841.585	12749.04	0.10	16	Ne I	LI68
7787.630	12837.366	0.15	3 L	Sm	BL69	7841.97	12748.40	0.10	2 W	Hf I	GO70
7788.227	12836.381		1750	Ge I	HU64	7843.160	12746.476	0.15	3 L	Sm I?	BL69
7788.91	12835.256	0.10	3 L	Nd	BL70	7843.160	12746.476	0.15	3 L	Sm II?	BL69
7790.70	12832.307	0.10	3 L	Nd	BL70	7843.310	12746.232		400	Ar I	HU73
7791.16	12831.55	0.20	1 L	Tm	CA69	7843.368	12746.14	0.10	11	Ne I	LI68
7791.768	12830.547		3 L	Th I	GI74	7843.408	12746.07		5	Te I	MO75
7791.86	12830.40		15	Ge I	HU64	7845.189	12743.18		3 L	Ce I	VE72
7792.23	12829.787	0.05	5 L	Nd	BL70	7845.24	12743.09		90 B	Ge I?	HU64
7793.508	12827.68		35	Te I	MO75	7845.24	12743.09		90 B	Ge I?	HU64
7793.911	12827.02		18	Ca I	RI68	7848.08	12738.49	0.25	1 L	Tm	CA69
7794.041	12826.806		3 L	Th I	GI74	7848.77	12737.37	0.25	1 L	Tm	CA69
7794.574	12825.929		5 B	Kr I?	KA69	7848.84	12737.25	0.20	180 U	Hf I	GO70
7795.226	12824.86	0.01	3	Fe I	LI76	7850.677	12734.28		8	Cm I	CO76
7795.338	12824.671		5 B	Kr I?	KA69	7850.789	12734.09		3 L	Ce	VE72
7795.833	12823.86		24	Ca I	RI68	7851.102	12733.582		3 L	Th I	GI74
7796.716	12822.41		3	Cm I	CO76	7851.203	12733.418		600	Ar I	HU73
7797.080	12821.807	0.15	3 L	Sm	BL69	7851.218	12733.393	0.10	3 L	Gd I	BL71
7797.08	12821.81	0.15	3 L	Tm	CA69	7851.788	12732.47		4 L	Ce II	VE72
7797.191	12821.620	0.01	12	Ce III	LI72	7852.633	12731.10		54	Te I	MO75
7797.76	12820.69	0.25	1 L	Tm	CA69	7852.89	12730.68	0.02	35	N I	ER61
7800.588	12816.04		25	Ca I	RI68	7856.533	12724.78		3 L	Ce I?	VE72
7801.86	12813.96	0.02	3	Hf	GO70	7856.533	12724.78		3 L	Ce I?	VE72
7802.144	12813.484		15	Ar I	HU73	7858.13	12722.19	0.20	70	Hf I	GO70
7803.29	12811.60	0.25	1 L	Tm	CA69	7862.30	12715.45	0.20	210	Hf I	GO70
7804.57	12809.50		400	Br I	TE63	7865.27	12710.64	0.05	100	Zr	TA76
7804.57	12809.50		1	Br I	TE63	7865.780	12709.820		4 L	Th I	GI74
7805.173	12808.51		2	Se I	MO74	7866.05	12709.384	0.08	4 L	Nd	BL70
7805.326	12808.26	0.01	1	Fe I	LI76	7866.083	12709.330		5 L	Th I	GI74
7806.004	12807.15	0.01	4	Fe I	LI76	7866.35	12708.89	0.02	30	N I	ER61
7807.008	12805.50		161	Te I	MO75	7867.50	12707.04		1	I I	LU75
7807.460	12804.76		3 L	Ce I	VE72	7868.288	12705.770	0.08	4 L	Gd I	BL71
7807.62	12804.50	0.10	9	Zr	TA76	7869.08	12704.49	0.20	2 L	Tm I	CA69
7808.50	12803.0		37	Cl I	RA69	7869.58	12703.68	0.10	3 L	Tm	CA69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7870.449	12702.280		1250	Ar I	HU73	7913.12	12633.78	0.15	2 L	Tm I	CA69
7873.720	12697.00		8	Ar I	HU73	7913.896	12632.545		3 L	Th I	GI74
7876.10	12693.17	0.02	8	Zr I	TA76	7913.96	12632.4		3	Cl I	RA69
7876.53	12692.48		450	Yb II	ME67	7914.242	12631.99		28	Se I	MO74
7876.91	12691.862	0.05	5 L	Nd	BL70	7918.202	12625.68		8	Se I	MO74
7877.183	12691.421		4 L	Th I	GI74	7919.635	12623.391		2500 I	Xe I	HU73
7877.767	12690.48		3 L	Ce I	VE72	7919.68	12623.32	0.13	2 L	Tm II	CA69
7878.562	12689.201		1000	Ne I	HU73	7920.132	12622.600	0.05	7 L	Gd I	BL71
7878.58	12689.171	0.05	5 L	Nd I	BL70	7920.747	12621.619		90	Ar I	HU73
7880.972	12685.32		3 L	Ce I	VE72	7920.92	12621.3		47	Cl I	RA69
7881.024	12685.24		9 B	Ar I	HU73	7922.06	12619.527	0.10	3 L	Nd	BL70
7881.224	12684.91		9 B	Ar I	HU73	7923.226	12617.670		20 B	Ne I?	HU73
7881.296	12684.798		3 L	Th	GI74	7923.230	12617.663		20 B	Ne I?	HU73
7881.55	12684.38	0.10	1	Hf	GO70	7923.610	12617.059	0.15	3 L	Sm I?	BL69
7881.95	12683.7		2 B	Cl I	RA69	7923.610	12617.059	0.15	3 L	Sm II?	BL69
7882.064	12683.56	0.10	8	Ne I	LI68	7923.802	12616.75		5	Te I	MO75
7882.281	12683.213		4 L	Th II	GI74	7924.05	12616.36	0.25	1 L	Tm	CA69
7882.944	12682.147	0.06	6 L	Gd I	BL71	7924.317	12615.93	0.01	2	Fe I	LI76
7883.381	12681.44		2	Se	MO74	7924.646	12615.41		6	Cm I	CO76
7883.484	12681.278		400	Ge I	HU64	7924.892	12615.02		70	Te I	MO75
7884.560	12679.547	0.12	4 L	Sm II	BL69	7925.47	12614.10	0.02	26	C I	JO65
7884.60	12679.5		1	Cl I	RA69	7925.52	12614.02	0.05	5	Zr	TA76
7884.79	12679.17	0.01	B	Na I	JO61	7926.01	12613.24	0.25	1 L	Tm	CA69
7886.368	12676.64		4 L	Ce II	VE72	7928.491	12609.29		3 L	Ce I	VE72
7886.403	12676.584		1500	Ge I	HU64	7929.430	12607.798	0.15	3 L	Sm II?	BL69
7889.41	12671.753	0.07	4 L	Nd	BL70	7929.430	12607.798	0.15	3 L	Sm II?	BL69
7891.72	12668.04		1	I I	LU75	7930.86	12605.5		1	Cl I	RA69
7892.110	12667.418	0.06	7 L	Sm I?	BL69	7930.900	12605.461	0.12	4 L	Sm	BL69
7892.110	12667.418	0.06	7 L	Sm II?	BL69	7931.688	12604.21	0.10	16	Ne I	LI68
7893.76	12664.770	0.10	3 L	Nd	BL70	7933.097	12601.97		35	Te I	MO75
7893.870	12664.594		25 B	Ne I?	HU73	7933.40	12601.48	0.02	8	C I	JO65
7893.874	12664.587		25 B	Ne I?	HU73	7933.400	12601.488	0.10	3 L	Gd I	BL71
7894.41	12663.73		1	I I	LU75	7934.03	12600.49	0.25	1 L	Tm I	CA69
7895.39	12662.16	0.02	27	N I	ER61	7935.25	12598.55	0.25	1 L	Tm	CA69
7895.64	12661.7		47	Cl I	RA69	7936.683	12596.276		40 B	Ar I?	HU73
7895.920	12661.31		15 B	Ar I	HU73	7936.725	12596.209		40 B	Ar I?	HU73
7897.501	12658.77		4 L	Ce I	VE72	7937.484	12595.004		300	Ne I	HU73
7897.740	12658.39	0.10	14	Ne I	LI68	7938.02	12594.2		142	Cl I	RA69
7898.448	12657.25		6	Se	MO74	7938.280	12593.742	0.12	4 L	Sm	BL69
7899.580	12655.439	0.15	3 L	Sm I	BL69	7939.47	12591.86	0.02	4	Hf	GO70
7902.338	12651.02	0.10	7	Ne I	LI68	7940.511	12590.203		300	Xe I	HU73
7902.764	12650.34		20 B	Ar I?	HU73	7941.152	12589.19		389	Te I	MO75
7903.004	12649.96		20 B	Ar I?	HU73	7941.37	12588.84	0.25	1 L	Tm I	CA69
7903.759	12648.75	0.01	7	Fe I	LI76	7941.75	12588.24	0.25	1 L	Tm I	CA69
7903.77	12648.73	0.05	55	Zr I	TA76	7941.971	12587.889		4 L	Th I	GI74
7904.51	12647.55		10	Br I	TE63	7942.00	12587.84	0.02	77	Zr I	TA76
7904.936	12646.864	0.06	6 L	Gd I	BL71	7942.244	12587.46	0.10	26	Ne I	LI68
7905.141	12646.536		8 L	Th I	GI74	7943.74	12585.1		10	Cl I	RA69
7905.665	12645.697		4 L	Th I	GI74	7944.028	12584.63	0.10	30	Ne I	LI68
7906.633	12644.15		3 L	Ce II	VE72	7945.549	12582.22		4 L	Ce II	VE72
7907.35	12643.00	0.10	3 L	Tm I	CA69	7945.95	12581.59	0.02	6	C I	JO65
7907.510	12642.75	0.10	22	Ne I	LI68	7946.32	12581.00	0.02	27	N I	ER61
7907.627	12642.56		3 L	Ce I	VE72	7947.544	12579.063	0.06	7 L	Gd I	BL71
7907.765	12642.339		3 L	Th	GI74	7947.73	12578.8	0.02	3	N I	ER61
7908.253	12641.56		3 L	Ce I?	VE72	7947.91	12578.483	0.10	3 L	Nd	BL70
7908.253	12641.56		3 L	Ce I?	VE72	7948.25	12577.94		2	Se I	MO74
7908.363	12641.383		3 L	Th I	GI74	7948.603	12577.386		5	Ne I	HU73
7908.985	12640.39	0.10	16	Ne I	LI68	7948.777	12577.11		3 L	Ce I	VE72
7909.141	12640.14		5 L	Ce II	VE72	7949.49	12575.99	0.02	8	N I	ER61
7910.035	12638.71	0.01	15	Fe I	LI76	7950.909	12573.738		10 B	Ne I?	HU73
7910.180	12638.480		25	Ar I	HU73	7950.916	12573.727		10 B	Ne I?	HU73
7911.23	12636.80		150	Ge I	HU64	7950.93	12573.71	0.02	34	Zr I	TA76
7911.643	12636.142		5 L	Th I	GI74	7952.683	12570.934		10 B	Ne I?	HU73
7911.69	12636.068	0.08	4 L	Nd II	BL70	7952.690	12570.923		10 B	Ne I?	HU73
7912.008	12635.56		3 L	Ce I?	VE72	7952.70	12570.91	0.25	1 L	Tm I	CA69
7912.008	12635.56		3 L	Ce I?	VE72	7953.248	12570.04	0.02	20 LB	O I	EI63

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
7953.88	12569.04	0.02	5	C I	JO65	8015.19	12472.90	0.25	1 L	Tm	CA69
7955.655	12566.24		188	Te I	MO75	8017.30	12469.62	0.02	1350	N I	ER61
7955.66	12566.230	0.07	5 L	Nd I	BL70	8017.444	12469.39		2	Se	MO74
7956.661	12564.65		7	Cm I	CO76	8017.549	12469.228		4 L	Th I	GI74
7956.84	12564.4	0.02	4 M	N I	ER61	8017.590	12469.16		8	Se	MO74
7957.34	12563.6		38	Cl I	RA69	8018.29	12468.08	0.25	1 L	Tm I	CA69
7958.26	12562.12	0.02	6	C I	JO65	8018.66	12467.51	0.02	660	Hf	GO70
7958.600	12561.59		6	Cm I	CO76	8020.234	12465.053		3 L	Th I	GI74
7958.620	12561.555		3 L	Th I	GI74	8020.275	12465.00		9	Cm I	CO76
7958.738	12561.370	0.01	1	Pb I	AN68	8020.80	12464.2	0.02	5 M	N I	ER61
7958.89	12561.13	0.20	2 L	Tm I	CA69	8020.860	12464.08	0.10	4	Ne I	LI68
7961.09	12557.66	0.02	14 U	N I	ER61	8020.897	12464.02	0.02	21 LB	O I	EI63
7961.511	12556.99	0.01	5	Fe I	LI76	8022.68	12461.25	0.02	680	N I	ER61
7962.506	12555.43		3	Se	MO74	8022.864	12460.967		4 L	Th I	GI74
7963.204	12554.324		75	Ar I	HU73	8022.90	12460.912	0.07	5 L	Nd I	BL70
7964.024	12553.032		5 L	Th I	GI74	8023.881	12459.389		800	Ne I	HU73
7964.170	12552.801		4 L	Th I	GI74	8024.720	12458.086	0.15	3 L	Sm	BL69
7965.91	12550.06	0.15	3 L	Tm I	CA69	8025.990	12456.114		2000	Ar I	HU73
7966.28	12549.48	0.02	5	C I	JO65	8026.720	12454.99		9	Cm I	CO76
7966.55	12549.052	0.08	4 L	Nd	BL70	8027.82	12453.27	0.10	2	Hf	GO70
7969.99	12543.64	0.25	1 L	Tm I	CA69	8027.828	12453.262		3 L	Th I	GI74
7970.90	12542.20	0.25	1 L	Tm I	CA69	8028.934	12451.547		75	Xe I	HU73
7971.25	12541.65	0.02	270	Hf I	GO70	8029.234	12451.082	0.01	10	S I	JA67
7971.930	12540.583	0.15	3 L	Sm II	BL69	8031.222	12447.999	0.05	7 L	Gd I	BL71
7972.043	12540.406		475	Ge I	HU64	8031.552	12447.488		5 L	Th I	GI74
7972.600	12539.529	0.12	4 L	Sm I?	BL69	8031.86	12447.01	0.25	1 L	Tm	CA69
7972.600	12539.529	0.12	4 L	Sm II?	BL69	8032.904	12445.393		3 L	Th I	GI74
7974.17	12537.06	0.02	5	Zr	TA76	8033.15	12445.01	0.25	1 L	Tm	CA69
7975.932	12534.29		3 L	Ce	VE72	8035.086	12442.013		5 L	Th I	GI74
7976.581	12533.27		3 L	Ce II?	VE72	8036.12	12440.41	0.05	8	Zr	TA76
7976.581	12533.27		3 L	Ce I?	VE72	8036.825	12439.321		5000 I	Ar I	HU73
7977.27	12532.19	0.02	8	Zr I	TA76	8037.33	12438.54	0.02	20	Hf I	GO70
7980.245	12527.52	0.01	20	He I	LT70	8037.42	12438.40	0.02	195	N I	ER61
7980.25	12527.51	0.02	3	Hf I	GO70	8038.555	12436.65		4	Cm	CO76
7980.657	12526.87		3 L	Ce	VE72	8040.69	12433.34	0.25	1 L	Tm	CA69
7983.670	12522.141	0.01	98	K I	JO72	8041.380	12432.274	0.01	56	K I	JO72
7985.938	12518.585	0.01	6 B	S I	JA67	8041.62	12431.90	0.25	1 L	Tm	CA69
7986.004	12518.48		29	Se I	MO74	8042.26	12430.915	0.10	3 L	Nd	BL70
7986.187	12518.195		3 L	Th I	GI74	8042.77	12430.1		12	Cl I	RA69
7986.27	12518.07	0.10	2	Hf	GO70	8043.62	12428.81	0.02	6	N I	ER61
7986.52	12517.67	0.02	185	Zr I	TA76	8046.47	12424.41	0.02	54	Zr I	TA76
7987.390	12516.31		3 L	Ce	VE72	8047.50	12422.82	0.25	1 L	Tm II	CA69
7987.659	12515.888	0.01	4 B	S I	JA67	8047.837	12422.300		4 L	Th I	GI74
7988.430	12514.68		3 L	Ce	VE72	8048.012	12422.03		5 L	Ce II	VE72
7988.43	12514.68	0.05	4 L	Tm II	CA69	8049.049	12420.430	0.06	7 L	Gd I	BL71
7988.64	12514.35	0.02	17	Zr	TA76	8049.308	12420.030		60	Ar I	HU73
7989.25	12513.40		20	Br I	TE63	8049.690	12419.44		4 L	Ce I	VE72
7990.660	12511.188	0.15	3 L	Sm	BL69	8049.707	12419.414		150	Ar I	HU73
7993.04	12507.46	0.25	1 L	Tm	CA69	8051.34	12416.90	0.25	1 L	Tm II	CA69
7994.88	12504.53	0.20	1 L	Tm	CA69	8052.465	12415.160		5 L	Th I	GI74
7996.09	12502.7		63	Cl I	RA69	8053.69	12413.272	0.07	5 L	Nd II	BL70
8000.030	12495.285	0.10	5 L	Sm II	BL69	8053.73	12413.22	0.02	9	Hf I	GO70
8004.75	12489.17		1	I I	LU75	8055.00	12411.26	0.05	2	Hf I	GO70
8005.38	12488.18	0.02	20	Hf I	GO70	8056.378	12409.131		20	Xe I	HU73
8005.713	12487.663		2500 I	Ar I	HU73	8059.017	12405.07		4	Cm I	CO76
8006.313	12486.73	0.10	13	Ne I	LI68	8059.12	12404.909	0.15	4 L	Nd I	BL70
8006.64	12486.22		1 L	Ar II?	MI63	8059.430	12404.432	0.06	7 L	Sm II	BL69
8006.747	12486.05		6 L	Ce I	VE72	8059.53	12404.27	0.02	98	N I	ER61
8010.28	12480.544	0.10	3 L	Nd	BL70	8060.472	12402.828		2000	Ar I	HU73
8010.440	12480.295	0.08	4 L	Gd I	BL71	8060.50	12402.78		15	I I	LU75
8012.364	12477.297		7 L	Th I	GI74	8061.107	12401.85		3 L	Ce I	VE72
8013.001	12476.305		3 L	Th I	GI74	8061.22	12401.68	0.20	1 L	Tm I	CA69
8013.170	12476.042	0.12	4 L	Sm I?	BL69	8062.095	12400.331		3 L	Th II	GI74
8013.170	12476.042	0.12	4 L	Sm II?	BL69	8063.390	12398.34		13	Te I	MO75
8014.77	12473.56	0.05	1	Hf I	GO70	8063.689	12397.88		3 L	Ce I	VE72
8014.956	12473.262	0.06	7 L	Gd I	BL71	8063.709	12397.849		4 L	Th I	GI74

Section 11. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8065.03	12395.82	0.02	6	Si I	LI65	8118.686	12313.894	0.06	6 L	Gd I	BL71
8065.359	12395.32		3	Cm I	CO76	8118.850	12313.646	0.15	3 L	Sm	BL69
8065.50	12395.10	0.02	70	Zr I	TA76	8120.934	12310.49		2	Se	MO74
8066.110	12394.16		9	Cm I	CO76	8121.209	12310.069		3 L	Th I	GI74
8066.21	12394.01	0.15	2 L	Tm I	CA69	8124.83	12304.58		150	I I	LU75
8066.84	12393.03	0.20	1	Hf I	GO70	8125.26	12303.93		275	Br I	TE63
8067.56	12391.9	0.02	5	N I	ER61	8125.29	12303.89		35	Br I	TE63
8067.791	12391.575		10500	Ge I	HU64	8125.34	12303.81		23	I I	LU75
8068.72	12390.16	0.02	4	Si I	LI65	8126.90	12301.45		2	Se	MO74
8069.45	12389.0		4	Cl	RA69	8127.50	12300.541	0.08	4 L	Nd II	BL70
8069.95	12388.26	0.05	6	Zr	TA76	8128.82	12298.55	0.02	120	N I	ER61
8070.552	12387.338	0.07	5 L	Gd I	BL71	8130.60	12295.85	0.05	5	Zr	TA76
8071.039	12386.59		3 L	Ce II	VE72	8130.891	12295.411	0.10	3 L	Gd I?	BL71
8072.18	12384.83	0.02	12	N I?	ER61	8130.891	12295.411	0.10	3 L	Gd I?	BL71
8072.18	12384.83	0.02	12	N I?	ER61	8131.209	12294.93		6 L	Ce II	VE72
8074.152	12381.813		3 L	Th I	GI74	8132.089	12293.60		4 L	Ce I?	VE72
8074.26	12381.65	0.02	375	N I	ER61	8132.089	12293.60		4 L	Ce I?	VE72
8074.74	12380.91	0.05	3	Hf I	GO70	8134.047	12290.64		6 L	Ce II	VE72
8075.922	12379.10		4 L	Ce II	VE72	8134.39	12290.12		65	Ge I	HU64
8077.166	12377.194		22	Ar I	HU73	8135.15	12288.97	0.02	260	N I?	ER61
8078.36	12375.36	0.25	1 L	Tm I	CA69	8135.15	12288.97	0.02	260	N I?	ER61
8078.674	12374.88		37	Te I	MO75	8135.76	12288.05	0.05	5 W	Zr I	TA76
8079.97	12372.90	0.05	200	Zr I	TA76	8135.785	12288.02		6	Cm	CO76
8080.05	12372.78	0.02	2	Hf	GO70	8135.997	12287.69		5	Se	MO74
8080.240	12372.484		4 L	Th II	GI74	8136.625	12286.746		600	Ge I	HU64
8081.032	12371.28		4	Cm I	CO76	8137.40	12285.57		2	Br I	TE63
8081.35	12370.79	0.10	3 L	Tm I	CA69	8138.680	12283.643	0.10	3 L	Gd I	BL71
8081.37	12370.755	0.10	3 L	Nd II	BL70	8138.92	12283.28	0.05	5 W	Zr	TA76
8082.00	12369.79	0.10	2	Zr	TA76	8140.73	12280.5		16	Cl	RA69
8082.52	12368.99		170	Br I	TE63	8143.56	12276.28	0.02	60	Zr I	TA76
8082.55	12368.95		1 W	Br I	TE63	8144.080	12275.499	0.10	5 L	Sm II	BL69
8084.49	12365.98	0.10	3	Hf I	GO70	8144.37	12275.06	0.10	3 L	Tm I	CA69
8084.50	12365.97	0.05	4	Zr	TA76	8145.390	12273.525	0.15	3 L	Sm	BL69
8084.72	12365.629	0.10	3 L	Nd	BL70	8145.437	12273.46		3	Cm I	CO76
8086.10	12363.52	0.10	3 L	Tm I	CA69	8145.53	12273.31	0.05	6	Zr I	TA76
8089.66	12358.08	0.05	20 U	Hf I	GO70	8145.634	12273.16		65	Te I	MO75
8089.868	12357.76		6 L	Ce II	VE72	8146.466	12271.904		50	Xe I	HU73
8090.82	12356.30		1 L	Ar I	MI73	8147.20	12270.80	0.02	20 M	N I	ER61
8090.826	12356.296		450 I	Ar I	HU73	8147.28	12270.68	0.02	120	Si I	LI65
8091.00	12356.03	0.02	290	Zr I	TA76	8148.15	12269.37	0.05	6	Zr I	TA76
8091.11	12355.87	0.10	3	Hf	GO70	8150.85	12265.30		11	I I	LU75
8091.96	12354.56		40	Br I	TE63	8151.787	12263.89		3	Se	MO74
8092.05	12354.43		1	Br I	TE63	8151.89	12263.74	0.20	60	Hf	GO70
8093.648	12351.988		3 L	Th	GI74	8152.203	12263.27		5	Cm I	CO76
8094.195	12351.153	0.08	4 L	Gd	BL71	8153.53	12261.28	0.02	27 M	N I	ER61
8096.706	12347.32		3	Se	MO74	8153.880	12260.745	0.12	4 L	Sm II	BL69
8098.735	12344.229	0.01	1	Pb I	AN68	8155.862	12257.765		100	Xe I	HU73
8099.285	12343.392		900 I	Ar I	HU73	8156.00	12257.56	0.20	1 L	Tm I	CA69
8099.594	12342.92	0.01	2	Fe I	LI76	8158.91	12253.186	0.08	4 L	Nd	BL70
8099.719	12342.73		5 L	Ce I	VE72	8159.19	12252.77	0.05	3	Hf I	GO70
8099.96	12342.36	0.05	3	Hf	GO70	8160.75	12250.42	0.25	1 L	Tm	CA69
8101.195	12340.48	0.01	1	Fe I	LI76	8160.96	12250.11	0.02	11 M	N I	ER61
8102.324	12338.762		550	Ge I	HU64	8161.573	12249.188		4 L	Th I	GI74
8102.825	12337.998		7 L	Th I	GI74	8161.68	12249.03	0.10	3	Hf I	GO70
8102.914	12337.863	0.06	6 L	Gd I	BL71	8164.042	12245.483		3 L	Th I	GI74
8103.550	12336.895	0.15	3 L	Sm	BL69	8164.384	12244.970		3 L	Th II	GI74
8104.174	12335.95		5	Te I	MO75	8165.343	12243.54		3	Cm I	CO76
8108.220	12329.790	0.10	5 L	Sm II	BL69	8167.11	12240.884	0.07	5 L	Nd	BL70
8108.90	12328.76	0.02	350	N I	ER61	8167.16	12240.81	0.10	3 L	Tm	CA69
8111.169	12325.31		38	Te I	MO75	8167.321	12240.568		2	Kr I	KA69
8111.397	12324.96		5 L	Ce I	VE72	8168.120	12239.37		3 L	Ce I	VE72
8111.70	12324.5		3	Cl	RA69	8169.255	12237.67	0.02	4	Li I	JO59
8112.455	12323.353	0.10	3 L	Gd I	BL71	8169.68	12237.03	0.25	1 L	Tm	CA69
8113.925	12321.120		3 L	Th I	GI74	8170.19	12236.3		5	Cl I	RA69
8115.947	12318.050		3 L	Th I	GI74	8170.875	12235.243		375	Xe I	HU73
8118.250	12314.56		6	Cm I	CO76	8171.440	12234.397		30	Ar I	HU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8172.240	12233.199		5 L	Th I	GI74	8227.274	12151.369		80	Ar I	HU73
8173.025	12232.02		45	Te I	MO75	8227.47	12151.08	0.15	2 L	Tm	CA69
8173.080	12231.942		8 L	Th I	GI74	8228.882	12148.994	0.10	3 L	Gd I	BL71
8173.50	12231.32	0.02	75 M	N I	ER61	8232.57	12143.56	0.10	7	Hf I	GO70
8173.62	12231.1		16	Cl I	RA69	8233.51	12142.16	0.02	12	N I	ER61
8173.743	12230.95		3 L	Ce II	VE72	8233.81	12141.72	0.05	23	Zr	TA76
8174.40	12229.97	0.25	1 L	Tm	CA69	8234.331	12140.955		3 L	Th I	GI74
8174.70	12229.5		4	Cl	RA69	8235.157	12139.737		700	Ar I	HU73
8174.787	12229.389		4	Kr I	KA69	8235.46	12139.29	0.02	20	Zr	TA76
8174.93	12229.175	0.08	4 L	Nd	BL70	8237.464	12136.34		4	Te I	MO75
8175.42	12228.442	0.10	3 L	Nd	BL70	8237.737	12135.94		106	I I	LU75
8176.307	12227.11	0.01	3	Fe I	LI76	8238.25	12135.180	0.10	3 L	Nd	BL70
8176.792	12226.39		6 L	Ce II	VE72	8239.19	12133.80	0.02	35	Zr I	TA76
8176.934	12226.177		4 L	Th I	GI74	8240.395	12132.020		3 L	Th I	GI74
8178.00	12224.58	0.10	2	Hf I	GO70	8241.79	12129.97	0.02	170	N I	ER61
8180.876	12220.29		4 W	Cm I	CO76	8242.157	12129.427		5 L	Th I	GI74
8182.723	12217.53		6	Cm I	CO76	8243.601	12127.302		8 L	Th I	GI74
8183.525	12216.330	0.10	5 L	Gd I	BL71	8243.762	12127.07		6	Tc I	MO75
8183.599	12216.22		5 L	Ce I	VE72	8243.98	12126.75	0.10	3 L	Tm I	CA69
8185.04	12214.07	0.25	1 L	Tm	CA69	8244.201	12126.419		5 L	Th I	GI74
8185.058	12214.041	0.06	6 L	Gd I	BL71	8244.83	12125.49	0.05	3	Hf I	GO70
8185.750	12213.01		3 L	Ce II	VE72	8245.440	12124.60	0.02	35	N I	ER61
8185.81	12212.92	0.25	1 L	Tm I	CA69	8245.866	12123.97		23	Se I	MO74
8187.66	12210.17	0.02	12 M	N I	ER61	8246.02	12123.75	0.25	1 L	Tm	CA69
8188.54	12208.85	0.02	6	Zr	TA76	8246.161	12123.537		40	Kr I	KA69
8189.29	12207.73		200	Ge I	HU64	8248.697	12119.81		3 L	Ce I	VE72
8189.851	12206.894		7 L	Th I	GI74	8248.810	12119.644		3 L	Th I	GI74
8189.90	12206.82	0.05	6	Zr	TA76	8248.914	12119.49	0.01	2	Fe I	LI76
8191.84	12203.93	0.02	150	N I	ER61	8250.698	12116.87		4 L	Ce II	VE72
8191.915	12203.818		50	Xe I	HU73	8250.852	12116.65		5	Cm I	CO76
8192.26	12203.31	0.25	1 L	Tm	CA69	8253.33	12113.01	0.25	1 L	Tm II	CA69
8192.48	12202.98	0.02	310	Zr I	TA76	8253.795	12112.324		1300 I	Ar I	HU73
8192.54	12202.89	0.10	3	Hf	GO70	8254.73	12111.0		60	Cl I	RA69
8193.377	12201.64		3 L	Ce II?	VE72	8255.38	12110.00		55	Ge I	HU64
8193.377	12201.64		3 L	Ce I?	VE72	8255.53	12109.78	0.02	9 L	Ga I	JO67
8195.231	12198.881		300	Ge I	HU64	8255.765	12109.434		3 L	Th I	GI74
8197.452	12195.575	0.08	4 L	Gd I	BL71	8255.86	12109.30	0.02	25 M	N I	ER61
8198.405	12194.157		8 L	Th II	GI74	8256.32	12108.62	0.02	4	Hf I	GO70
8199.51	12192.52	0.02	77	Zr I	TA76	8256.63	12108.16		14 B	Br I?	TE63
8199.60	12192.39	0.05	3	Hf	GO70	8256.68	12108.09		14 B	Br I?	TE63
8200.03	12191.74	0.25	1 L	Tm I	CA69	8256.73	12108.019	0.07	5 L	Nd II	BL70
8200.061	12191.70		4	Se	MO74	8257.71	12106.59	0.02	45	N I	ER61
8200.186	12191.51		2	Se	MO74	8257.950	12106.23		34	Se I	MO74
8200.300	12191.34		3 L	Ce II	VE72	8258.211	12105.85		11	Se I	MO74
8200.890	12190.463	0.15	3 L	Sm I?	BL69	8259.79	12103.53	0.02	150	Si I	LI65
8200.890	12190.463	0.15	3 L	Sm II?	BL69	8260.624	12102.31		14	Se I	MO74
8201.133	12190.10	0.01	3	Fe I	LI76	8261.34	12101.26	0.05	4 U	Hf I	GO70
8201.552	12189.479	0.10	3 L	Gd I	BL71	8261.433	12101.13		3	Se I	MO74
8203.34	12186.82	0.02	480	N I	ER61	8261.772	12100.63		3 L	Ce I	VE72
8205.880	12183.05		3 L	Ce I?	VE72	8263.450	12098.180	0.02	4 L	Be II	JH61
8205.880	12183.05		3 L	Ce I?	VE72	8263.882	12097.54		5 L	Ce II	VE72
8206.574	12182.019		3 L	Th I	GI74	8264.12	12097.19		13	I I	LU75
8208.103	12179.75		5 L	Ce II	VE72	8265.370	12095.360	0.02	6 L	Be II	JH61
8208.12	12179.7		77	Cl I	RA69	8265.420	12095.289	0.08	6 L	Sm	BL69
8209.51	12177.66	0.15	2 L	Tm I	CA69	8265.910	12094.572	0.12	4 L	Sm II?	BL69
8211.11	12175.29	0.02	5	Hf	GO70	8265.910	12094.572	0.12	4 L	Sm II?	BL69
8211.26	12175.07	0.25	1 L	Tm	CA69	8265.93	12094.54		3	Br I	TE63
8211.28	12175.04	0.05	540	Zr I	TA76	8267.43	12092.348	0.07	5 L	Nd	BL70
8212.290	12173.54		2	Te I	MO75	8267.500	12092.246	0.15	3 L	Sm I	BL69
8212.69	12173.0		60	Cl I	RA69	8270.30	12088.15		2	Br	TE63
8213.454	12171.815		4 L	Th I	GI74	8271.428	12086.503		3 L	Th II	GI74
8215.89	12168.21	0.10	4 L	Tm I	CA69	8271.687	12086.12		23	Te I	MO75
8216.150	12167.821		3 L	Th I	GI74	8272.29	12085.24		27	Ge	HU64
8219.791	12162.431		3 L	Th	GI74	8273.160	12083.973	0.12	4 L	Sm II	BL69
8221.47	12159.95	0.25	1 L	Tm II	CA69	8273.373	12083.66	0.02	30	Mg I	RI65
8223.556	12156.863		2	Kr I	KA69	8273.456	12083.54		3 L	Ce	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8274.50	12082.01	0.02	4	Si I	LI65	8336.91	11991.57	0.02	220	Si I	LI65
8276.571	12078.993	0.10	3 L	Gd I	BL71	8337.61	11990.57		15	Br I	TE63
8277.783	12077.224		160	Kr I	KA69	8338.57	11989.19	0.02	30	Hf I	GO70
8279.64	12074.51	0.02	230	N I	ER61	8341.541	11984.912		1000	Ne I	HU73
8281.259	12072.155	0.08	4 L	Gd I	BL71	8341.714	11984.664		8 L	Th II	GI74
8282.95	12069.69	0.10	12 U	Zr	TA76	8342.053	11984.18	0.02	10	Si I	RA65
8283.06	12069.53	0.05	7	Hf I	GO70	8343.94	11981.47	0.20	1 L	Tm I	CA69
8283.286	12069.201		13000	Ge I	HU64	8345.687	11978.96		280	Te I	MO75
8285.254	12066.334		3000 I	Ne I	HU73	8345.960	11978.567	0.15	3 L	Sm I	BL69
8285.65	12065.76		450	Ge I	HU64	8349.23	11973.88	0.15	3 L	Tm	CA69
8286.94	12063.879	0.10	3 L	Nd I?	BL70	8349.791	11973.07		130	Se I	MO74
8286.94	12063.879	0.10	3 L	Nd II?	BL70	8349.807	11973.05	0.01	1030	Fe I	LI76
8288.63	12061.41		300	Ge I	HU64	8349.886	11972.93		426	Se I	MO74
8290.887	12058.14		97	Se I	MO74	8350.04	11972.72	0.02	20	Zr	TA76
8292.70	12055.49		100	Ge I	HU64	8351.50	11970.62	0.05	5	Zr	TA76
8294.357	12053.09	0.01	2	Fe I	LI76	8352.550	11969.12	0.01	30	He I	LT70
8297.710	12048.22		3 L	Ce II	VE72	8353.20	11968.19	0.10	4 L	Tm I	CA69
8298.810	12046.624	0.06	7 L	Sm II	BL69	8353.280	11968.07		8	Se I?	MO74
8299.950	12044.969	0.06	7 L	Sm II	BL69	8353.280	11968.07		8	Se I?	MO74
8301.28	12043.04	0.02	680	Hf I	GO70	8354.470	11966.365	0.15	3 L	Sm	BL69
8302.44	12041.36	0.10	20	Hf	GO70	8354.698	11966.04		101	Se I	MO74
8303.106	12040.39		3 L	Ce	VE72	8354.756	11965.96		50	Se I	MO74
8305.00	12037.65	0.15	3 L	Tm I	CA69	8354.91	11965.74		60	Ge I	HU64
8305.004	12037.639		4 L	Th I	GI74	8355.40	11965.03	0.10	4 L	Tm II	CA69
8305.198	12037.365	0.08	4 L	Gd I	BL71	8356.37	11963.65	0.25	1 L	Tm I	CA69
8305.630	12036.732	0.15	3 L	Sm	BL69	8356.648	11963.25		96	Se I	MO74
8307.03	12034.71	0.02	7	Hf	GO70	8357.285	11962.34		5	Cm I	CO76
8307.20	12034.46	0.15	3 L	Tm	CA69	8357.926	11961.42		6	Se I	MO74
8307.26	12034.37	0.05	770	Zr I	TA76	8358.28	11960.91	0.05	390	Hf	GO70
8307.727	12033.69		300	I I	LU75	8358.821	11960.136		3 L	Th II	GI74
8309.23	12031.51	0.02	440	Si I	LI65	8360.610	11957.577	0.12	4 L	Sm II	BL69
8309.25	12031.49	0.10	5	Zr	TA76	8360.871	11957.21		4	Cm I?	CO76
8309.387	12031.29		3 L	Ce II?	VE72	8360.871	11957.21		4	Cm I?	CO76
8309.387	12031.29		3 L	Ce I?	VE72	8360.91	11957.15	0.05	9	Zr	TA76
8309.387	12031.29		3 L	Ce I?	VE72	8361.749	11955.95		17	Ca I	RI68
8310.77	12029.29	0.02	20	Hf	GO70	8362.13	11955.40	0.25	1 L	Tm	CA69
8311.81	12027.782	0.15	3 L	Nd	BL70	8364.062	11952.64		292	Se I	MO74
8312.24	12027.160	0.15	3 L	Nd	BL70	8364.321	11952.27		112	Se I	MO74
8312.594	12026.648		80	Ar I	HU73	8364.467	11952.063		4 L	Th I	GI74
8313.29	12025.64		100	Ge I	HU64	8364.791	11951.60		3 L	Ce I	VE72
8313.480	12025.366	0.15	3 L	Sm	BL69	8365.901	11950.01		82	Te I	MO75
8314.73	12023.56		34	I I	LU75	8366.11	11949.72	0.01	1 L	Ca II	ED56
8316.00	12021.72	0.02	40	Hf I	GO70	8366.17	11949.63	0.15	3 L	Tm	CA69
8316.04	12021.7		172	Cl I	RA69	8366.24	11949.55	0.10	8 W	Hf	GO70
8318.078	12018.718		7 L	Th I	GI74	8366.53	11949.12	0.02	10 L	Ga I	JO67
8318.538	12018.054		4 L	Th I	GI74	8366.93	11948.54		1 L	Ar	MI63
8318.680	12017.86		9	Cm I	CO76	8367.18	11948.19	0.20	1 L	Tm	CA69
8319.994	12015.950		4 L	Th I	GI74	8367.25	11948.09	0.05	580	Zr I	TA76
8320.237	12015.60		5 L	Ce I	VE72	8367.35	11947.95	0.05	8	Hf	GO70
8321.110	12014.34		3 L	Ce II	VE72	8367.367	11947.92		101	Se I	MO74
8322.31	12012.607	0.10	3 L	Nd	BL70	8368.105	11946.87		752	Se I	MO74
8322.93	12011.68		70	Ge I	HU64	8368.248	11946.67		4 L	Ce II	VE72
8323.54	12010.83	0.15	3 L	Tm I	CA69	8369.159	11945.362		6 L	Th I	GI74
8325.604	12007.854		5 L	Th II	GI74	8370.24	11943.82		3 L	Ar I	MI73
8325.788	12007.59		14	Te I	MO75	8370.614	11943.285		4 L	Ar I	MI73
8327.580	12005.005	0.08	6 L	Sm	BL69	8371.424	11942.130		5 L	Th I	GI74
8329.380	12002.41		5 L	Ce	VE72	8371.824	11941.560	0.10	7 L	Gd I	BL71
8329.60	12002.094	0.15	3 L	Nd	BL70	8372.470	11940.638		7 L	Th I	GI74
8329.747	12001.881	0.06	6 L	Gd I	BL71	8373.68	11938.92	0.02	26	Zr	TA76
8332.19	11998.36	0.02	110	N I	ER61	8375.12	11936.86	0.10	5	Zr	TA76
8332.51	11997.902	0.10	3 L	Nd	BL70	8375.310	11936.60		7	Cm I	CO76
8333.063	11997.105		600	Kr I	KA69	8376.04	11935.55	0.25	1 L	Tm II	CA69
8333.237	11996.86		450	I I	LU75	8376.732	11934.56		152	Se I	MO74
8333.827	11996.005		25	Kr I	KA69	8379.19	11931.07	0.20	10	Hf I	GO70
8334.84	11995.41	0.10	2	Hf I	GO70	8379.856	11930.11		13	Te I	MO75
8336...			2 L	Ce I	VE72	8380.57	11929.10	0.02	2	Hf I	GO70

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8380.630	11929.013	0.15	3 L	Sm	BL69	8437.608	11848.46		5	Se	MO74
8381.26	11928.11		8	Br I	TE63	8438.01	11847.89	0.20	1 L	Tm I	CA69
8381.531	11927.73		5 L	Ce II	VE72	8438.43	11847.30	0.05	4	Hf I	GO70
8381.953	11927.13		4 L	Ce II	VE72	8438.56	11847.12	0.05	460	Zr I	TA76
8383.28	11925.24	0.20	1 L	Tm II	CA69	8441.047	11843.63		5 L	Ce I?	VE72
8384.727	11923.18	0.01	1	Fe	LI76	8441.047	11843.63		5 L	Ce I?	VE72
8387.780	11918.844	0.10	7 L	Gd I	BL71	8443.80	11839.77		100 B	Ge I	HU64
8389.071	11917.009		550	Ge I	HU64	8444.36	11838.99	0.01	2 L	Ca II	ED56
8389.369	11916.586		3 L	Th I	GI74	8444.380	11838.956	0.15	3 L	Sm II	BL69
8389.74	11916.06	0.05	5 W	Zr	TA76	8445.04	11838.03	0.10	6	Hf I	GO70
8391.033	11914.22		3	Te I	MO75	8446.03	11836.642	0.15	3 L	Nd II?	BL70
8392.950	11911.501		4 L	Th	GI74	8446.03	11836.642	0.15	3 L	Nd II?	BL70
8393.178	11911.179	0.10	3 L	Gd I	BL71	8446.49	11836.00	0.05	6 W	Hf	GO70
8393.719	11910.41		3 L	Ce II	VE72	8447.719	11834.28		9	Cm I	CO76
8394.47	11909.34	0.10	3	Hf I	GO70	8448.53	11833.14		1	Br I	TE63
8394.82	11908.848	0.05	6 L	Nd II	BL70	8448.630	11833.00		6 L	Ce II	VE72
8394.89	11908.75	0.10	4 L	Tm	CA69	8450.50	11830.38	0.25	1 L	Tm I	CA69
8395.320	11908.139	0.15	3 L	Sm	BL69	8450.965	11829.730		4 L	Th I	GI74
8397.160	11905.530	0.15	3 L	Sm	BL69	8451.029	11829.640		5 L	Th I	GI74
8397.16	11905.53	0.05	8	Zr	TA76	8451.72	11828.67		75	Ge I	HU64
8398.51	11903.61		8	Br I	TE63	8451.86	11828.478	0.10	3 L	Nd	BL70
8399.09	11902.79		5	Br I	TE63	8452.069	11828.18	0.02	30	Mg I	RI65
8399.848	11901.73		6	Cm	CO76	8452.499	11827.583		4 L	Th I	GI74
8401.177	11899.837		4 L	Th I	GI74	8452.819	11827.14	0.01	1	Fe I	LI76
8402.26	11898.30	0.25	1 L	Tm	CA69	8452.93	11826.98	0.05	12	Zr	TA76
8402.65	11897.75	0.05	3	Hf I	GO70	8454.02	11825.46	0.02	2	Hf I	GO70
8403.26	11896.888	0.10	3 L	Nd I	BL70	8454.372	11824.963	0.06	5 L	Gd I	BL71
8403.75	11896.194	0.10	3 L	Nd	BL70	8454.94	11824.17	0.10	1	Hf	GO70
8404.07	11895.75	0.02	30	C I	JO65	8456.033	11822.640		4 L	Th I	GI74
8404.148	11895.631	0.06	6 L	Gd I	BL71	8456.65	11821.778	0.05	5 L	Nd II	BL70
8404.634	11894.942		3 L	Th I	GI74	8457.221	11820.98		5 L	Ce II	VE72
8406.07	11892.91	0.02	17	C I	JO65	8458.35	11819.40		2	Br	TE63
8406.18	11892.76	0.25	1 L	Tm	CA69	8458.368	11819.377		1500 I	Kr I	KA69
8406.268	11892.63		5 L	Ce II	VE72	8459.092	11818.365	0.06	6 L	Gd I	BL71
8407.01	11891.58	0.02	30	Zr	TA76	8461.258	11815.34		4 L	Ce II	VE72
8407.542	11890.83		8	Te I	MO75	8462.23*	11813.98	0.20	6	Hf I	GO70
8407.78	11890.49	0.25	1 L	Tm	CA69	8464.88	11810.29		1 B	Br I	TE63
8409.21	11888.47	0.10	10	Hf I	GO70	8465.59	11809.294	0.08	4 L	Nd	BL70
8411.997	11884.530		5 L	Th I	GI74	8467.04	11807.27	0.02	30	Th III	LI74
8412.01	11884.51		5 H	Ba I	RU55	8467.73	11806.31		1	Br I	TE63
8412.044	11884.463		2 L	Ar I	MI73	8468.943	11804.617		6 L	Th I	GI74
8412.313	11884.08	0.01	225	Fe I	LI76	8469.303	11804.116		3 L	Th I	GI74
8412.41	11883.95		4	Br I	TE63	8471.38	11801.22		20	Ge I	HU64
8413.191	11882.84	0.01	580	Fe I	LI76	8471.48	11801.08	0.02	7	C I	JO65
8415.50	11879.59	0.02	8	C I	JO65	8473.221	11798.66		3	Se I	MO74
8419.04	11874.589	0.05	7 L	Nd	BL70	8474.21	11797.28	0.25	1 L	Tm	CA69
8419.316	11874.199		3 L	Th II	GI74	8474.25	11797.22	0.10	1	Hf	GO70
8419.800	11873.517	0.06	7 L	Sm II	BL69	8474.30	11797.16	0.05	140	Zr I	TA76
8421.34	11871.35	0.05	2	Hf I	GO70	8475.10	11796.04		2	Se I	MO74
8421.75	11870.77		4	Br I	TE63	8476.990	11793.412	0.15	3 L	Sm II	BL69
8421.947	11870.49		3 L	Ce II	VE72	8477.699	11792.425		150	Kr I	KA69
8422.869	11869.19		3 L	Ce I	VE72	8479.523	11789.889		500	Ne I	HU73
8423.449	11868.373		3 L	Th	GI74	8480.131	11789.043		1500	Ne I	HU73
8424.59	11866.76	0.02	195	Cl I	RA69	8480.665	11788.31		6	Cm I	CO76
8425.14	11866.00		2	I I	MI62	8481.78	11786.75	0.25	1 L	Tm	CA69
8425.392	11865.636		4 L	Th II	GI74	8482.844	11785.27		33	Se I	MO74
8426.378	11864.247		7 L	Th I	GI74	8484.210	11783.376	0.15	3 L	Sm	BL69
8427.27	11862.99	0.02	5	C I	JO65	8484.290	11783.26	0.01	160	Fe I	LI76
8429.76	11859.488	0.07	6 L	Nd	BL70	8485.960	11780.95		9	Cm I	CO76
8429.86	11859.35	0.20	1 L	Tm	CA69	8486.66	11779.98	0.05	7	Hf I	GO70
8430.39	11858.60	0.02	11	Zr	TA76	8487.41	11778.93	0.25	1 L	Tm	CA69
8430.546	11858.382		4 L	Th I	GI74	8487.840	11778.34		320	I I	LU75
8430.818	11858.00		4 L	Ce	VE72	8488.08	11778.01		45	I	MI62
8435.570	11851.32		3 L	Ce I	VE72	8488.41	11777.54	0.02	11	C I	JO65
8436.65	11849.80	0.05	11 W	Zr	TA76	8489.233	11776.403		5 L	Th II	GI74
8437.42	11848.73	0.02	6	C I	JO65	8490.127	11775.163		4 L	Th I	GI74

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8490.36	11774.85	0.05	4	Hf I	GO70	8557.07	11683.05	0.05	12	Zr	TA76
8491.805	11772.838	0.01	17 V	K I	JO72	8558.660	11680.875	0.12	4 L	Sm	BL69
8492.692	11771.61		8	Se	MO74	8560.410	11678.487	0.15	3 L	Sm	BL69
8493.01	11771.17	0.05	70	Hf I	GO70	8560.41	11678.48		2 L	Ar I	MI73
8493.563	11770.40		3 L	Ce I	VE72	8562.011	11676.302	0.06	6 L	Cd I	BL71
8494.114	11769.637	0.01	16 V	K I	JO72	8563.60	11674.14	0.02	7	C I	JO65
8494.21	11769.50		1 L	Ar II?	MI63	8565.62	11671.38	0.25	1 L	Tm	CA69
8495.829	11767.26		4 L	Ce II	VE72	8566.355	11670.381	0.01	10	S I	JA67
8495.95	11767.09	0.25	1 L	Tm	CA69	8566.604	11670.042	0.10	3 L	Gd	BL71
8496.10	11766.88	0.05	150	Hf I	GO70	8566.91	11669.63	0.02	24	C I	JO65
8496.167	11766.792		2000 I	Ne I	HU73	8568.030	11668.10		4 L	Ce II	VE72
8497.73	11764.629	0.15	3 L	Nd	BL70	8568.369	11667.638		.5 L	Th I	GI74
8498.825	11763.112	0.10	3 L	Gd I	BL71	8569.43	11666.20		20 D	Br I	TE63
8499.008	11762.86		6	Te I	MO75	8571.64	11663.186	0.10	3 L	Nd II	BL70
8499.82	11761.74		2	I I	MI62	8572.169	11662.467	0.01	3200	B I	LI70
8502.040	11758.665	0.15	3 L	Sm II	BL69	8572.19	11662.44	0.20	1 L	Tm I	CA69
8504.86	11754.76	0.02	114	C I	JO65	8573.124	11661.167		3 L	Th I	GI74
8505.00	11754.57	0.10	5	Zr	TA76	8573.80	11660.25	0.02	1 L	Be II	HO69
8505.91	11753.32	0.02	142	C I	JO65	8573.949	11660.045	0.01	6600	B I	LI70
8506.71	11752.21	0.10	3	Zr	TA76	8574.22	11659.68	0.02	47	C I	JO65
8508.67	11749.50		5	Tm	SU73	8574.83	11658.85	0.02	13	C I	JO65
8509.60	11748.22	0.02	82	C I	JO65	8574.91	11658.73	0.10	10	Hf	GO70
8510.939	11746.37		3 L	Ce II	VE72	8575.012	11658.60		5 L	Ce II	VE72
8513.49	11742.85		400	Br I	TE63	8575.40	11658.07	0.02	1500	Zr I	TA76
8515.540	11740.023	0.12	4 L	Sm	BL69	8576.60	11656.44	0.25	1 L	Tm I	CA69
8516.340	11738.921	0.08	4 L	Gd	BL71	8577.082	11655.786		1	Kr I	KA69
8519.337	11734.79		3 L	Ce II?	VE72	8577.388	11655.37		3 L	Ce I	VE72
8519.337	11734.79		3 L	Ce I?	VE72	8577.431	11655.312	0.01	10	S I	JA67
8520.477	11733.220		5 L	Ar I	MI73	8577.99	11654.55	0.25	1 L	Tm	CA69
8521.74	11731.48	0.02	3 L	In I	JO67	8579.20	11652.91	0.02	5	C I	JO65
8522.42	11730.55		10	Ge	HU64	8579.677	11652.26		3 L	Ce I	VE72
8523.46	11729.12	0.05	4	Hf I	GO70	8580.27	11651.45	0.02	2 V	N I	EI58
8526.32	11725.19	0.10	4 W	Hf I	GO70	8581.05	11650.40		1 W	I I	MI62
8527.447	11723.63		3 L	Ce I	VE72	8581.12	11650.30		4	Tm	SU73
8529.631	11720.628		3 L	Th	GI74	8581.14	11650.28	0.20	7	Zr	TA76
8529.68	11720.56	0.02	180	Cl I	RA69	8582.08	11649.00		5 H	Tm I	SU73
8530.20	11719.85	0.10	5	Zr	TA76	8582.330	11648.66		55	Te I	MO75
8533.902	11714.763		6000	Ge I	HU64	8582.82	11647.99	0.02	5	C I	JO65
8534.08	11714.51	0.05	4	Hf I	GO70	8585.14	11644.85	0.10	7	Hf I	GO70
8535.754	11712.220		3 L	Th I	GI74	8586.051	11643.62		3	Cm I	CO76
8536.017	11711.86		3 L	Ce II	VE72	8586.243	11643.35		4 L	Ce II?	VE72
8537.160	11710.291	0.08	4 L	Gd I	BL71	8586.243	11643.35		4 L	Ce I?	VE72
8538.20	11708.87		90	Ge I	HU64	8586.51	11642.99	0.25	1 L	Tm I	CA69
8538.71	11708.16		1 L	Ar I	MI73	8587.356	11641.85	0.01	1	Fe I	LI76
8539.028	11707.74		9	Cm I	CO76	8587.932	11641.06		4 L	Ce I	VE72
8539.70	11706.81	0.20	3	Zr	TA76	8588.01	11640.96	0.02	4	Si I	LI65
8540.14	11706.21	0.25	1 L	Tm	CA69	8588.02	11640.94		1	Br I	TE63
8541.31	11704.60	0.20	4	Hf I	GO70	8588.40	11640.43	0.05	2	Hf I	GO70
8542.070	11703.561	0.15	3 L	Sm	BL69	8589.610	11638.79		5	Te I	MO75
8542.145	11703.457		7 L	Th I	GI74	8589.997	11638.26	0.01	160	Fe I	LI76
8544.49	11700.24	0.02	3	Si I	LI65	8591.50	11636.2		4	Cl I	RA69
8545.20	11699.27		10	Ge	HU64	8591.552	11636.155		3 L	Th I	GI74
8545.523	11698.831		3 L	Th I	GI74	8591.61	11636.08		1	Br I	TE63
8546.53	11697.45		40 H	Ba I	RU55	8592.699	11634.601		4 L	Th I	GI74
8548.080	11695.332	0.12	4 L	Sm II?	BL69	8593.15	11633.99	0.15	2 L	Tm I	CA69
8548.080	11695.332	0.12	4 L	Sm II?	BL69	8593.18	11633.951	0.10	3 L	Nd	BL70
8548.379	11694.93		3	Cm I	CO76	8594.659	11631.948		3 L	Th II	GI74
8548.46	11694.82	0.02	2	S I	JA67	8594.902	11631.62		3 L	Ce II	VE72
8548.845	11694.285		3 L	Th I	GI74	8595.12	11631.33		2	Br I	TE63
8550.11	11692.56	0.02	85	Cl I	RA69	8595.433	11630.90		1 LW	Tb I	KL69
8551.819	11690.219	0.01	17 V	K I	JO72	8596.032	11630.09		2	Se	MO74
8551.997	11689.98	0.01	230	Fe I	LI76	8596.97	11628.83	0.02	23	C I	JO65
8553.347	11688.13		3 L	Ce I?	VE72	8596.97	11628.82	0.25	1 L	Tm I	CA69
8553.347	11688.13		3 L	Ce I?	VE72	8598.56	11626.67	0.25	1 L	Tm	CA69
8553.441	11688.002		300	Ne I	HU73	8599.67	11625.173	0.02	3 V	N I	EI58
8555.461	11685.25		3	Cm I	CO76	8599.68	11625.16	0.02	1 LD	Be II	HO69

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8600.267	11624.36		138	Te I	MO75	8634.569	11578.184	0.06	5 L	Gd I	BL71
8600.299	11624.32		4 L	Ce II	VE72	8635.27	11577.2		11	Cl I	RA69
8601.15	11623.17	0.25	1 L	Tm	CA69	8636.558	11575.518		4 L	Th I	GI74
8601.462	11622.749	0.01	1	Pb I	AN68	8637.874	11573.75		23	Te I	MO75
8602.93	11620.766	0.15	3 L	Nd	BL70	8638.08	11573.5		2	Cl I	RA69
8603.39	11620.14	0.02	3 LB	Mg II	RI55	8639.568	11571.485		5 L	Th I	GI74
8603.55	11619.93	0.20	1 L	Tm I	CA69	8640.02	11570.88		20	Ge I	HU64
8603.733	11619.681	0.08	4 L	Gd I	BL71	8641.51	11568.885	0.10	3 L	Nd	BL70
8604.02	11619.29	0.02	12	C I	JO65	8643.58	11566.114	0.02	4 V	N I	EI58
8604.837	11618.190		3 L	Th I	GI74	8645.710	11563.265	0.15	3 L	Sm II	BL69
8605.376	11617.462		5 L	Th I	GI74	8645.76	11563.19	0.10	5 U	Hf	GO70
8605.536	11617.25		28	Te I	MO75	8646.40	11562.34	0.25	1 L	Tm II	CA69
8606.18	11616.38	0.25	1 L	Tm I	CA69	8647.67	11560.64	0.10	5	Hf	GO70
8606.6	11615.8		1	Re I	KL57	8648.86	11559.05		5	Yb II	ME67
8607.338	11614.814		1750	Ge I	HU64	8649.305	11558.46		350	I I	LU75
8607.882	11614.081		1200 I	Ne I	HU73	8649.488	11558.214		3 L	Th I	GI74
8608.447	11613.318		3 L	Th	GI74	8650.09	11557.41	0.25	1 L	Tm I	CA69
8608.92	11612.68	0.02	900	Zr I	TA76	8650.144	11557.337		3 L	Th I	GI74
8609.03	11612.53	0.25	1 L	Tm	CA69	8650.26	11557.17	0.05	50	F I	LI49
8609.42	11612.0	0.50	1	Hf	GO70	8651.30	11555.79	0.05	4	Hf I	GO70
8609.441	11611.98		8	Te I	MO75	8653.330	11553.082	0.15	3 L	Sm II	BL69
8609.826	11611.458		1	Kr I	KA69	8654.339	11551.735	0.05	7 L	Gd I	BL71
8610.10	11611.09	0.02	12	Si I	LI65	8656.520	11548.825	0.15	3 L	Sm II	BL69
8610.47	11610.60		5	I I	MI62	8657.14	11548.00	0.25	1 L	Tm	CA69
8610.55	11610.48		15	Cr I	KI53	8659.65	11544.65	0.05	20	F I	LI49
8611.099	11609.74		5	Se	MO74	8660.14	11544.00		5	Tm	SU73
8611.12	11609.72	0.02	1	Si I	LI65	8661.268	11542.494		3 L	Th II	GI74
8612.07	11608.43	0.20	1	Hf	GO70	8663.14	11540.00		5	Tm I	SU73
8612.707	11607.57	0.01	255	Fe I	LI76	8663.97	11538.90		3	Tm I	SU73
8612.854	11607.375	0.02	4	S I	a67	8664.22	11538.57		2	I I	MI62
8612.86	11607.36		30 H	Ba I	RU55	8665.885	11536.345		950	Ne I	HU73
8613.27	11606.815	0.10	3 L	Nd	BL70	8666.181	11535.95		2	Se	MO74
8614.266	11605.473		3 L	Th I	GI74	8667.53	11534.16	0.10	10	Hf I	GO70
8614.699	11604.89		3 L	Ce I?	VE72	8668.277	11533.16		3 L	Ce I	VE72
8614.699	11604.89		3 L	Ce I?	VE72	8669.948	11530.938		3 L	Th I	GI74
8615.41	11603.94		20	Yb I	ME66	8672.64	11527.36		45	Ge I	HU64
8616.57	11602.38	0.10	130	Hf I	GO70	8672.982	11526.904		5 L	Th	GI74
8617.017	11601.768	0.01	13	S I	JA67	8673.316	11526.460		4 L	Th I	GI74
8617.189	11601.537		500	Ne I	HU73	8674.34	11525.10	0.05	28	Zr	TA76
8617.92	11600.56	0.02	3 LB	Mg II	RI55	8674.400	11525.019		1500	Ne I	HU73
8619.26	11598.7		5	Cl I	RA69	8675.131	11524.05		4	Se	MO74
8620.08	11597.64		1	Br I	TE63	8675.657	11523.350	0.01	6	S I	JA67
8620.83	11596.64	0.25	1 L	Tm I	CA69	8676.112	11522.746		3000	Ne I	HU73
8621.314	11595.985		6 L	Th I	GI74	8676.49	11522.24	0.25	1 L	Tm II	CA69
8622.88	11593.9		3	Cl	RA69	8676.508	11522.22	0.01	2	Fe I	LI76
8623.096	11593.59	0.01	91	Fe I	LI76	8676.637	11522.05		45	Te I	MO75
8623.886	11592.527	0.06	6 L	Gd I	BL71	8680.850	11516.456		5 L	Th I	GI74
8623.99	11592.38	0.02	3	Si I	LI65	8681.72	11515.30		50	Tm I	SU73
8624.17	11592.14	0.11	4	Si I	RA65	8681.979	11514.959		4 L	Th I	GI74
8624.449	11591.77		28	Te I	MO75	8684.163	11512.063		3 L	Th I	GI74
8624.47	11591.74	0.10	3	Hf I	GO70	8684.538	11511.566		6 L	Th I	GI74
8624.64	11591.52	0.02	5	Si I	LI65	8685.698	11510.028		3 L	Th I	GI74
8625.759	11590.01		5 L	Ce II	VE72	8686.65	11508.77		30	Br I	TE63
8625.801	11589.953		4 L	Th I	GI74	8687.642	11507.46		9	Cm I	CO76
8625.952	11589.75		3 L	Ce	VE72	8688.52	11506.29	0.25	1 L	Tm	CA69
8627.20	11588.07		37	I I	LU75	8689.023	11505.624	0.10	3 L	Gd I	BL71
8627.46	11587.73	0.05	28	Zr I	TA76	8690.52	11503.64	0.20	6	Hf I	GO70
8628.390	11586.476	0.15	3 L	Sm II	BL69	8690.80	11503.271	0.10	3 L	Nd I	BL70
8628.43	11586.42	0.20	11	Zr	TA76	8691.05	11502.94	0.20	3	Zr I	TA76
8630.45	11583.71		10	Br I	TE63	8691.12	11502.84	0.11	4	Si I	RA65
8631.0	11583.0		1 H	Ba I	RU55	8691.54	11502.292	0.10	3 L	Nd	BL70
8631.64	11582.12	0.02	43	Zr	TA76	8691.621	11502.185		3 L	Th I	GI74
8632.40	11581.1		3	Cl	RA69	8692.155	11501.478		4 L	Th I	GI74
8632.71	11580.68		8	Ge	HU64	8692.28	11501.31		1	Br I	TE63
8632.929	11580.384		4 L	Ar I	MI73	8692.297	11501.290	0.08	4 L	Gd I	BL71
8633.28	11579.9		9	Cl I	RA69	8692.57	11500.53	0.20	7	Hf	GO70

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8694.46	11498.43		18	I I	LU75	8748.843	11426.955	0.07	7 L	Gd I	BL71
8694.68	11498.138	0.10	3 L	Nd	BL70	8749.760	11425.757	0.12	4 L	Sm II	BL69
8695.62	11496.90		10	Tm I	SU73	8751.130	11423.968	0.12	4 L	Sm II	BL69
8696.00	11496.39	0.02	3 LB	Be I	HO69	8751.289	11423.76		3 L	Ce I?	VE72
8700.53	11490.4		3	Cl	RA69	8751.289	11423.76		3 L	Ce I?	VE72
8700.925	11489.885		5 L	Th I	GI74	8751.52	11423.46		20 H	Ba I	RU55
8701.779	11488.757	0.01	2	Pb I	AN68	8751.72	11423.20		1	Tm	SU73
8702.936	11487.23		6623	Te I	MO75	8752.391	11422.32	0.01	52	Fe I	LI76
8703.27	11486.80		8	I I?	MI62	8753.48	11420.9		3	Cl	RA69
8703.27	11486.80		8	I I?	MI62	8753.899	11420.36		8	Cm I	CO76
8703.853	11486.02		5 L	Ce I	VE72	8753.923	11420.32		154	I I	LU75
8704.00	11485.83	0.02	5	Si I	LI65	8754.217	11419.940	0.08	4 L	Gd I	BL71
8704.8	11484.8			Y I	BO55	8754.78	11419.20		10	Tm I	SU73
8705.01	11484.50		15	Cr I	KI53	8755.57	11418.18	0.20	6 U	Zr I	TA76
8705.45	11483.91		3	Ru I	KE59	8756.234	11417.309		3 L	Th I	GI74
8705.555	11483.774		1500	Ge I	HU64	8757.50	11415.66		3	I I?	MI62
8705.77	11483.49	0.25	1 L	Tm II	CA69	8757.50	11415.66		3	I I?	MI62
8707.93	11480.65	0.02	200	Hf I	GO70	8758.112	11414.86		3 L	Ce II	VE72
8708.25	11480.22	0.05	12	F I	LI49	8758.61	11414.20	0.05	15	F I	LI49
8711.14	11476.42	0.05	10	Hf I	GO70	8759.77	11412.70	0.10	30	Hf	GO70
8711.637	11475.757		3 L	Th I	GI74	8761.480	11410.47		35	Te I	MO75
8712.071	11475.19		3	Cm I	CO76	8761.49	11410.460	0.10	3 L	Nd	BL70
8713.08	11473.85	0.05	30	Hf I	GO70	8761.779	11410.08		137	I I	LU75
8713.19	11473.70	0.05	30	F I	LI49	8762.08	11409.69	0.02	269	Cl I	RA69
8713.79	11472.93		10	Cr I	KI53	8762.508	11409.134		1100 I	Ne I	HU73
8715.84	11470.22		1 L	Ar II?	MI63	8764.766	11406.195	0.01	165 B	S I	JA67
8716.913	11468.811	0.10	3 L	Gd I	BL71	8764.99	11405.90		7	Tm I	SU73
8717.075	11468.598		3 L	Th	GI74	8766.51	11403.92		2	Ba	RU55
8719.45	11465.47		13	I I?	LU75	8766.62	11403.78	0.03	12 V	Na I	RI56
8719.45	11465.47		13	I I?	LU75	8767.004	11403.283	0.01	150 B	S I	JA67
8719.696	11465.15		4 L	Ce I	VE72	8768.42	11401.46		2	I I	MI62
8719.781	11465.039		5 L	Th I	GI74	8769.296	11400.303	0.01	85 B	S I	JA67
8719.831	11464.974		1 L	Tb I	KL72	8769.893	11399.53		125	Te I	MO75
8720.13	11464.58		35	Br I	TE63	8770.575	11398.640		4 L	Ar I	MI73
8724.338	11459.050		550	Ge I	HU64	8770.689	11398.492	0.01	30	S I	JA67
8725.09	11458.07		6	I	MI62	8771.09	11397.98		10	I	MI62
8725.50	11457.52		13	I I	LU75	8771.10	11397.96		12	Cr I	KI53
8725.533	11457.481		500	Kr I	KA69	8771.22	11397.80		1	Tm	SU73
8725.84	11457.08		8	I I	MI62	8771.70	11397.18		16	I I	LU75
8727.072	11455.46		5 L	Ce I	VE72	8772.23	11396.50		10	I	MI62
8728.85	11453.12		3	Re I	KL57	8772.76	11395.80		1	Tm I	SU73
8729.36	11452.46	0.02	3	Hf I	GO70	8774.79	11393.17	0.02	10	Hf I	GO70
8729.48	11452.30		1	Tm	SU73	8775.21	11392.62	0.02	231	Cl I	RA69
8729.74	11452.0		2	Cl	RA69	8775.276	11392.54		4 L	Tb I	KL69
8730.453	11451.02		51	I I	LU75	8775.76	11391.91	0.05	23	Zr I	TA76
8730.53	11450.92	0.20	60	Hf I	GO70	8776.74	11390.63		15	Cr I	KI53
8731.930	11449.087	0.15	3 L	Sm II?	BL69	8776.894	11390.434		1600 I	Ne I	HU73
8731.930	11449.087	0.15	3 L	Sm I?	BL69	8777.134	11390.122	0.01	265 B	S I	JA67
8732.66	11448.13	0.10	6	Zr	TA76	8777.891	11389.14		2 L	Tb I	KL69
8733.012	11447.67		160	I I	LU75	8779.23	11387.40		4	Tm	SU73
8733.32	11447.27		18	Br I	TE63	8780.130	11386.235		5 L	Th I	GI74
8736.80	11442.70		1	Yb II	ME67	8781.491	11384.471		3 L	Th I	GI74
8737.50	11441.79	0.02	4	S	JA67	8781.72	11384.174	0.10	5 L	Nd	BL70
8738.48	11440.51	0.02	3	Hf I	GO70	8781.82	11384.04	0.20	1 L	Tm	CA69
8739.535	11439.12	0.01	87	Fe I	LI76	8781.916	11383.920		3 L	Th I	GI74
8740.69	11437.61		9	Br I	TE63	8782.08	11383.70		8	Re I	KL57
8741.67	11436.33	0.02	1000	Cl I	RA69	8782.73	11382.863	0.02	1	Dy I	CO71
8742.442	11435.32		3 L	Ce I	VE72	8783.740	11381.556	0.15	3 L	Sm	BL69
8742.76	11434.90		200	Tm I	SU73	8783.80	11381.48	0.05	3	Hf I	GO70
8744.400	11432.76		4 L	Ce	VE72	8783.82	11381.45	0.03	11 V	Na I	RI56
8744.528	11432.593		4 L	Th I	GI74	8784.555	11380.51		6	Cm I	CO76
8746.738	11429.704		6 L	Th I	GI74	8785.52	11379.26		5	Cr I	KI53
8746.86	11429.56		15	I I	MI62	8786.44	11378.06	0.02	45	Cl I	RA69
8747.169	11429.14		9	Te I	MO75	8786.71	11377.71	0.02	51	Zr I	TA76
8747.74	11428.40		50	I I?	MI62	8788.633	11375.22		108	I I	LU75
8747.74	11428.40		50	I I?	MI62	8789.024	11374.713		6 L	Th II	GI74

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8789.173	11374.52		3 L	Ce	VE72	8826.067	11326.973		3 L	Th I	GI74
8789.480	11374.123	0.15	3 L	Sm I?	BL69	8826.362	11326.595	0.08	4 L	Gd I	BL71
8789.480	11374.123	0.15	3 L	Sm II?	BL69	8826.41	11326.5		6	Cl I	RA69
8789.513	11374.08	0.01	14	Fe I	LI76	8826.85	11325.97		1	Br	TE63
8789.62	11373.9		5	Cl I	RA69	8826.92	11325.88		6	Ru I	KE59
8789.67	11373.88		5 H	Ba I	RU55	8827.18	11325.55	0.05	5	Zr	TA76
8789.75	11373.78		1	I I	MI62	8827.198	11325.53		5	Cm	CO76
8789.874	11373.61		75	Te I	MO75	8827.731	11324.839	0.06	7 L	Gd I	BL71
8790.871	11372.33		5	Cm I	CO76	8829.02	11323.184	0.02	3 V	N I	EI58
8791.054	11372.09		250	I I	LU75	8830.68	11321.06	0.05	12	Zr	TA76
8793.357	11369.108	0.01	1	Pb I	AN68	8832.96	11318.13		330	Ge I	HU64
8793.750	11368.60		3 L	Ce I	VE72	8833.586	11317.33		2	Se	MO74
8794.07	11368.18	0.20	610	Hf	GO70	8833.90	11316.93		10 W	Br I	TE63
8794.24	11367.97		4 W	Br I	TE63	8834.539	11316.111		1	Kr I	KA69
8794.370	11367.799	0.15	3 L	Sm II	BL69	8836.160	11314.035	0.01	2	Pb I	AN68
8794.79	11367.25		4 W	Br I	TE63	8836.27	11313.900	0.02	4 V	N I	EI58
8795.07	11366.90		1	I	MI62	8836.763	11313.26		500	I I	LU75
8795.241	11366.673		10	Ne I	HU73	8838.50	11311.03	0.02	1 B	S I	JA67
8796.55	11364.98	0.20	610	Hf I	GO70	8838.78	11310.69		12	Cr I	KI53
8797.310	11364.00		3 L	Ce I	VE72	8839.33	11309.97		4	Re I	KL57
8797.477	11363.79		6	Cm I	CO76	8839.703	11309.50		1 L	Tb I	KL69
8797.73	11363.454	0.02	1	Dy I	CO71	8839.94	11309.20	0.02	1	S I	JA67
8798.35	11362.657	0.10	3 L	Nd	BL70	8840.4	11308.5	0.40	2	Si I	RA65
8799.83	11360.74		1 L	Ar	MI63	8841.412	11307.314		3 L	Th I	GI74
8800.384	11360.030	0.01	2	Pb I	AN68	8841.90	11306.7		3	Cl I	RA69
8801.421	11358.692	0.03	18 L	O I	ER68	8843.46	11304.711	0.02	1	Dy I	CO71
8801.570	11358.499		3 L	Th I	GI74	8843.569	11304.557		20	Ne I	HU73
8802.50	11357.30		3	Tm I?	SU73	8844.12	11303.85		50	Ne I	HU73
8802.50	11357.30		3	Tm I?	SU73	8844.171	11303.787		5 L	Th I	GI74
8803.262	11356.32		2400	I I	LU75	8844.247	11303.690		1	Kr I	KA69
8803.542	11355.96	0.01	2	Fe I	LI76	8844.361	11303.544		4 L	Th I?	GI74
8804.503	11354.715		8 L	Th I	GI74	8844.361	11303.544		4 L	Th I?	GI74
8805.32	11353.67		75	I I	MI62	8844.38	11303.52	0.10	100	Hf I	GO70
8806.668	11351.924		6 L	Th I	GI74	8844.75	11303.04		80	Ba I	RU55
8806.85	11351.69		15	I I	LU75	8845.275	11302.376	0.01	23 L	O I	EI63
8806.997	11351.50		3 L	Ce I?	VE72	8847.31	11299.78		5 H	Yb II	ME67
8806.997	11351.50		3 L	Ce I?	VE72	8848.026	11298.86	0.01	11	Fe I	LI76
8808.13	11350.04		65	Br I	TE63	8848.18	11298.66		3	Ru I	KE59
8809.51	11348.26	0.05	3 U	Hf I	GO70	8848.19	11298.66		4	I I	MI62
8809.849	11347.83		160	I I	LU75	8848.349	11298.450		2	Ne I	HU73
8811.273	11346.00		3	Cm	CO76	8848.950	11297.682	0.01	22 L	O I	EI63
8811.907	11345.175	0.01	24 B	S I	JA67	8849.52	11296.96	0.20	9	Hf I	GO70
8812.44	11344.489	0.05	7 L	Nd I	BL70	8850.970	11295.104	0.01	21 L	O I	EI63
8812.82	11344.00		30	Tm I?	SU73	8851.65	11294.242	0.02	2 V	N I	EI58
8812.82	11344.00		30	Tm I?	SU73	8851.70	11294.173	0.15	3 L	Nd	BL70
8813.034	11343.73		3	Cm I	CO76	8851.86	11293.97	0.25	1 L	Tm	CA69
8813.046	11343.709		4 L	Th I	GI74	8852.31	11293.40		240	Ge I	HU64
8813.42	11343.23		75	I I	MI62	8852.45	11293.22		54	I I	LU75
8813.45	11343.19	0.02	2 B	S I	JA67	8852.648	11292.964		5	Ne I	HU73
8813.69	11342.88	0.05	5	Zr	TA76	8852.86	11292.69		2	Br I	TE63
8813.708	11342.857		3 L	Th I	GI74	8853.175	11292.29		35	Te I	MO75
8816.58	11339.16		15	Cr I	KI53	8853.234	11292.22		3	Cm I	CO76
8817.07	11338.53		25	Ge I	HU64	8853.65	11291.679	0.02	5 V	N I	EI58
8817.097	11338.497	0.06	6 L	Gd I	BL71	8853.685	11291.64		2 L	Tb I	KL69
8820.04	11334.72	0.02	2 L	In I	JO67	8854.62	11290.45		17	I I	LU75
8820.890	11333.621		20	Ne I	HU73	8855.107	11289.83	0.02	15	Si I	RA65
8821.081	11333.375		1	Kr I	KA69	8857.006	11287.407		I	Hg I	PE62
8821.308	11333.084	0.01	3	Pb I	AN68	8857.041	11287.36		63	I I	LU75
8821.76	11332.50		5	Tm I	SU73	8857.075	11287.318	0.01	21 L	O I	EI63
8822.117	11332.045		4 L	Th I	GI74	8857.308	11287.022	0.01	21 LB	O I	EI63
8822.25	11331.88		10	Cr I	KI53	8857.392	11286.914	0.01	24 L	O I	EI63
8822.87	11331.1		5	Cl I	RA69	8857.80	11286.4		9	Cl	RA69
8823.376	11330.428		5 L	Th	GI74	8857.840	11286.344	0.01	23 LB	O I	EI63
8823.49	11330.285	0.02	6 L	C I	JO66	8858.27	11285.80		3	Tm	SU73
8824.010	11329.613		10	Ne I	HU73	8858.368	11285.67		3 L	Ce I	VE72
8824.916	11328.451		4	Kr I	KA69	8859.60	11284.10		4	Tm	SU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8861.840	11281.25		3 L	Tb I	KL69	8910.97	11219.05	0.20	10	Hf	GO70
8864.53	11277.83		1	Yb II	ME67	8912.706	11216.87		3	Se	MO74
8865.322	11276.818		4 L	Th I	GI74	8913.63	11215.70		200	Tm I	SU73
8866.93	11274.77		10	Ba I	RU55	8914.438	11214.687	0.01	28 B	S I	JA67
8867.251	11274.365	0.01	1	Pb I	AN68	8914.45	11214.67	0.05	11	Zr	TA76
8867.873	11273.574		4 L	Th I	GI74	8914.532	11214.568		5 B	Kr I?	KA69
8869.269	11271.800	0.01	1	Pb I	AN68	8914.902	11214.101		5 B	Kr I?	KA69
8869.567	11271.421	0.10	3 L	Gd I	BL71	8917.21	11211.20		0 L	Ar II	MI63
8869.88	11271.03		1	I I	MI62	8917.488	11210.85		4 L	Ce I	VE72
8870.13	11270.71	0.02	29	Zr I	TA76	8918.40	11209.71		1 LB	Ar II	MI63
8870.76	11269.90		6	Tm I	SU73	8920.55	11207.00		2	Tm I	SU73
8871.933	11268.42		12	Te I	MO75	8920.83	11206.65	0.10	6	Hf I	GO70
8872.10	11268.20		8	Tm I	SU73	8921.683	11205.579		4 L	Th I	GI74
8872.662	11267.49		10	Te I	MO75	8923.18	11203.70	0.05	9	Zr	TA76
8872.821	11267.29		117	Te I	MO75	8924.22	11202.40		2	Tm I	SU73
8873.67	11266.210	0.02	3 V	N I	EI58	8924.63	11201.88	0.03	4	Si I	RA65
8875.780	11263.531	0.06	5 L	Gd I	BL71	8925.184	11201.183	0.01	5	S I	JA67
8876.357	11262.799		2 B	Kr I?	KA69	8925.619	11200.637	0.10	3 L	Gd I	BL71
8876.48	11262.643	0.05	7 L	Nd I	BL70	8926.12	11200.01	0.05	28	Zr	TA76
8876.78	11262.27		250	Yb I	ME66	8926.39	11199.67		8	Ru I	KE59
8876.991	11261.994		2 B	Kr I?	KA69	8928.35	11197.21	0.03	2 V	Na I	RI56
8877.46	11261.40		2	Tm I	SU73	8928.41	11197.14		3	Br I	TE63
8877.593	11261.234	0.01		Zn I	JO68	8928.68	11196.80	0.08	2	Si I	RA65
8879.252	11259.126	0.06	5 L	Gd I	BL71	8930.12	11194.99		100	Br I	TE63
8879.252	11259.126		150	Kr I	KA69	8930.957	11193.943	0.06	5 L	Gd I	BL71
8879.363	11258.986		4 L	Th I	GI74	8931.29	11193.52	0.05	1	Hf I	GO70
8879.762	11258.48		3 L	Ce II	VE72	8931.949	11192.70		3 L	Ce	VE72
8880.038	11258.130		3 L	Th I	GI74	8933.532	11190.716		3 L	Th	GI74
8880.369	11257.711		200	Kr I	KA69	8933.96	11190.19	0.03	1 V	Na I	RI56
8880.490	11257.557	0.12	4 L	Sm I	BL69	8934.03	11190.09	0.20	2	Hf	GO70
8880.7	11257.3		2 H	Ba I	RU55	8934.950	11188.94		28	Se I	MO74
8881.44	11256.35	0.02	4 L	Mg II	RI55	8936.030	11187.588	0.01	16	Si I	RA65
8881.78	11255.93	0.02	5 L	Mg II	RI55	8936.263	11187.297	0.01	16	S I	JA67
8882.43	11255.10	0.10	3 L	Tm	CA69	8936.34	11187.21		5	I	MI62
8882.435	11255.092		3 L	Th I	GI74	8936.413	11187.108		100	Kr I	KA69
8882.602	11254.881	0.02	15 L	Al I	ER63	8936.49	11187.02	0.05	70	Zr	TA76
8883.70	11253.496	0.02	1 L	Ar II	MI63	8937.359	11185.925		5 L	Th I	GI74
8883.78	11253.39	0.10	3 L	Tm	CA69	8938.88	11184.020	0.02	30	Dy I	CO71
8883.936	11253.190	0.02	14 L	Al I	ER63	8941.42	11181.36		0 L	Ar II?	MI63
8884.220	11252.830		2300	Ge I	HU64	8941.98	11180.142	0.02	1 V	N I	EI58
8885.578	11251.11	0.01	6	Fe I	LI76	8942.811	11179.105		3 L	Th I	GI74
8886.758	11249.62		5	Te I	MO75	8942.82	11179.11		10	I I	MI62
8887.82	11248.273	0.05	5 L	Nd I	BL70	8943.040	11178.819	0.12	4 L	Sm II	BL69
8888.43	11247.50		2	Br I	TE63	8944.073	11177.528		3500 I	Ne I	HU73
8889.04	11246.73	0.02	8	Zr	TA76	8945.17	11176.16		33	I I	LU75
8889.05	11246.72		200	I I	LU75	8945.86	11175.30		1	Tm	SU73
8890.201	11245.26		4 L	Ce I?	VE72	8947.11	11173.73	0.02	0 LB	Be II	HO69
8890.201	11245.26		4 L	Ce I?	VE72	8947.484	11173.266	0.02	2 L	Ar II	MI63
8892.56	11242.28	0.05	40	Hf I	GO70	8947.87	11172.79		8	I I	MI62
8893.785	11240.729		4 L	Tb I	KL72	8948.10	11172.50		2	Tm II	SU73
8894.949	11239.26		57	Se I	MO74	8950.613	11169.36		71	I I	LU75
8895.147	11239.02		6	Cm I	CO76	8951.33	11168.47	0.05	9	Zr I	TA76
8896.30	11237.556	0.02	2 V	N I	EI58	8951.607	11168.12		5 L	Ce II	VE72
8897.113	11236.52		6700	I I	LU75	8951.82	11167.855	0.07	5 L	Nd	BL70
8897.15	11236.47	0.05	40	Hf I	GO70	8951.88	11167.78	0.25	1 L	Tm II	CA69
8902.080	11230.255		9 L	Th I	GI74	8952.468	11167.05		10	Te I	MO75
8902.92	11229.20		100	Tm I	SU73	8954.17	11164.92	0.15	3 L	Tm II	CA69
8902.920	11229.195		6 L	Tb I	KL72	8954.67	11164.30		20	Tm I	SU73
8903.08	11228.99	0.20	460	Hf I	GO70	8954.68	11164.29	0.25	1 L	Tm II	CA69
8903.55	11228.40		10	Tm I	SU73	8955.119	11163.74		508	Te I	MO75
8904.08	11227.73	0.02	230	Hf	GO70	8955.48	11163.29	0.05	20	Zr	TA76
8904.60	11227.076	0.02	3 V	N I	EI58	8956.436	11162.099		3 L	Th I	GI74
8905.26	11226.2		2	Cl I	RA69	8956.685	11161.79		43	Se I	MO74
8905.825	11225.532		3 L	Th I	GI74	8956.74	11161.72		1 W	Br I	TE63
8906.18	11225.08		250	Br I	TE63	8957.227	11161.113	0.10	3 L	Gd I	BL71
8908.83	11221.742	0.02	10	Dy I	CO71	8957.48	11160.80		5	Tm I	SU73

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8957.945	11160.219		15	Ne I	HU73	9005.44	11101.36		1	Br I	TE63
8960.400	11157.16		5 L	Ce I	VE72	9005.81	11100.90		2	Tm I	SU73
8960.51	11157.03		25	Cr I	KI53	9006.02	11100.65		1	Br I	TE63
8961.067	11156.330	0.08	4 L	Gd I	BL71	9009.23	11096.69	0.02	56	Cl I	RA69
8961.222	11156.15		9	Cm I	CO76	9009.31	11096.59		20	Br I	TE63
8962.70	11154.30		1	Tm	SU73	9009.93	11095.827	0.15	3 L	Nd	BL70
8963.105	11153.793		0	Gd II	SP70	9010.11	11095.60		20	Tm I	SU73
8963.50	11153.30		1	Tm	SU73	9011.22	11094.24		100	Br I?	TE63
8964.74	11151.76	0.03	6	Cl I	RA69	9011.61	11093.8		6	Cl I	RA69
8965.60	11150.687	0.02	3	Dy I	CO71	9011.66	11093.70		4 B	I I	MI62
8966.747	11149.26	0.01	5	Fe I	LI76	9011.81	11093.51		250	Br I?	TE63
8967.68	11148.11	0.05	5	Zr	TA76	9012.19	11093.0		6	Cl I	RA69
8967.793	11147.96		8	Se	MO74	9012.59	11092.55	0.10	3	Hf	GO70
8968.04	11147.65	0.10	60	Hf I	GO70	9013.77	11091.10		150	Ce III	SU65
8968.111	11147.567	0.01	1	Pb I	AN68	9013.973	11090.85		4 L	Ce I	VE72
8968.46	11147.15		10	I I	MI62	9014.066	11090.735		3 L	Th I	GI74
8968.56	11147.0	0.50	4	Hf	GO70	9015.022	11089.56		10181	Te I	MO75
8968.889	11146.61		9	Cm I	CO76	9016.55	11087.68		1 L	Ar II	MI63
8969.68	11145.62	0.25	1 L	Tm	CA69	9017.360	11086.68		106	Te I	MO75
8969.86	11145.40		1 LW	Ar I	MI73	9017.97	11085.934	0.10	3 L	Nd	BL70
8970.146	11145.037	0.01	25 B	S I	JA67	9018.00	11085.90	0.25	1 L	Tm	CA69
8970.45	11144.66	0.01	1 L	Ge I	AN59	9018.534	11085.241		I	Xe I	HU70
8970.59	11144.49	0.20	1 L	Tm II	CA69	9018.99	11084.68		1	I II	MA60
8970.92	11144.08	0.02	17	Zr I	TA76	9019.42	11084.16		2	I I	MI62
8971.771	11143.020		3000 I	Ne I	HU73	9020.49	11082.84	0.02	206	Cl I	RA69
8972.67	11141.90		1	Re I	KL57	9020.577	11082.73		3 L	Ce I	VE72
8974.032	11140.22		3	Cm I	CO76	9022.677	11080.15		3 L	Ce II	VE72
8974.05	11140.20		6	I I	MI62	9023.527	11079.107	0.01	3	Pb I	AN68
8974.299	11139.881		3 L	Th I	GI74	9024.02	11078.51	0.05	3	Zr	TA76
8974.95	11139.07	0.10	80	Hf	GO70	9026.3	11075.7		3	Ba I	RU55
8975.050	11138.949	0.10	5 L	Sm I?	BL69	9027.029	11074.809		5 L	Th	GI74
8975.050	11138.949	0.10	5 L	Sm II?	BL69	9027.29	11074.49	0.05	40	Hf I	GO70
8975.153	11138.821		4 L	Th I	GI74	9027.62	11074.08		40	Br I	TE63
8975.627	11138.24		0 LW	Tb I	KL69	9027.904	11073.735		3 L	Th I	GI74
8975.74	11138.10		2	I	MI62	9028.449	11073.07	0.01	1	Fe	LI76
8977.932	11135.373	0.01	18 B	S I	JA67	9029.045	11072.34		42	I I	LU75
8977.99	11135.30		40	Tm I	SU73	9029.23	11072.1		3	Cl I	RA69
8979.148	11133.865		7 L	Ar I	MI73	9029.551	11071.72	0.01	1	Fe I	LI76
8979.51	11133.42	0.01	13 M	S I	JA67	9029.91	11071.28		2	Tm	SU73
8980.983	11131.59		3 L	Ce II	VE72	9031.19	11069.71		2	Tm I	SU73
8981.38	11131.10		2	Tm I	SU73	9031.403	11069.446	0.01	1	Pb I	AN68
8982.07	11130.25	0.05	14	Zr	TA76	9031.726	11069.049		3 L	Th II	GI74
8982.240	11130.03	0.01	12	Si I	RA65	9032.22	11068.44		1 L	Ar II	MI63
8982.470	11129.747	0.10	5 L	Sm I	BL69	9032.322	11068.320		4	Ce III	LI72
8983.01	11129.08	0.20	3	Zr	TA76	9032.57	11068.02		60	Ce	SU65
8983.44	11128.55		3 H	Tm I	SU73	9032.640	11067.929	0.02	2 L	Ar II	MI63
8983.649	11128.287		5 L	Th I	GI74	9033.84	11066.46	0.02	4 LB	Be I	JH62
8984.050	11127.790	0.06	7 L	Sm II	BL69	9034.17	11066.06	0.02	3 LB	Be I	JH62
8985.866	11125.541		4 L	Th I	GI74	9034.590	11065.54		5 L	Ce I?	VE72
8986.059	11125.30		153	Te I	MO75	9034.590	11065.54		5 L	Ce I?	VE72
8986.202	11125.125	0.01	4 L	Ge I	AN59	9035.02	11065.02		2	Re I?	KL57
8987.090	11124.026		3 L	Th I	GI74	9035.02	11065.02		2	Re I?	KL57
8987.88	11123.05	0.02	300	Cl I	RA69	9035.458	11064.478	0.01	2	Pb I	AN68
8990.509	11119.80	0.01	21	Fe I	LI76	9035.903	11063.932		2	As II	AN71
8991.348	11118.757		8 L	Ar I	MI73	9036.19	11063.6		2	Cl I	RA69
8991.7	11118.3		1 H	Ba	RU55	9037.759	11061.66		4 L	Ce I	VE72
8993.09	11116.62		7	I	MI62	9038.29	11061.01		150	Ce III	SU65
8994.762	11114.558		2 L	Tb I	KL72	9038.91	11060.25		2 H	Yb II	ME67
8994.85	11114.42		50 H	Ba I	RU55	9039.48	11059.56		4	I I	MI62
8995.070	11114.157		3 L	Th I	GI74	9039.754	11059.219	0.01	6	Pb I	AN68
9001.300	11106.464		20 L	Ar I	MI73	9039.760	11059.212	0.10	5 L	Sm	BL69
9001.798	11105.85		3 L	Ce II	VE72	9039.952	11058.977	0.07	5 L	Gd I	BL71
9003.10	11104.25		2	Tm	SU73	9040.00	11058.9		1	Cl	RA69
9003.70	11103.51	0.02	3 L	Ga I	JO67	9041.415	11057.19		155	Te I	MO75
9005.079	11101.804		5 L	Th I	GI74	9041.561	11057.009		4 L	Th I	GI74
9005.33	11101.498	0.02	10	Dy I	CO71	9042.053	11056.407		2 L	Tb I	KL72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9043.02	11055.2		2	Cl I	RA69	9079.110	11011.28		3 L	Ce I	VE72
9043.213	11054.989		4 L	Th I	GI74	9079.22	11011.15		2000	Tm I	SU73
9043.818	11054.249	0.01		Zn I	JO68	9079.79	11010.45		600	Br I	TE63
9044.20	11053.79		15	I I	MI62	9080.487	11009.61		3 L	Ce I	VE72
9044.35	11053.60		20	Tm I	SU73	9081.979	11007.80		298	Te I	MO75
9045.63	11052.035	0.05	5 L	Nd I	BL70	9082.29	11007.42		10	Br I	TE63
9045.742	11051.898		7 L	Th I	GI74	9082.936	11006.64		42	Te I	MO75
9046.44	11051.05		2	Yb II	ME67	9083.37	11006.11		2	Tm I	SU73
9047.27	11050.04		2	I	MI62	9083.75	11005.655	0.05	7 L	Nd I	BL70
9048.714	11048.27		19	Te I	MO75	9085.98	11002.95		4	Yb II	ME67
9049.25	11047.62		17	Br I	TE63	9086.688	11002.096	0.15	3 L	Gd I	BL71
9049.392	11047.45		4	Cm I	CO76	9086.933	11001.800		3 L	Th I	GI74
9049.58	11047.21		10	Br I?	TE63	9087.779	11000.776	0.20	3 L	Gd I	BL71
9049.58	11047.21		10	Br I?	TE63	9088.39	11000.04	0.02	7	Hf I	GO70
9049.75	11047.00	0.20	80	Hf	GO70	9088.74	10999.62	0.02	70	Zr I	TA76
9050.05	11046.638	0.05	5 L	Nd I	BL70	9089.84	10998.28		400	Br I	TE63
9050.389	11046.224		4 L	Th I	GI74	9090.20	10997.85		600	Br I	TE63
9050.79	11045.74		800 D	Br I	TE63	9092.570	10994.979	0.06	7 L	Gd I	BL71
9051.69	11044.64		5	Cr I	KI53	9093.297	10994.10		3 L	Ce II?	VE72
9052.55	11043.59		12	I	LU75	9093.297	10994.10		3 L	Ce II?	VE72
9052.911	11043.146		3 L	Th I	GI74	9093.297	10994.10		3 L	Ce I?	VE72
9053.35	11042.611	0.08	4 L	Nd	BL70	9094.29	10992.90	0.05	3	Zr I	TA76
9054.074	11041.73		2	Se I	MO74	9094.452	10992.71		9 L	Tb I	KL69
9055.33	11040.20	0.01	0 L	Ge I	AN59	9095.71	10991.19		4	I I	MI62
9055.44	11040.07	0.05	9	Zr I	TA76	9095.76	10991.12		2	Br I	TE63
9055.53	11039.95		20	Tm	SU73	9097.10	10989.51		1	Br I	TE63
9055.66	11039.80		60	Br I	TE63	9097.58	10988.93	0.02	2 H	Zr I	TA76
9056.29	11039.03	0.20	20	Hf	GO70	9097.703	10988.78		50	Te I	MO75
9058.511	11036.319		4 L	Th I	GI74	9097.89	10988.55		100	Ce III	SU65
9059.438	11035.19		3 L	Ce I	VE72	9099.001	10987.21	0.01	1	Fe I	LI76
9059.47	11035.15		1 H	Yb II	ME67	9099.23	10986.93	0.02	13	Cl I	RA69
9060.693	11033.661	0.02	14	Mg I	RI65	9099.46	10986.66		10	Tm I	SU73
9061.072	11033.20		5 L	Ce I	VE72	9099.66	10986.42	0.02	20	Zr I	TA76
9061.973	11032.103	0.02	15	Mg I	RI65	9100.780	10985.061	0.15	3 L	Sm II	BL69
9061.99	11032.09	0.02	1 L	Li I	JO59	9101.222	10984.527	0.01	20	Si I	RA65
9062.459	11031.51	0.01	1	Fe	LI76	9101.963	10983.633		5 L	Th I	GI74
9062.59	11031.35		0 L	Ar II	MI63	9102.502	10982.982		3 L	Th I	GI74
9062.98	11030.88	0.01	0 L	Ge I	AN59	9102.562	10982.910		4 L	Th I	GI74
9063.57	11030.16	0.02	50	Hf I	GO70	9102.97	10982.424	0.02	0	Dy I	CO71
9063.73	11029.96		5	Tm II	SU73	9102.999	10982.382	0.02	2 L	Ar II	MI63
9064.85	11028.60		2 L	Ar I	MI73	9103.07	10982.30		100	Br I	TE63
9066.15	11027.020	0.02	1	Dy I	CO71	9103.266	10982.061	0.01	30	Si I	RA65
9066.349	11026.78	0.01	1	Fe I	LI76	9103.901	10981.29		79	Te I	MO75
9067.976	11024.81		3	Cm I	CO76	9104.00	10981.17		30	Ce III	SU65
9067.976	11024.81		3	Cm I	CO76	9104.58	10980.47		3 H	Yb II	ME67
9068.43	11024.25		10	Br I	TE63	9104.89	10980.10		100	Tm I	SU73
9069.15	11023.37		1 H	Yb II	ME67	9105.23	10979.70		6	I I	MI62
9069.73	11022.67	0.03	16 V	K I	RI56	9105.548	10979.308	0.01	80	Si I	RA65
9070.470	11021.768		3 L	Th I	GI74	9105.80	10979.00		300	Br I	TE63
9071.134	11020.96		2	Se	MO74	9106.126	10978.611	0.01	1	Pb	AN68
9071.31	11020.761	0.02	1	Dy I	CO71	9107.678	10976.74		10	Te I	MO75
9071.44	11020.60		250	I I	MI62	9108.24	10976.06	0.02	0 L	Li I	JO59
9072.03	11019.87	0.03	17 V	K I	RI56	9108.399	10975.871	0.08	4 L	Gd I	BL71
9072.045	11019.855	0.01	4	Pb I	AN68	9109.435	10974.624		0	Gd II	SP70
9072.383	11019.45		6	Cm I	CO76	9109.68	10974.33		1 L	Ar II	MI63
9073.12	11018.55		1	Br I	TE63	9110.12	10973.80		2 L	Ar II	MI63
9073.601	11017.965	0.01	80	Si I	RA65	9110.278	10973.608	0.01	2	Pb I	AN68
9074.29	11017.14		100	I I	MI62	9110.38	10973.48		500	Br I	TE63
9074.571	11016.787		4 L	Th I	GI74	9110.54	10973.29	0.25	1 L	Tm	CA69
9075.53	11015.63		30	Cr I	KI53	9111.32	10972.35		15	Tm I	SU73
9076.18	11014.84	0.03	3	Cl I	RA69	9111.37	10972.29	0.25	1 L	Tm II	CA69
9077.121	11013.69	0.02	5	Si I	RA65	9111.96	10971.58	0.10	380	Hf I	GO70
9077.488	11013.25	0.01	1	Fe I	LI76	9112.95	10970.39		4	I I	MI62
9077.51	11013.22		20	Br I	TE63	9113.085	10970.229		0 L	Tb I	KL72
9077.95	11012.69		60 HU	Ba I	RU55	9113.665	10969.530	0.01	40	Pb I	AN68
9078.26	11012.31		5	Br I	TE63	9114.72	10968.27	0.02	1 L	Ga I	JO67

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9115.200	10967.683	0.15	3 L	Sm II	BL69	9155.78	10919.07	0.02	3 LD	Li I	JO59
9117.056	10965.450	0.02	28	Mg I	RI65	9156.396	10918.34		1879	Te I	MO75
9118.33	10963.92	0.25	1 L	Tm II	CA69	9157.15	10917.44		1	Tm	SU73
9118.88	10963.260	0.02	0	Dy I	CO71	9157.432	10917.10	0.01	3	He I	LT70
9119.189	10962.885		5 L	Th I	GI74	9157.479	10917.05		2 LW	Tb I	KL69
9119.39	10962.65		20	Ba I	RU55	9157.79	10916.67		1 L	Ar II	MI63
9119.49	10962.527	0.02	0	Dy I	CO71	9158.736	10915.55		6	Te I	MO75
9119.69	10962.28	0.02	2 L	Ne II	PE71	9158.97	10915.27	0.02	7 L	Mg II	RI55
9120.51	10961.30		3	Br I	TE63	9159.32	10914.85		3	Ba	RU55
9120.90	10960.83		2 W	Br I	TE63	9159.58	10914.54	0.05	20	Hf I	GO70
9121.23	10960.43	0.02	0 L	Ne II	PE71	9159.77	10914.32		15	I I	MI62
9121.64	10959.94		1 H	Yb II	ME67	9159.84	10914.23	0.02	11 L	Mg II	RI55
9123.834	10957.304	0.02	27	Mg I	RI65	9159.841	10914.23		6 L	Ce I	VE72
9123.84	10957.30	0.05	3	Zr	TA76	9160.21	10913.79		0 L	Ar II?	MI63
9123.93	10957.19		12	Cr I	KI53	9160.386	10913.581		3 L	Th I	GI74
9124.050	10957.044	0.12	4 L	Sm II	BL69	9160.54	10913.401	0.02	1	Dy I	CO71
9125.16	10955.71	0.04	1	Cl II	RA74	9160.833	10913.05	0.01	9	He I	LT70
9125.54	10955.26	0.01	9	S I	JA67	9162.158	10911.47		5 L	Ce I	VE72
9125.94	10954.775	0.05	5 L	Nd I	BL70	9162.44	10911.14		1 L	Ar I	MI73
9126.37	10954.260	0.02	2 L	Ar II	MI63	9162.86	10910.635	0.07	5 L	Nd I	BL70
9127.02	10953.48		10	Tm II	SU73	9163.559	10909.802		11	Ca I	RI68
9127.152	10953.320	0.02	25	Mg I	RI65	9163.8	10909.5		1	Re I	KL57
9127.20	10953.26	0.10	8	Hf I	GO70	9164.409	10908.79		4 L	Ce	VE72
9128.42	10951.799	0.10	3 L	Nd	BL70	9164.55	10908.62		60 D	Br I	TE63
9128.43	10951.78	0.02	10 L	Mg II	RI55	9165.85	10907.07		3	Tm I	SU73
9129.40	10950.62	0.02	1 L	Ne II	PE71	9166.68	10906.090	0.02	3	Dy I	CO71
9130.478	10949.33		3 L	Ce I	VE72	9166.90	10905.83		25	Cr I	KI53
9130.88	10948.852	0.02	1	Dy I	CO71	9167.20	10905.47	0.02	5 LB	Ga I	JO67
9131.459	10948.154		4 L	Th I	GI74	9168.300	10904.16		5 L	Ce I	VE72
9131.68	10947.89		1	Br I	TE63	9169.37	10902.90		2	Cr	KI53
9132.00	10947.50		1	Br I	TE63	9169.41	10902.84	0.02	8	Zr I	TA76
9132.078	10947.412	0.01	4 L	Ge I	AN59	9170.01	10902.13		60	Ce III	SU65
9132.609	10946.775		6 LW	Tb I	KL72	9170.167	10901.94		5 L	Ce	VE72
9133.73	10945.4		5	Cl I	RA69	9170.796	10901.193		4 L	Th I	GI74
9135.62	10943.17		1	Yb II	ME67	9170.99	10900.96	0.05	2	Hf I	GO70
9136.234	10942.432		3 L	Th I	GI74	9171.764	10900.042	0.10	3 L	Gd I	BL71
9136.391	10942.244		8 L	Th II	GI74	9172.271	10899.45		6	Cm I	CO76
9136.40	10942.23		3	Re I	KL57	9172.83	10898.78	0.05	11	Zr I	TA76
9136.731	10941.84		50	Te I	MO75	9173.40	10898.10	0.02	4 L	Ga I	JO67
9136.914	10941.617		4 L	Th II	GI74	9173.57	10897.90		0 L	Ar II?	MI63
9137.95	10940.37	0.05	40	F I	LI49	9173.60	10897.87		65	I I	MI62
9139.022	10939.094		1	As II	AN71	9173.947	10897.46		9	Cm I	CO76
9139.79	10938.18	0.05	20	Hf I	GO70	9174.320	10897.006	0.06	7 L	Sm II	BL69
9140.02	10937.898	0.02	12	La III	OD67	9174.50	10896.79		200	Br I	TE63
9140.230	10937.648	0.12	4 L	Sm I	BL69	9174.911	10896.30	0.01	4	Fe I	LI76
9140.429	10937.41		3 L	Ce I?	VE72	9175.736	10895.324		I	Xe I	HU70
9140.429	10937.41		3 L	Ce I?	VE72	9176.30	10894.66		70	I I	MI62
9140.65	10937.15	0.02	3	Zr I	TA76	9176.868	10893.98		3 L	Ce I	VE72
9143.120	10934.19		5 L	Ce I	VE72	9177.87	10892.79		100	Br I	TE63
9143.45	10933.80	0.02	20	Hf I	GO70	9178.66	10891.86	0.02	25	Zr I	TA76
9143.74	10933.44		2	Re I	KL57	9178.761	10891.733	0.02	11 L	Al I	ER63
9146.71	10929.90		10	Cr I	KI53	9178.99	10891.47		75 D	I I	MI62
9146.893	10929.68		3 L	Ce I	VE72	9179.02	10891.43		250 B	Br I	TE63
9149.279	10926.83		5 L	Ce I	VE72	9179.02	10891.43	0.01	1	Pb	AN68
9150.259	10925.66		2	Se	MO74	9179.980	10890.287		4 L	Th I	GI74
9150.322	10925.58		22	Te	MO75	9180.31	10889.90		4	Tm	SU73
9150.97	10924.81	0.05	25	F I	LI49	9180.88	10889.23		18	I I	MI62
9151.245	10924.483		4 L	Th II	GI74	9181.36	10888.65		30	Ba I	RU55
9152.120	10923.438	0.02	7 L	Ar II	MI63	9181.62	10888.35		10	Ca I	RI68
9152.15	10923.40	0.05	6 W	Hf	GO70	9182.060	10887.820	0.15	3 L	Sm	BL69
9152.227	10923.31		3 L	Ce I	VE72	9182.068	10887.81		5 L	Ce	VE72
9153.40	10921.91	0.05	6	Zr	TA76	9183.015	10886.688	0.01	15	Pb I	AN68
9153.9	10921.3			Y I	BO55	9183.920	10885.615		10	Ca I	RI68
9154.59	10920.489	0.02	1	Dy I	CO71	9184.08	10885.42	0.03	5	Cl II	RA74
9155.495	10919.411		12	Ca I	RI68	9184.155	10885.336	0.01	30	Si I	RA65
9155.59	10919.30		1	Re I	KL57	9184.78	10884.60	0.02	2 V	N I	EI58

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9185.060	10884.26	0.01	3	Fe I	LI76	9217.86	10845.53		3 H	Yb II	ME67
9185.620	10883.601	0.15	3 L	Sm II	BL69	9217.941	10845.438		2 L	Ar I	MI73
9185.70	10883.51	0.02	32	Zr I	TA76	9218.30	10845.02	0.02	380	Zr I	TA76
9185.89	10883.28	0.05	25	F I	LI49	9218.820	10844.405		4 L	Th I	GI74
9186.19	10882.92		1 H	Yb II	ME67	9218.951	10844.25		4 L	Ce I	VE72
9186.29	10882.80	0.02	5	Si I	LI65	9219.176	10843.986		9 L	Tb I	KL72
9187.174	10881.76	0.01	2	Fe I	LI76	9219.28	10843.86		2 W	Br I	TE63
9187.359	10881.54		3 L	Ce I	VE72	9219.288	10843.854	0.01	60	Si I	RA65
9188.769	10879.871		14	Ca I	RI68	9219.470	10843.640	0.05	7 L	Gd I	BL71
9189.34	10879.19	0.02	1 V	N I	EI58	9221.233	10841.567	0.01	100	Cl I	RA69
9192.0	10876.0			Y I	BO55	9221.43	10841.34		4	I I	MI62
9192.53	10875.419	0.15	3 L	Nd	BL70	9222.14	10840.50		2 H	Tm	SU73
9192.942	10874.931		80	Kr I	KA69	9222.52	10840.05		500 D	Br I	TE63
9193.146	10874.69		3 L	Ce I	VE72	9222.53	10840.04		1 L	Ar II	MI63
9194.596	10872.975	0.02	10 L	Al I	ER63	9223.28	10839.16	0.02	3	Cl II	RA74
9195.74	10871.62		90	Br I	TE63	9223.439	10838.974		13	Ca I	RI68
9196.70	10870.49	0.02	115	Zr I	TA76	9223.45	10838.967	0.02	10	Dy I	CO71
9196.90	10870.25	0.10	2	Hf	GO70	9223.50	10838.90		1	Tm	SU73
9196.943	10870.20		6 L	Ce II?	VE72	9223.983	10838.335		I	Xe I	HU70
9196.943	10870.20		6 L	Ce I?	VE72	9224.37	10837.88	0.02	3 L	Ne II	PE71
9197.141	10869.967		4 L	Th I	GI74	9224.74	10837.45		1 L	Ar I	MI73
9197.368	10869.698	0.02	2 L	Ar II	MI63	9224.86	10837.30		2 H	Tm	SU73
9197.37	10869.70		100	Br I	TE63	9226.013	10835.95		6 L	Ce I?	VE72
9197.45	10869.60		30	Tm	SU73	9226.013	10835.95		6 L	Ce I?	VE72
9197.501	10869.541	0.01	130	Si I	RA65	9226.349	10835.555		8 L	Tb I?	KL72
9197.540	10869.496		14	Ca I	RI68	9226.349	10835.555		8 L	Tb I?	KL72
9198.135	10868.79	0.01	30	Si I	RA65	9226.93	10834.87	0.03	8 VB	Na I	RI56
9198.50	10868.36	0.10	40	Hf	GO70	9227.307	10834.43		5 L	Ce I	VE72
9198.512	10868.35		1 LW	Tb I	KL69	9227.521	10834.179		3 L	Th	GI74
9198.92	10867.87		1 L	Ar II	MI63	9228.204	10833.378		11	Ca I	RI68
9199.31	10867.41	0.02	98	Zr	TA76	9229.198	10832.21		4 L	Ce I	VE72
9199.361	10867.343	0.02	3 L	Ar II	MI63	9229.27	10832.13	0.02	9	Cl I	RA69
9202.304	10863.868		13	Ca I	RI68	9229.46	10831.90		1 L	Ar I	MI73
9202.591	10863.53	0.01	3	Fe I	LI76	9230.076	10831.18		4 L	Ce I?	VE72
9203.25	10862.75		4	Tm I	SU73	9230.076	10831.18		4 L	Ce I?	VE72
9203.456	10862.508		4 L	Th I	GI74	9230.77	10830.36		100	Yb II	ME67
9203.62	10862.31	0.05	200	F I	LI49	9231.55	10829.452	0.02	3 L	Ar II	MI63
9203.67	10862.25		10	Re I	KL57	9231.70	10829.275		11	Ca I	RI68
9203.74	10862.17	0.02	3 L	Ne II	PE71	9231.84	10829.11		40	Yb II	ME67
9204.244	10861.578		13	Ca I	RI68	9232.83	10827.949	0.07	5 L	Nd I	BL70
9205.346	10860.28		8	Se	MO74	9233.162	10827.56		3 L	Ce I	VE72
9207.09	10858.22		0 V	Ge I	HU64	9233.297	10827.41		3	Cm I	CO76
9207.167	10858.13		5 L	Ce I	VE72	9233.47	10827.20		30	Tm	SU73
9208.29	10856.81	0.02	3	Cl II	RA74	9233.562	10827.091	0.01	140	Si I	RA65
9208.31	10856.80		2	I I	MI62	9233.760	10826.859	0.15	3 L	Sm II	BL69
9208.53	10856.53	0.02	62	Zr I	TA76	9235.550	10824.76		3 L	Ce	VE72
9208.760	10856.252	0.12	4 L	Sm II	BL69	9236.01	10824.22		10	Re I	KL57
9208.76	10856.25		1	Yb II	ME67	9236.19	10824.01		1 L	Ar I?	MI73
9208.927	10856.05		153	Te I	MO75	9236.19	10824.01		1 L	Ar I?	MI73
9209.538	10855.34		9	Cm I	CO76	9236.25	10823.94	0.25	1 L	Tm	CA69
9210.442	10854.269	0.01	1	Pb I	AN68	9236.847	10823.24		4 L	Ce I	VE72
9210.577	10854.11		3 L	Ce I	VE72	9237.197	10822.83		4 L	Ce I	VE72
9211.130	10853.458		3 L	Th I	GI74	9237.263	10822.75		68	Se I	MO74
9211.233	10853.35		3	Cm II	CO76	9237.75	10822.18	0.03	3	Cl I	RA69
9211.93	10852.52		10	Tm	SU73	9238.038	10821.85		0 L	Tb I	KL69
9211.983	10852.46		3	Cm I	CO76	9238.23	10821.62		12	Cr I	KI53
9212.016	10852.42		9	Cm I	CO76	9239.436	10820.207		6 L	Ar I	MI73
9212.5	10851.9	0.30	1	Cl II	RA74	9239.549	10820.075		5 L	Th II	GI74
9212.66	10851.66	0.05	10 U	Hf I	GO70	9239.75	10819.84		0 LP	Ar I	MI73
9212.89	10851.39	0.25	1 L	Tm II	CA69	9241.076	10818.287	0.01	1	Pb I	AN68
9212.93	10851.34		40	Tm I	SU73	9241.088	10818.27	0.01	2	Fe I	LI76
9214.516	10849.47	0.01	1	Fe I	LI76	9241.44	10817.858	0.02	1 L	Ar II	MI63
9214.87	10849.05		15	Tm	SU73	9242.26	10816.91		8	Cr I	KI53
9216.806	10846.775		10	Ca I	RI68	9242.61	10816.49		1 L	Ar II	MI63
9217.22	10846.29	0.02	4	Hf	GO70	9242.93	10816.11	0.02	4	Cl II	RA74
9217.36	10846.12		10	Br I	TE63	9242.974	10816.066		1	As II	AN71

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9243.33	10815.65		6	Br I	TE63	9275.045	10778.669	0.06	6 L	Gd I?	BL71
9243.490	10815.46		14	Te I	MO75	9275.045	10778.669	0.06	6 L	Gd I?	BL71
9243.65	10815.28		3 H	Ru I?	KE59	9275.240	10778.440	0.15	3 L	Sm	BL69
9243.65	10815.28		3 H	Ru I?	KE59	9275.65	10777.97		4	I I	MI62
9245.105	10813.573		4 L	Th I	GI74	9276.109	10777.43		3 L	Ce I	VE72
9245.257	10813.395		6 L	Th I	GI74	9276.493	10776.984		4 L	Th I	GI74
9245.44	10813.181	0.05	7 L	Nd I	BL70	9277.25	10776.11		1	Yb II	ME67
9245.57	10813.03		0	P I	MA59	9278.21	10774.993	0.02	3 V	N I	EI58
9245.680	10812.901	0.02	12 L	Ar II	MI63	9278.73	10774.38		1	Yb II	ME67
9245.83	10812.73		5 H	Tm I	SU73	9279.07	10773.99	0.04	1	Cl II	RA74
9246.209	10812.281		5 L	Th I	GI74	9279.345	10773.68		3	Cm	CO76
9246.874	10811.51		3	Cm	CO76	9279.562	10773.419		7 L	Tb I	KL72
9246.90	10811.47		1 W	Br I	TE63	9279.82	10773.12	0.15	2 L	Tm	CA69
9247.233	10811.085	0.02	35 B	Mg I	RI65	9280.47	10772.37	0.02	30	Hf I	GO70
9247.46	10810.82		5 H	Yb II	ME67	9280.98	10771.79		20	I I	MI62
9248.12	10810.05		300	Br I	TE63	9281.569	10771.09		4 L	Tb I	KL69
9248.65	10809.43	0.02	51	Zr I	TA76	9281.638	10771.01		3 L	Ce I	VE72
9250.433	10807.344		3 L	Th I	GI74	9282.160	10770.404		12 L	Ar I	MI73
9250.882	10806.82		6 I	Tb I	KL69	9282.43	10770.10		2000	Yb I	ME66
9251.408	10806.21		8	Cm I	CO76	9283.00	10769.43	0.05	40	F I	LI49
9252.95	10804.40		3	Br I	TE63	9283.2	10769.2		4 H	Ba I	RU55
9253.367	10803.918		4 L	Th I	GI74	9283.760	10768.548	0.15	3 L	Sm II	BL69
9253.90	10803.30		1	Tm I	SU73	9283.919	10768.364	0.02	8 L	Al I	ER63
9254.61	10802.47		4	Yb II	ME67	9284.83	10767.31		80	Tm I	SU73
9255.47	10801.47	0.01	9	Cl II	RA74	9285.306	10766.755		2 L	Tb I	KL72
9255.55	10801.37		12	Cr I	KI53	9287.29	10764.45		30	Ce III	SU65
9255.649	10801.254		1	Kr I	KA69	9287.356	10764.378	0.02	8 L	Ar II	MI63
9256.589	10800.157		4 L	Th I	GI74	9287.467	10764.249		1 L	Tb I	KL72
9256.678	10800.053		5 L	Th I	GI74	9287.48	10764.23	0.02	2 L	Ne II	PE71
9256.93	10799.759	0.10	3 L	Nd	BL70	9287.53	10764.178	0.02	3	Dy I	CO71
9256.97	10799.71	0.25	1 L	Tm	CA69	9287.94	10763.70		3	Tm	SU73
9257.328	10799.295		3 LW	Tb I	KL72	9288.226	10763.37		5 L	Ce I	VE72
9258.36	10798.09		25	Br I	TE63	9288.57	10762.97	0.20	1 L	Tm	CA69
9258.99	10797.36		3	Tm	SU73	9288.82	10762.69	0.50	3	Hf	GO70
9259.773	10796.444	0.15	3 L	Gd I	BL71	9290.591	10760.63		4 L	Ce	VE72
9260.10	10796.06	0.03	7	Si I	RA65	9291.357	10759.743	0.01	7	Pb I	AN68
9260.11	10796.05		3 LH	Ar I	MI73	9291.645	10759.410	0.01	5	Pb I	AN68
9260.93	10795.10		10	Br I?	TE63	9291.856	10759.165		20 L	Ar I	MI73
9261.08	10794.92		5	Br I?	TE63	9292.087	10758.898		I	Xe I	HU70
9261.430	10794.512	0.08	6 L	Sm	BL69	9292.560	10758.35		3 L	Ce I	VE72
9261.821	10794.056		3 L	Th II	GI74	9292.96	10757.888	0.02	7 V	N I	EI58
9263.373	10792.26		9	Cm I	CO76	9293.06	10757.77		6	Br I	TE63
9264.23	10791.25		40 HU	Ba I	RU55	9293.47	10757.30		2	Tm I	SU73
9264.630	10790.783	0.15	3 L	Sm I?	BL69	9294.655	10755.925		0 L	Tb I	KL72
9264.630	10790.783	0.15	3 L	Sm II?	BL69	9294.66	10755.92		3000	Br I	TE63
9265.663	10789.580		3 LW	Tb I	KL72	9294.685	10755.890	0.06	6 L	Gd I	BL71
9266.38	10788.746	0.02	3	Dy I	CO71	9294.87	10755.68	0.25	1 L	Tm	CA69
9266.711	10788.36		3 L	Ce I	VE72	9295.46	10754.99		1	Yb II	ME67
9266.87	10788.18		10	I I	MI62	9296.035	10754.328		4 L	Th I	GI74
9267.96	10786.905	0.02	1	Dy I	CO71	9296.21	10754.13		200	Br I	TE63
9267.97	10786.90		2	Tm	SU73	9296.33	10753.985	0.02	2 L	C I	JO66
9268.003	10786.856	0.01	80	Si I	RA65	9296.68	10753.58		150	Br I	TE63
9268.077	10786.770	0.02	4 L	Al I	ER63	9296.725	10753.530	0.01	17 LB	O I	EI63
9268.420	10786.371		3 L	Th I	GI74	9297.182	10753.00	0.01	3	Fe	LI76
9268.80	10785.93	0.25	1 L	Tm II	CA69	9298.578	10751.39		8	Te I	MO75
9268.814	10785.912		4 L	Th I	GI74	9299.244	10750.617	0.01	1	Pb I	AN68
9269.38	10785.25	0.02	7	Cl I	RA69	9299.752	10750.03		5 L	Ce I	VE72
9269.430	10785.195	0.06	6 L	Gd I?	BL71	9300.26	10749.44		5	Tm I	SU73
9269.430	10785.195	0.06	6 L	Gd I?	BL71	9300.268	10749.434		3 L	Th I	GI74
9269.49	10785.13		1 L	Ar II	MI63	9300.311	10749.384	0.01	60	Si I	RA65
9269.88	10784.67		4	Tm I	SU73	9300.39	10749.29	0.03	9 V	Na I	RI56
9269.976	10784.560	0.01	30	Si I	RA65	9301.66	10747.8		1	Cl	RA69
9270.0	10784.5			Y I	BO55	9301.73	10747.744	0.02	1	Dy I	CO71
9270.990	10783.38		3 L	Ce	VE72	9302.20	10747.20		20	Br I	TE63
9271.274	10783.05	0.01	5	Fe I	LI76	9302.29	10747.10	0.10	3	Zr I	TA76
9272.138	10782.045	0.02	9 L	Al I	ER63	9302.86	10746.44	0.03	10 V	Na I	RI56

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9303.210	10746.04		5 L	Tb I	KL69	9338.368	10705.576		8 L	Tb I	KL72
9303.286	10745.946	0.01	2	Pb I	AN68	9339.869	10703.856	0.08	4 L	Gd I	BL71
9303.35	10745.87		3	Yb II	ME67	9340.95	10702.62		4	Th	KL50
9303.37	10745.85		4	Tm I	SU73	9341.71	10701.75		1	Tm	SU73
9304.71	10744.31	0.02	6 LB	In I	JO67	9342.60	10700.73		4 V	Ce I	HU64
9304.804	10744.20		3	Cm I	CO76	9342.97	10700.30		8	Tm I	SU73
9306.29	10742.48		100	Br I?	TE63	9343.375	10699.84		23	Se I	MO74
9306.29	10742.48		100	Br I?	TE63	9343.884	10699.256		20	Kr I	KA69
9306.58	10742.14		1000	Br I	TE63	9346.00	10696.84	0.02	550	Zr I	TA76
9309.175	10739.148	0.01	1	Pb I	AN68	9346.11	10696.71	0.05	5	Hf I	GO70
9309.25	10739.07	0.02	460	Zr I	TA76	9346.327	10696.46		4 L	Ce II	VE72
9309.91	10738.30		1	Tm	SU73	9346.72	10696.02		100	I I	MI62
9309.98	10738.22	0.10	7	Hf I	GO70	9347.68	10694.91		12	Br I	TE63
9310.91	10737.15		30	Ce III	SU65	9348.257	10694.251	0.01	30	Si I	RA65
9311.780	10736.144	0.12	4 L	Sm	BL69	9348.45	10694.03		2000	Tm I	SU73
9311.91	10736.00	0.10	7	Hf	GO70	9348.59	10693.88	0.02	14	Zr I	TA76
9313.589	10734.059	0.01	4 L	Ge I	AN59	9349.20	10693.167	0.02	3 V	N I	EI58
9313.756	10733.866		20 L	Ar I	MI73	9349.62	10692.698	0.02	1	Dy I	CO71
9315.163	10732.245		5 L	Th I	GI74	9350.25	10691.98	0.04	2	Cl II	RA74
9315.23	10732.17	0.10	3	Zr	TA76	9350.73	10691.42	0.25	1 L	Tm	CA69
9315.28	10732.11		4 L	Ar I	MI73	9350.88	10691.250	0.02	10 L	C I	JO66
9315.43	10731.94		3	Yb II	ME67	9351.00	10691.12		1	I	MA60
9315.55	10731.80	0.01	1 L	Ge I	AN59	9351.08	10691.02		1 H	Yb II	ME67
9315.74	10731.58		6 V	Ge I	HU64	9351.926	10690.06		1 L	Tb I	KL69
9316.67	10730.510	0.02	4 V	N I	EI58	9352.220	10689.719	0.01	25	Si I	RA65
9317.3	10729.8		10	Lu I	KI54	9352.67	10689.20		2 H	Yb II	ME67
9317.52	10729.533	0.02	6 L	C I	JO66	9353.23	10688.57	0.25	1 L	Tm	CA69
9317.592	10729.447		2	Kr I	KA69	9355.64	10685.82		100	I I	MI62
9318.57	10728.322		10	Ca I	RI68	9356.05	10685.345	0.02	6 L	C I	JO66
9319.10	10727.72		200	Yb I	ME66	9356.11	10685.28	0.09	6	Si	RA65
9319.364	10727.408	0.01	30	Si I	RA65	9356.82	10684.46		400	Ce III	SU65
9319.72	10727.00		5	Tm	SU73	9357.8	10683.4			Y I	BO55
9319.755	10726.97		3	Cm I	CO76	9357.950	10683.175	0.06	5 L	Gd I	BL71
9319.782	10726.926		8 L	Th I	GI74	9358.03	10683.082	0.02	8 L	C I	JO66
9321.092	10725.418		6 L	Th I	GI74	9358.06	10683.050		12 L	Ar II	MI63
9322.068	10724.30		4	Cm I	CO76	9358.41	10682.65	0.05	6 L	Tm	CA69
9322.394	10723.921		7 L	Th II	GI74	9358.46	10682.60	0.05	12	Zr I	TA76
9322.727	10723.537		0 L	Tb I	KL72	9358.98	10682.0		7	Cl	RA69
9323.11	10723.10		15	Br I	TE63	9359.48	10681.43		1	P I	MA59
9323.5	10722.6			Y I	BO55	9360.039	10680.79		5 L	Ce I	VE72
9324.01	10722.07		2 B	I I	MI62	9360.35	10680.43		40	Tm I	SU73
9324.34	10721.68		3 H	Yb II	ME67	9360.984	10679.719	0.06	6 L	Gd I	BL71
9325.34	10720.530		1 L	Ar II	MI63	9361.92	10678.64		1	Yb II	ME67
9325.370	10720.498	0.12	4 L	Sm II	BL69	9361.95	10678.62	0.02	8	Hf	GO70
9325.37	10720.50		50	Ce III?	SU65	9362.161	10678.369		3 L	Th I	GI74
9325.37	10720.50		50	Ce III?	SU65	9363.60	10676.73		30	Yb II?	ME67
9326.580	10719.108	0.10	5 L	Sm	BL69	9363.60	10676.73		30	Yb II?	ME67
9326.81	10718.84		100	Br I	TE63	9363.94	10676.337	0.02	10	Dy II	CO71
9327.32	10718.25	0.02	0	Cl I	RA69	9364.291	10675.940	0.01	16 LB	O I	EI63
9327.58	10717.954	0.02	6 V	N I	EI58	9364.480	10675.725	0.01	17 LB	O I	EI63
9328.05	10717.42	0.02	5 L	In I	JO67	9366.34	10673.60		1	Tm	SU73
9328.35	10717.07		2	Yb II	ME67	9366.44	10673.50	0.02	123	Zr I	TA76
9328.40	10717.02		2	Yb I	ME66	9366.520	10673.40		3 L	Ce I	VE72
9328.78	10716.583		500 V	Pr III	SU74	9367.13	10672.70		6	Tm I	SU73
9330.110	10715.052	0.15	3 L	Sm II	BL69	9367.60	10672.17		18	Cr I	KI53
9330.357	10714.768	0.08	4 L	Gd I	BL71	9367.871	10671.86		3 L	Ce I	VE72
9330.50	10714.60		1 L	Ar I	MI73	9368.24	10671.444	0.02	0	Dy I	CO71
9331.42	10713.550	0.02	8 V	N I	EI58	9368.574	10671.07		3	Cm I	CO76
9332.088	10712.780		15 L	Ar I	MI73	9368.80	10670.80		1	Tm	SU73
9333.12	10711.60		80	Yb II	KA73	9369.004	10670.57		4 L	Ce I	VE72
9333.243	10711.455	0.01	1	Pb I	AN68	9369.441	10670.08		0 LW	Tb I	KL69
9336.84	10707.333	0.02	6 L	C I	JO66	9369.478	10670.03		5 L	Ce I	VE72
9337.31	10706.79		15	I I	MI62	9369.61	10669.880	0.10	3 L	Nd	BL70
9337.315	10706.783		I	Xe I	HU70	9369.68	10669.80		2	Tm I	SU73
9337.50	10706.57	0.02	3	Cl II	RA74	9371.31	10667.95	0.02	140	Zr I	TA76
9337.66	10706.39	0.10	3	Zr	TA76	9371.533	10667.69		3 L	Ce I	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9371.645	10667.565	0.06	6 L	Gd I	BL71	9405.628	10629.02		4 L	Ce I	VE72
9371.68	10667.53		15	Cr I	KI53	9406.43	10628.11		4	Yb II	ME67
9372.75	10666.30		2 H	Yb II	ME67	9406.844	10627.647	0.01	20	Si I	RA65
9373.176	10665.82		3 L	Ce I?	VE72	9407.145	10627.306		2	Gd II	SP70
9373.176	10665.82		3 L	Ce I?	VE72	9407.712	10626.665		8	Kr I	KA69
9374.30	10664.54		1 L	Ar II	MI63	9408.68	10625.57		8	Re I	KL57
9374.570	10664.234		5 L	Th I	GI74	9409.77	10624.34		1	Br I	TE63
9375.30	10663.40		2 V	Ge I	HU64	9409.803	10624.304	0.06	6 L	Gd I	BL71
9376.01	10662.60	0.05	21	Zr	TA76	9409.958	10624.129	0.01	2	Pb I	AN68
9377.33	10661.10		4	Tm I	SU73	9410.62	10623.38		2 L	Ar I	MI73
9377.42	10660.99		2 L	Ar II	MI63	9410.80	10623.177	0.02	5 V	N I	EI58
9377.436	10660.975	0.01	120	Si I	RA65	9411.517	10622.370	0.06	6 L	Gd I	BL71
9377.549	10660.847		3 L	Th II	GI74	9411.575	10622.31		1 LW	Tb I	KL69
9377.59	10660.80		3	Br I	TE63	9411.68	10622.18	0.02	6	Hf I	GO70
9377.96	10660.380	0.05	5 L	Nd I	BL70	9413.23	10620.44	0.05	680 U	Hf	GO70
9378.99	10659.209	0.05	5 L	Nd I	BL70	9413.29	10620.4		7	Cl	RA69
9379.147	10659.03		5 L	Ce I	VE72	9413.93	10619.65		1	Br I	TE63
9379.261	10658.91		9	Cm I	CO76	9414.097	10619.458	0.02	7 L	Ar II	MI63
9379.719	10658.38		3 L	Ce I	VE72	9414.122	10619.43		6 L	Ce	VE72
9379.94	10658.13	0.04	1	Cl II	RA74	9414.62	10618.87	0.05	5 H	Zr I	TA76
9382.413	10655.32		3 L	Ce I?	VE72	9414.99	10618.45		40	Re I	KL57
9382.413	10655.32		3 L	Ce I?	VE72	9416.521	10616.72	0.01	1	Fe I	LI76
9383.41	10654.19	0.02	4	Hf	GO70	9416.86	10616.34	0.02	2	Cl I	RA69
9383.44	10654.16	0.02	570	Zr I	TA76	9416.89	10616.31		1	Br	TE63
9383.66	10653.90		1	Tm	SU73	9417.26	10615.89		1 L	Ar I	MI73
9383.663	10653.90		3 L	Ce I	VE72	9417.731	10615.36		3 L	Ce	VE72
9384.43	10653.034	0.02	8 V	N I	EI58	9418.044	10615.008		4 L	Th I	GI74
9385.90	10651.36		5	Yb II?	ME67	9418.93	10614.01		1 L	Ar II	MI63
9385.90	10651.36		5	Yb II?	ME67	9419.12	10613.80		2	Tm	SU73
9386.831	10650.30		150	Se I	MO74	9419.481	10613.388		4 L	Th I	GI74
9386.976	10650.14		3 L	Ce I	VE72	9419.550	10613.310		8 LW	Tb I	KL72
9387.25	10649.83		6	Ru I	KE59	9419.826	10613.00		3 L	Ce I	VE72
9387.762	10649.249	0.01	50	Pb I	AN68	9420.33	10612.432	0.08	4 L	Nd	BL70
9387.808	10649.20		4	Se	MO74	9420.63	10612.10	0.02	1	Cl I	RA69
9387.90	10649.10		30 H	Ba I	RU55	9423.68	10608.66		40	Br I	TE63
9388.237	10648.71		5 L	Ce I	VE72	9423.871	10608.444		20 B	Kr I	KA69
9389.17	10647.66		12	Cr I	KI53	9424.504	10607.731		20 B	Kr I	KA69
9389.29	10647.516	0.10	3 L	Nd I	BL70	9424.54	10607.69		0 L	Ar II	MI63
9391.761	10644.714		1	Kr I	KA69	9425.95	10606.10		8	Tm I	SU73
9392.41	10643.981	0.02	6 V	N I	EI58	9426.519	10605.464		4 L	Th I	GI74
9392.659	10643.697	0.01	1	Pb I	AN68	9426.54	10605.44	0.02	3 L	Ne II	PE71
9395.138	10640.89		3	Te I	MO75	9426.703	10605.27		3	Cm	CO76
9395.90	10640.03	0.04	1	Cl II	RA74	9426.73	10605.228	0.02	1	Dy I	CO71
9396.05	10639.86		1 L	Ar II	MI63	9426.8	10605.2			Y II	BO55
9396.40	10639.45		100	Re I	KL57	9427.25	10604.65	0.02	30	Hf	GO70
9396.96	10638.82		15	Br I	TE63	9427.49	10604.372	0.05	5 L	Nd I	BL70
9397.38	10638.35		1	Yb II	ME67	9428.15	10603.64		4	I I?	MI62
9397.581	10638.121	0.02	8 L	Ar II	MI63	9428.15	10603.64		4	I I?	MI62
9397.65	10638.05	0.05	330	Hf I	GO70	9428.27	10603.50		1	Tm	SU73
9397.924	10637.733	0.15	3 L	Gd I	BL71	9428.326	10603.431	0.01	120	Si I	RA65
9397.945	10637.71		36	Te	MO75	9428.93	10602.75		2 H	Yb II	ME67
9400.48	10634.84	0.02	5	Hf	GO70	9429.60	10602.00		7	Tm I	SU73
9401.15	10634.08		1	Br I	TE63	9430.151	10601.379		1 LW	Tb I	KL72
9401.90	10633.24		5	Yb I	ME66	9430.853	10600.59		4 L	Ce I	VE72
9402.04	10633.08	0.01	210	S I	JA67	9430.94	10600.50	0.02	18	Cl I	RA69
9402.116	10632.99		3 L	Ce I	VE72	9431.33	10550.83	0.05	10	Hf	GO70
9402.20	10632.89		400	Yb II	KA73	9431.43	10599.94		1	Br I	TE63
9403.39	10631.55		20 D	Tm	SU73	9431.44	10599.928	0.02	10	Dy I	CO71
9403.50	10631.42		2	Cr I?	KI53	9431.57	10599.790	0.02	10	Dy I	CO71
9403.50	10631.42		2	Cr I?	KI53	9432.00	10599.31		8	Re I	KL57
9404.66	10630.12	0.02	3	Cl	RA74	9433.883	10597.19		161	Te I	MO75
9404.72	10630.05		4	Ru I?	KE59	9434.09	10596.958	0.02	6 V	N I	EI58
9404.72	10630.05		4	Ru I?	KE59	9434.14	10596.92		1	P I	MA59
9405.112	10629.60		60	Te I	MO75	9434.48	10596.51		5 V	Ge I	HU64
9405.25	10629.45		18	Br I	TE63	9434.794	10596.163		2 L	Tb I	KL72
9405.323	10629.367	0.06	6 L	Gd I	BL71	9435.94	10594.87	0.05	50	Hf I	GO70

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9436.95	10593.74		2	Re I	KL57	9470.283	10556.454		7 L	Th I	GI74
9438.25	10592.28	0.05	18	F I	LI49	9470.69	10556.001	0.10	3 L	Nd	BL70
9438.59	10591.905	0.02	5 V	N I	EI58	9470.78	10555.90		1 L	Ar II	MI63
9438.94	10591.51		10 W	Br I	TE63	9470.819	10555.86		43	Te I	MO75
9439.050	10591.385	0.15	3 L	Sm II	BL69	9471.60	10554.986	0.05	5 L	Nd	BL70
9439.89	10590.44	0.05	7 L	Tm I	CA69	9471.734	10554.837		4 L	Th I	GI74
9441.43	10588.71	0.05	45	F I	LI49	9471.79	10554.77	0.02	8	Cl I	RA69
9441.55	10588.59		6	I I	MI62	9471.84	10554.72		1	Br	TE63
9442.49	10587.53	0.25	1 L	Tm	CA69	9471.89	10554.66	0.20	1 L	Tm	CA69
9442.728	10587.26		5 LW	Tb I	KL69	9474.44	10551.83	0.02	170	Zr I	TA76
9442.758	10587.23		2	Se	MO74	9475.241	10550.93		3 L	Ce I	VE72
9442.870	10587.100		3 L	Th I	GI74	9475.97	10550.12		3	Cr I	KI53
9442.897	10587.07		8	Se	MO74	9476.40	10549.638	0.02	8 V	N I	EI58
9444.48	10585.30		6	Tm I	SU73	9476.422	10549.615		1	Kr I	KA69
9444.491	10585.29		3 L	Tb I	KL69	9476.46	10546.24		1	Yb II	ME67
9444.59	10585.17	0.02	4	Cl	RA69	9476.87	10549.12		1 L	Ar II	MI63
9444.617	10585.141	0.01	120	Si I	RA65	9476.929	10549.06		5	Cm I	CO76
9444.86	10584.87		1	Yb II	ME67	9478.07	10547.78		4	Yb II	ME67
9446.14	10583.435	0.10	3 L	Nd I	BL70	9478.411	10547.40		15	Te	MO75
9446.900	10582.584	0.06	7 L	Sm II	BL69	9478.929	10546.83		4	Cm I	CO76
9447.298	10582.14	0.02	2	Si I	RA65	9478.99	10546.76	0.04	4 L	N II	ER58
9447.736	10581.647	0.01	1	Pb	AN68	9480.02	10545.62		15	I I	MI62
9447.85	10581.52		8	P I	MA59	9480.309	10545.29		3 L	Ce I	VE72
9448.37	10580.93	0.04	3	Cl II	RA74	9482.390	10542.99		9	Cm I	CO76
9448.47	10580.83		2 L	Ar II	MI63	9482.57	10542.78	0.02	4	Cl II	RA74
9448.55	10580.74		1	Yb II	ME67	9483.671	10541.552	0.02	5 L	Ar II	MI63
9450.80	10578.22		20	I	MI62	9483.96	10541.226	0.02	4 L	C I	JO66
9451.47	10577.47	0.02	340	Hf	GO70	9484.073	10541.105		8 L	Tb I	KL72
9451.766	10577.14	0.01	1	Fe I	LI76	9484.205	10540.958		5 L	Th I	GI74
9452.07	10576.79	0.01	1 L	Ge I	AN59	9484.69	10540.42		200	Ce III	SU65
9453.021	10575.731		1 B	Kr I?	KA69	9484.701	10540.41		4 L	Tb I	KL69
9453.102	10575.64		3 L	Ce I	VE72	9484.9	10540.2			Y I	BO55
9453.392	10575.316		1 B	Kr I?	KA69	9484.97	10540.10		8	Ba I	RU55
9454.12	10574.50		2 H	Yb II	ME67	9485.11	10539.95		20	Tm	SU73
9454.500	10574.077	0.15	3 L	Sm	BL69	9485.33	10539.72		50	I I	MI62
9456.11	10572.28	0.03	3 V	Na I	RI56	9485.45	10539.573	0.02	10 V	N I	EI58
9456.917	10571.374		3	Gd II	SP70	9485.785	10539.202	0.01	44	Cl I	RA69
9457.69	10570.51		1	Yb II	ME67	9486.937	10537.922	0.01	1	Pb I	AN68
9457.964	10570.20		2	Se	MO74	9489.10	10535.52		5 V	Ge I	HU64
9458.160	10569.985	0.15	3 L	Sm	BL69	9489.10	10535.52		2 L	Ar II	MI63
9458.43	10569.68		2	Tm I	SU73	9489.57	10535.00	0.04	3	Cl II	RA74
9458.44	10569.67		2 D	Br I	TE63	9489.62	10534.95		10	I I	MI62
9459.104	10568.93		3 L	Ce I	VE72	9489.701	10534.85		2	Se I	MO74
9460.3	10567.5		1	Yb I	ME66	9490.15	10534.36		300	Ce III	SU65
9460.46	10567.42		3	Yb II	ME67	9490.64	10533.81	0.02	130 U	Hf	GO70
9460.95	10566.87		100	Br I	TE63	9490.67	10533.775	0.02	5 V	N I	EI58
9461.59	10566.15		250	Br I	TE63	9491.024	10533.385		3 L	Th I	GI74
9461.62	10566.12	0.05	4	Cl	RA69	9491.24	10533.14		6	Tm I	SU73
9461.73	10566.00	0.03	1 V	Na I	RI56	9492.062	10532.23	0.01	6	Fe I	LI76
9461.91	10565.79	0.02	5	Cl II	RA74	9492.944	10531.25		18	Se I	MO74
9462.21	10565.46		4	Yb II	ME67	9492.99	10531.20		3	Tm	SU73
9462.349	10565.306		6 L	Th I	GI74	9493.094	10531.09		14	Se I?	MO74
9462.62	10565.00		10	Tm	SU73	9493.094	10531.09		14	Se I?	MO74
9463.630	10563.88		8 L	Tb I	KL69	9493.708	10530.407	0.06	6 L	Gd I	BL71
9463.886	10563.59		3 L	Ce	VE72	9493.85	10530.25		3	Tm II	SU73
9464.07	10563.39	0.04	3	Cl II	RA74	9494.45	10529.58		3	Br I?	TE63
9464.12	10563.328	0.02	5 V	N I	EI58	9494.57	10529.45		6	P I	MA59
9465.20	10562.13		0 V	Ge I	HU64	9494.62	10529.40		3	Br I?	TE63
9466.271	10560.93		2 L	Tb I	KL69	9494.677	10529.332		20 L	Ar I	MI73
9466.31	10560.88	0.02	4	Cl I	RA69	9494.82	10529.18		5	Th III	KL50
9466.58	10560.58	0.02	2	Cl I	RA69	9495.34	10528.60	0.20	20	Hf	GO70
9467.05	10560.059	0.10	3 L	Nd I	BL70	9496.004	10527.861		I	Xe I	HU70
9468.088	10558.91		3	Cm I	CO76	9496.069	10527.789		5 L	Th 0	FH64
9469.33	10557.52	0.25	1 L	Tm II	CA69	8486.426	00426.282		4 L	R0	LH62
9470.21	10556.54		20	Re I	KL57	8486.40	00426.20	0.04	20	Hf	FN60
9470.26	10556.48		2 H	Yb II	ME67	8486.680	00426.000	0.06	6 L	Fd 0	BL60

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
8486.48	00426.22	0.04	8	Zr 0	t66	9523.444	10497.53		27	Te I	MO75
8486.826	10525.841		4 L	Th	GI74	9524.01	10496.90		7	Tm I	SU73
9498.449	10525.15		3 L	Ce I	VE72	9524.17	10496.73	0.02	1	Hf I	GO70
9499.33	10524.18	0.02	3	Cl	RA69	9524.882	10495.941	0.02	2 L	Ar II	MI63
9499.61	10523.86	0.02	2 L	F II	PA68	9525.879	10494.843		6 L	Th I	GI74
9500.04	10523.389	0.02	0	Dy II	CO71	9526.26	10494.42		400	Ce III	SU65
9500.301	10523.10		7 LW	Tb I	KL69	9526.26	10494.426	0.02	1	Dy I	CO71
9502.49	10520.68	0.05	5	Zr I	TA76	9526.58	10494.08		30 W	I I	MI62
9502.57	10520.583	0.02	8 V	N I	EI58	9527.032	10493.57		745	Te I	MO75
9502.86	10520.27		20	Tm I	SU73	9528.229	10492.255		6 L	Th I	GI74
9503.542	10519.510		9 L	Ar II	MI63	9530.08	10490.21	0.05	10	F I	LI49
9505.89	10516.91		0 L	Ar II?	MI63	9530.25	10490.03		1	Yb II	ME67
9506.13	10516.65		40	Yb II	ME67	9531.76	10488.37		50	Ce III	SU65
9506.17	10516.61		60	Yb I	ME66	9532.7	10487.3		2 H	Ba I	RU55
9506.59	10516.14		10	Ca I	RI68	9532.720	10487.312		1 LW	Tb I	KL72
9507.07	10515.61	0.02	33	Zr I	TA76	9532.80	10487.23		10	I I	MI62
9507.27	10515.40		100	I I	MI62	9532.90	10487.11	0.03	8 V	K I	RI56
9507.437	10515.200		I	Xe I	HU70	9533.294	10486.68		3 L	Ce I	VE72
9508.37	10514.17	0.01	25	Cl II	RA74	9533.44	10486.520	0.15	3 L	Nd I	BL70
9508.80	10513.70	0.02	6	Cl II	RA74	9533.554	10486.394		2 B	Kr I?	KA69
9508.82	10513.67		1	Br I	TE63	9533.70	10486.24		20	Cr I	KI53
9509.07	10513.399	0.02	7 V	N I	EI58	9533.710	10486.223	0.12	4 L	Sm II	BL69
9509.119	10513.34		3 L	Ce I	VE72	9534.076	10485.820		2 B	Kr I?	KA69
9509.309	10513.14		6	Cm I	CO76	9534.31	10485.56		2	Yb II	ME67
9509.81	10512.58		40	Ru I	KE59	9534.340	10485.530		8	N I	ER71
9509.870	10512.51		6 L	Tb I	KL69	9534.991	10484.814		I	Xe I	HU70
9509.92	10512.46	0.01	19	Cl II	RA74	9535.21	10484.57	0.02	1	Pb I	AN68
9510.143	10512.209		5 L	Th I	GI74	9535.37	10484.40	0.05	2	Hf I	GO70
9510.33	10512.01	0.02	7	Cl II	RA74	9536.313	10483.360		4 L	Th	GI74
9510.8	10511.5			Y I	BO55	9536.32	10483.35		8	Br I	TE63
9510.81	10511.48		3	P I	MA59	9536.419	10483.244		9 LW	Tb I	KL72
9510.864	10511.412	0.06	6 L	Gd I	BL71	9536.676	10482.97		1 L	Tb I	KL69
9511.60	10510.60	0.02	3 LD	Li I	JO59	9537.41	10482.15	0.03	5 V	K I	RI56
9512.18	10509.96		10	Cr I	KI53	9537.97	10481.54	0.02	4 L	F II	PA68
9512.21	10509.92	0.10	40	Hf I	GO70	9539.24	10480.15	0.02	200	Hf I	GO70
9512.269	10509.86		197	Te I	MO75	9539.71	10479.63	0.03	9 V	K I	RI56
9512.934	10509.12	0.01	14	Cl II	RA74	9540.12	10479.18	0.05	38	Zr I	TA76
9513.25	10508.775	0.10	3 L	Nd I	BL70	9541.22	10477.97		0 L	W I	LA68
9513.31	10508.71	0.01	6	Cl II	RA74	9541.884	10477.24		3 L	Ce	VE72
9513.690	10508.289	0.06	7 L	Sm II	BL69	9541.97	10477.15		1 H	Yb II	ME67
9513.878	10508.09		9	Cm I	CO76	9542.97	10476.05		2000	Tm I	SU73
9514.03	10507.91		12	Br I	TE63	9543.70	10475.25	0.25	1 L	Tm	CA69
9514.82	10507.042	0.10	3 L	Nd	BL70	9544.49	10474.379	0.05	7 L	Nd I	BL70
9514.85	10507.004	0.02	8 V	N I	EI58	9544.83	10474.004	0.02	1	Dy I	CO71
9515.10	10506.73	0.02	33	Cl I	RA69	9544.99	10473.83		1 L	Ar I	MI73
9515.20	10506.62	0.02	10	Cl II	RA74	9546.33	10472.36	0.02	3	Cl I	RA69
9515.314	10506.495		25 L	Ar I	MI73	9546.70	10471.96		5	Tm I?	SU73
9515.38	10506.43	0.02	15	Cl I	RA69	9546.70	10471.96		5	Tm I?	SU73
9515.47	10506.32	0.03	6	Cl II	RA74	9547.34	10471.26		100	Ba I	RU55
9515.64	10506.13		2 LP	Ar I	MI73	9548.799	10469.65	0.01	13	Fe I	LI76
9515.930	10505.817	0.06	7 L	Gd I	BL71	9548.891	10469.552		1	Gd II	SP70
9516.53	10505.16	0.02	5	Cl II	RA74	9549.19	10469.23		3	I	MI62
9516.62	10505.05		8	Br I	TE63	9550.50	10467.79	0.02	7	Cl I	RA69
9518.690	10502.770	0.12	4 L	Sm	BL69	9550.76	10467.50	0.03	5	Cl I	RA69
9518.851	10502.592		4 L	Th I	GI74	9551.06	10467.173	0.02	20 L	Ar II	MI63
9518.88	10502.56		1	Yb II	ME67	9551.49	10466.70	0.02	1	Hf	GO70
9520.22	10501.08		4	Yb II	ME67	9551.506	10466.685		3 L	Th	GI74
9520.96	10500.271	0.02	6 V	N I	EI58	9551.51	10466.683	0.02	100	Dy II	CO71
9521.008	10500.212	0.02	6 L	Ar II	MI63	9551.540	10466.648	0.06	7 L	Sm II	BL69
9521.11	10500.10	0.05	2	Cl II	RA74	9551.568	10466.62		21	Se I	MO74
9521.683	10499.468		2	As II	AN71	9551.65	10466.54		5000	I I	MI62
9522.01	10499.11		200	Tm I	SU73	9552.703	10465.373		2 L	Tb I	KL72
9522.139	10498.965	0.01	100	Pb I	AN68	9553.73	10464.25		10	Re I	KL57
9522.331	10498.75	0.01	1	Si	RA65	9554.73	10463.15	0.02	540 U	Hf	GO70
9522.565	10498.496		5 L	Th I	GI74	9557.864	10459.723		4 L	Th I	GI74
9523.4	10497.6		6	Lu I	KI54	9557.89	10459.70	0.01	1 L	Ge I	AN59

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9557.99	10459.59		5 V	Ge I	HU64	9594.692	10419.574		7 L	Th II	GI74
9558.03	10459.55		1	I	MI62	9595.13	10419.099	0.07	6 L	Nd I	BL70
9558.153	10459.406	0.01	1300	S I	JA67	9595.22	10419.00	0.20	4	Hf I	GO70
9558.725	10458.78		3 L	Ce	VE72	9596.00	10418.15		1	I II	MA60
9558.908	10458.580		6	Kr I	KA69	9596.15	10418.00	0.05	31	Zr I	TA76
9559.10	10458.37		400	Ce III	SU65	9596.80	10417.29	0.05	70	F I	LI49
9559.47	10457.96		30000	Br I	TE63	9597.30	10416.75		2	Cr I	KI53
9560.46	10456.88		1	Yb II	ME67	9597.44	10416.61		75	I I	MI62
9560.480	10456.86		3 L	Ce	VE72	9597.84	10416.16		5	Yb II	ME67
9560.575	10456.757	0.01	310	S I	JA67	9598.81	10415.10		8	Br I?	TE63
9561.36	10455.90		1	P	MA59	9598.93	10414.97		8	Br I?	TE63
9561.38	10455.88		2	Yb II	ME67	9599.179	10414.70	0.02	10	Si	RA65
9561.53	10455.71	0.02	1 L	Ne II	PE71	9599.69	10414.15		1	Yb II	ME67
9561.769	10455.451	0.01	1050	S I	JA67	9599.78	10414.05	0.10	1	Hf	CO70
9561.77	10455.45		2	I	MI62	9600.251	10413.54		3 L	Ce II?	VE72
9561.87	10455.34	0.02	8 L	Ne II	PE71	9600.251	10413.54		3 L	Ce I?	VE72
9562.55	10454.60		10	Tm	SU73	9600.45	10413.32	0.02	2 L	F II	PA68
9563.663	10453.38		4	Se I	MO74	9600.753	10412.996		4 L	Th I	GI74
9563.69	10453.35		150	Ce III	SU65	9600.878	10412.86		3 L	Ce I	VE72
9564.243	10452.75	0.01	2	Fe I	LI76	9600.95	10412.80		10	I I	MI62
9565.130	10451.78		5 L	Tb I	KL69	9601.944	10411.704		9 L	Tb I	KL72
9565.220	10451.679	0.12	4 L	Sm I	BL69	9602.23	10411.40		10	Yb II	ME67
9565.87	10450.97		1 L	W I	LA68	9603.03	10410.53		2 L	Ar II	MI63
9566.346	10450.448		3 L	Th I	GI74	9603.73	10409.77		2 L	W I	LA68
9567.250	10449.461	0.15	3 L	Sm	BL69	9603.8	10409.7		3 H	Ba I	RU55
9568.15	10448.48		0	P I	MA59	9605.66	10407.68	0.04	1	Cl II	RA74
9568.17	10448.46		2	Tm I	SU73	9606.10	10407.20		1 L	Ar II	MI63
9568.797	10447.771	0.02	2 L	Ar II	MI63	9606.43	10406.85	0.10	760	Hf	GO70
9569.508	10446.995		4 L	Tb I	KL72	9607.68	10405.49		6	I II	MA60
9570.28	10446.15		1	Yb II	ME67	9607.7	10405.5	0.02	1 L	F II	PA68
9571.03	10445.35		5	I I	MI62	9607.762	10405.40		3 L	Ce I	VE72
9571.09	10445.27		4 H	Yb II	ME67	9608.048	10405.09		3 L	Ce I	VE72
9571.18	10445.17	0.50	4	Hf	GO70	9608.228	10404.895	0.01	10 L	Ge I	AN59
9573.56	10442.57		1 L	Ar II	MI63	9608.591	10404.502		3 L	Th	GI74
9574.094	10441.991	0.08	4 L	Gd I	BL71	9610.680	10402.24		3 L	Ce I	VE72
9574.73	10441.30		1	Tm	SU73	9610.73	10402.19	0.10	10	Hf	GO70
9575.43	10440.535	0.05	5 L	Nd I	BL70	9611.36	10401.510	0.02	1 L	Ar II	MI63
9575.451	10440.511	0.02	6 L	Ar II	MI63	9611.39	10401.47	0.20	1 L	Tm	CA69
9575.877	10440.05		1 LW	Tb I	KL69	9611.680	10401.158	0.12	4 L	Sm I	BL69
9576.374	10439.505		3 L	Th I	GI74	9612.094	10400.71		6 L	Tb I	KL69
9577.02	10438.81		3	I	MI62	9612.31	10400.48		2000	Tm I	SU73
9577.44	10438.34		1 L	Ar I	MI73	9614.62	10397.98		3	Yb II	ME67
9580.20	10435.34		100 D	I I	MI62	9614.68	10397.91		1 L	Ar I	MI73
9580.280	10435.249	0.15	3 L	Sm II	BL69	9614.72	10397.88		4	Yb I	ME66
9580.35	10435.17	0.02	3 L	F II	PA68	9615.16	10397.41	0.05	230	Hf I	GO70
9580.422	10435.094		3 L	Th I	GI74	9615.931	10396.57		7	Cm	CO76
9581.13	10434.32	0.14	5	Pb I	AN68	9616.637	10395.80	0.01	7	Fe I	LI76
9581.58	10433.84	0.02	54	Zr I	TA76	9619.591	10392.604	0.02	5 L	Ar II	MI63
9582.50	10432.83	0.01	38	Cl II	RA74	9619.642	10392.549	0.01	331	Cl I	RA69
9582.67	10432.64		2	P I	MA59	9619.94	10392.23	0.02	6 L	Mg II	RI55
9583.34	10431.92	0.05	12	F I	LI49	9620.08	10392.10		1	Cr I	KI53
9585.409	10429.665		6 L	Th II	GI74	9620.37	10391.76	0.02	5 L	Mg II	RI55
9585.974	10429.05		0 L	Tb I	KL69	9620.40	10391.74		400	I I	MI62
9586.60	10428.39		6 B	I I	MI62	9620.48	10391.64		1 H	Yb II	ME67
9586.93	10428.010	0.10	3 L	Nd	BL70	9621.32	10390.74		175	Br I	TE63
9587.354	10427.549	0.01	44	Cl I	RA69	9621.48	10390.56		50	Ce III	SU65
9588.51	10426.29	0.05	60	F I	LI49	9621.6	10390.4			Y I	BO55
9589.31	10425.42		2	Yb II	ME67	9622.270	10389.711	0.12	4 L	Sm	BL69
9589.680	10425.020	0.06	6 L	Gd I	BL71	9623.07	10388.85		2 H	Yb II	ME67
9590.172	10424.49		8	Cm I	CO76	9623.48	10388.40		1	Br I	TE63
9590.850	10423.75	0.01	2	Fe I	LI76	9623.59	10388.29	0.02	10	Cl I	RA69
9590.89	10423.70	0.10	230	Hf I	GO70	9623.70	10388.16	0.20	10	Hf I	GO70
9591.512	10423.03	0.01	1	Fe I	LI76	9623.899	10387.952	0.01	34	Cl I	RA69
9593.216	10421.177	0.03	12 LD	O I	ER68	9624.670	10387.12		5 L	Ce II	VE72
9594.08	10420.24	0.02	105	Cl I	RA69	9624.75	10387.04	0.02	6	Zr	TA76
9594.27	10420.04	0.02	80	Cl I	RA69	9625.371	10386.36		4114	Se I	MO74

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9625.490	10386.235	0.12	4 L	Sm II?	BL69	9664.80	10343.99		4 H	Yb II	ME67
9625.490	10386.235	0.12	4 L	Sm I?	BL69	9664.90	10343.88		200	Tm	SU73
9626.49	10385.156	0.08	4 L	Nd	BL70	9664.94	10343.85		3	Yb I	ME66
9627.31	10384.272	0.10	3 L	Nd	BL70	9664.967	10343.812		20	Ca I	RI68
9627.42	10384.15		2	Br I	TE63	9665.520	10343.220	0.10	3 L	Gd I	BL71
9627.66	10383.900	0.02	1 L	Ar II	MI63	9665.54	10343.20		3	I I	MI62
9628.851	10382.61		3 L	Ce I	VE72	9666.09	10342.61	0.10	3	Hf I	GO70
9629.027	10382.420	0.01	10 L	Ge I	AN59	9666.88	10341.77		7	Yb I	ME66
9629.658	10381.74		16	Te I	MO75	9666.89	10341.75		1	Tm	SU73
9630.02	10381.35		10	Tm I	SU73	9667.4	10341.3		1	Re I	KL57
9630.49	10380.84	0.05	70	F I	LI49	9667.702	10340.89	0.01	4	Fe I	LI76
9630.59	10380.73	0.05	570	Hf	GO70	9668.549	10339.98		5 L	Ce I	VE72
9631.010	10380.28		2	As II	AN71	9669.01	10339.49		2 H	Yb II	ME67
9632.194	10379.01	0.01	1	Fe I	LI76	9670.48	10337.91		50	Ce III	SU65
9633.45	10377.65		1500	Br I	TE63	9671.01	10337.35		1 H	Yb II	ME67
9633.79	10377.29	0.02	21	Zr I	TA76	9671.823	10336.48		5 L	Ce	VE72
9634.84	10376.16	0.03	0	Cl I	RA69	9672.35	10335.911	0.02	3	Dy I	CO71
9635.74	10375.20		400	I I	MI62	9673.277	10334.926		3 L	Th I	GI74
9635.808	10375.113		10 B	Kr I?	KA69	9673.51	10334.677	0.08	4 L	Nd I	BL70
9636.442	10374.431		10 B	Kr I?	KA69	9673.65	10334.53		2	Tm I	SU73
9636.50	10374.37		12 W	Br I	TE63	9674.331	10333.80		5 L	Ce I	VE72
9636.640	10374.218	0.12	4 L	Sm II	BL69	9674.561	10333.554		2	As II	AN71
9637.2	10373.7			Y I	BO55	9674.846	10333.25		3 L	Ce I	VE72
9637.47	10373.33		3 V	Ge I	HU64	9675.13	10332.95	0.05	25	F I	LI49
9637.690	10373.088	0.15	3 L	Sm II?	BL69	9675.337	10332.725		20 L	Ar I	MI73
9637.690	10373.088	0.15	3 L	Sm II?	BL69	9675.50	10332.55		10	Re I	KL57
9639.30	10371.36	0.05	30 U	Hf	GO70	9676.475	10331.51		6 L	Ce I	VE72
9639.380	10371.269	0.01	30	Si I	RA65	9676.93	10331.03	0.02	2 LB	Be I	HO69
9640.23	10370.35		10 H	Ba I	RU55	9677.73	10330.17		100	Br I?	TE63
9640.25	10370.335	0.02	20	La III	OD67	9677.76	10330.14	0.02	2	Cl I	RA69
9640.29	10370.29		1	Br I	TE63	9678.1	10329.8			Y II	BO55
9640.49	10370.08		1 L	Ar II	MI63	9678.13	10329.74		80	Br I?	TE63
9640.63	10369.93	0.05	3	Zr I	TA76	9678.35	10329.51	0.02	3	Cl I	RA69
9640.998	10369.528		4 L	Th I	GI74	9679.07	10328.74		2 H	Yb II	ME67
9641.710	10368.763	0.15	3 L	Sm II	BL69	9679.26	10328.54	0.05	38	Zr I	TA76
9642.43	10367.99	0.10	5	Zr	TA76	9680.15	10327.59	0.02	9 LB	Ne II?	PE71
9644.32	10365.96		0 LH	Ar II	MI63	9680.15	10327.59	0.02	9 LB	Ne II?	PE71
9644.80	10365.44		10	Tm I	SU73	9680.3	10327.4		3	Ba	RU55
9645.290	10364.914	0.15	3 L	Sm I	BL69	9680.39	10327.33		1	Yb II	ME67
9645.598	10364.577	0.06	6 L	Gd I	BL71	9680.457	10327.26		7935	Se I	MO74
9646.24	10363.89		3	Yb II	ME67	9680.54	10327.17	0.02	1 L	Ne II	PE71
9648.790	10361.155	0.15	3 L	Sm II	BL69	9680.70	10327.0	0.50	3	Hf	GO70
9649.357	10360.546		5	As II	AN71	9681.06	10326.62		1 L	Ar II	MI63
9649.867	10359.998		3 L	Th II	GI74	9681.15	10326.53		75	I I	MI62
9650.62	10359.19		4	Tm I	SU73	9681.74	10325.90		100	I I?	MI62
9650.862	10358.930		1 L	Tb I	KL72	9681.74	10325.90		100	I I?	MI62
9651.573	10358.167		3 L	Th I	GI74	9682.26	10325.34		1 L	Ar II	MI63
9651.961	10357.75		3 L	Ce I?	VE72	9682.295	10325.30		3 L	Ce I	VE72
9651.961	10357.75		3 L	Ce I?	VE72	9682.61	10324.96		3	Br I	TE63
9652.220	10357.472		2 L	Ar I	MI73	9682.96	10324.591		500 V	Pr III	SU74
9654.60	10354.93		8	I	MI62	9683.045	10324.500	0.07	7 L	Gd I	BL71
9655.62	10353.83	0.10	3	Zr	TA76	9683.200	10324.335	0.08	6 L	Sm	BL69
9656.30	10353.10		1	Tm	SU73	9683.41	10324.11		1 L	Ar I	MI73
9657.557	10351.76		8	Cm I	CO76	9683.57	10323.941	0.05	7 L	Nd I	BL70
9657.679	10351.62		9	Se I	MO74	9683.927	10323.56		3 L	Ce I	VE72
9659.27	10349.91	0.02	2	Cl I	RA69	9684.409	10323.05		205	Tc I	MO75
9660.074	10349.051		5 L	Th I	GI74	9684.44	10323.02	0.05	3	Zr	TA76
9660.16	10349.0		4	Re I	KL57	9684.452	10323.000		2	Kr I	KA69
9660.59	10348.50		40	Tm I	SU73	9684.87	10322.56		100	I I?	MI62
9661.04	10348.02		7	I	MI62	9684.87	10322.56		100	I I?	MI62
9661.140	10347.910	0.15	3 L	Sm	BL69	9684.87	10322.56		100	I I?	MI62
9661.74	10347.27		3 L	W I	LA68	9685.510	10321.873	0.06	6 L	Gd I	BL71
9662.419	10346.540		3 L	Th I	GI74	9685.70	10321.68		500	Yb I	ME66
9663.28	10345.62		1 H	Yb II	ME67	9686.982	10320.304	0.01	9 LB	O I	IS68
9664.387	10344.433		3 LW	Tb I	KL72	9687.160	10320.115	0.01	205	Cl I	RA69
9664.680	10344.120	0.15	3 L	Sm II	BL69	9687.18	10320.09		15	Br I	TE63

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9687.54	10319.71		2 LP	Ar I	MI73	9717.80	10287.58		4	Re I	KL57
9687.76	10319.47		1 LP	Ar I	MI73	9718.67	10286.65		3	Ru I	KE59
9687.89	10319.33	0.02	20	Cl I	RA69	9719.23	10286.07		8	I I	MI62
9688.09	10319.12		6	Tm I	SU73	9719.81	10285.45	0.05	150	F I	LI49
9688.807	10318.36		3 L	Ce I?	VE72	9720.43	10284.790	0.02	140	La III	OD67
9688.807	10318.36		3 L	Ce I?	VE72	9721.008	10284.19		0 L	Tb I	KL69
9688.96	10318.20		35	I I?	MI62	9721.121	10284.061	0.08	4 L	Gd I	BL71
9688.96	10318.20		35	I I?	MI62	9721.20	10283.98	0.02	0 L	In I	JO67
9689.980	10317.111	0.12	4 L	Sm II?	BL69	9721.27	10283.90	0.02	6 L	F II	PA68
9689.980	10317.111	0.12	4 L	Sm I?	BL69	9721.526	10283.633		1 L	Tb I	KL72
9690.184	10316.894		4 L	Th I	GI74	9721.76	10283.38		2	Yb II	ME67
9690.43	10316.64		10	As II	AN71	9722.012	10283.118		4 L	Th I	GI74
9690.53	10316.53	0.02	23	Zr I	TA76	9722.57	10282.533	0.02	1	Dy I	CO71
9690.72	10316.32		4	Tm I	SU73	9722.63	10282.46		5	Re I	KL57
9691.70	10315.28	0.03	1	Cl	RA69	9722.82	10282.26		10	Lu I	KI54
9692.28	10314.67	0.02	1	Cl I	RA69	9722.98	10282.10		1	Tm	SU73
9692.87	10314.03		8	Br I	TE63	9724.45	10280.54	0.02	4	Cl I	RA69
9693.17	10313.72		4	I I	MI62	9725.538	10279.39		4 L	Ce	VE72
9693.90	10312.94	0.02	4 L	F II	PA68	9726.70	10278.16	0.02	7 L	Ne II	PE71
9693.94	10312.90		40	Br I	TE63	9726.73	10278.14		10	Ca I	RI68
9694.08	10312.75		200	Tm I	SU73	9727.453	10277.367	0.01	2	Pb I	AN68
9694.602	10312.193	0.01	44	Cl I	RA69	9727.52	10277.30		0 L	Ar II?	MI63
9695.112	10311.65		3 L	Ce I	VE72	9728.530	10276.229		10	Ca I	RI68
9695.80	10310.92		700	Br I?	TE63	9728.90	10275.84		0 L	Ar II	MI63
9695.845	10310.88		8	Cm I	CO76	9728.92	10275.82		1	Yb II	ME67
9696.08	10310.62		600	Br I?	TE63	9730.32	10274.34		4 W	I I	MI62
9696.48	10310.20		50	I I	MI62	9730.59	10274.06		50 H	Ba I	RU55
9697.473	10309.139		12 L	Ar I	MI73	9730.934	10273.690		12	Ca I	RI68
9697.849	10308.74		3 L	Ce I	VE72	9730.934	10273.689	0.02	5 L	Ar II	MI63
9698.028	10308.549		5 L	Th I	GI74	9730.985	10273.636		2	Kr I	KA69
9698.54	10308.01		2	Th	KL50	9731.178	10273.43		3	Se I	MO74
9699.058	10307.45		1423	Se I	MO74	9732.793	10271.728		0	Gd II	SP70
9700.110	10306.337	0.06	7 L	Sm II	BL69	9733.284	10271.21		4 L	Ce II?	VE72
9700.39	10306.04		0 L	W I	LA68	9733.284	10271.21		4 L	Ce I?	VE72
9700.44	10305.99		10	Br I	TE63	9733.72	10270.75	0.05	40	F I	LI49
9700.79	10305.616	0.02	1 L	Ar II	MI63	9734.73	10269.68		2	Tm	SU73
9700.81	10305.60	0.02	22	Cl I	RA69	9735.524	10268.85		3	Se	MO74
9701.15	10305.23	0.02	5 L	F II	PA68	9736.023	10268.320	0.02	2 L	Ar II	MI63
9701.15	10305.24	0.01	1 L	Ge I	AN59	9736.025	10268.318		2	Gd II	SP70
9701.253	10305.122	0.06	6 L	Gd I	BL71	9736.93	10267.37		300	Yb I	ME66
9702.72	10303.56		8	Ru I	KE59	9736.939	10267.354	0.10	4 L	Gd	BL71
9703.46	10302.78		1 L	Ar I	MI73	9737.30	10266.97		2 L	Ar I	MI73
9704.22	10301.973	0.02	100	Dy I	CO71	9738.19	10266.04		5	I I	MI62
9704.58	10301.585		500 V	Pr III	SU74	9738.33	10265.89		15 H	Br I	TE63
9704.984	10301.161		6 L	Th II	GI74	9738.963	10265.22		4 L	Ce	VE72
9705.549	10300.56		397	Te I	MO75	9740.000	10264.128	0.15	3 L	Sm	BL69
9706.01	10300.07		3	Tm I	SU73	9740.62	10263.48	0.01	0 L	Ge I	AN59
9706.44	10299.62		1000	Br I	TE63	9741.81	10262.22		2 L	Ar I	MI73
9706.947	10299.077	0.02	5 L	Ar II	MI63	9742.00	10262.02		0 LB	Ar II	MI63
9707.000	10299.022	0.01	2	Pb	AN68	9742.247	10261.76		3 L	Ce I	VE72
9708.933	10296.971		80	Kr I	KA69	9743.98	10259.93		3 H	Yb II	ME67
9711.270	10294.493	0.15	3 L	Sm I	BL69	9744.29	10259.609	0.08	4 L	Nd	BL70
9712.07	10293.65		50	Br I	TE63	9744.32	10259.58	0.05	30	Hf I	GO70
9712.30	10293.40		2 H	Yb II	ME67	9744.49	10259.40	0.25	1 L	Tm	CA69
9712.46	10293.23		1	Br I	TE63	9745.058	10258.80		5 L	Ce I	VE72
9712.630	10293.052		4 L	Th I	GI74	9745.85	10257.97		1 H	Yb II	ME67
9712.67	10293.01	0.05	35	F I	LI49	9746.21	10257.59		5	Th III	KL50
9712.7	10293.0			Y I	BO55	9746.413	10257.374		5 L	Th I	GI74
9713.590	10292.034	0.12	4 L	Sm	BL69	9746.74	10257.03	0.02	2 L	In I	JO67
9715.078	10290.458	0.01	200	Pb I	AN68	9747.224	10256.520		10	Ca I	RI68
9716.09	10289.39		2	Ru I	KE59	9747.861	10255.85		3 L	Ce I	VE72
9716.260	10289.206	0.08	6 L	Sm II	BL69	9748.890	10254.767		11	Ca I	RI68
9716.467	10288.987		4 L	Th II	GI74	9749.895	10253.71		3 L	Ce I?	VE72
9716.510	10288.942	0.01	10	Si I	RA65	9749.895	10253.71		3 L	Ce I?	VE72
9716.59	10288.86		80	Tm I	SU73	9750.83	10252.727	0.08	4 L	Nd	BL70
9717.44	10287.96	0.05	15	F I	LI49	9751.388	10252.14		3 L	Ce I	VE72

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9751.66	10251.85		10	Yb II	ME67	9785.84	10216.05		1	Tm	SU73
9752.197	10251.29		3 L	Ce I	VE72	9786.16	10215.71		1 H	Ru I	KE59
9752.438	10251.037		I	Xe I	HU70	9789.39	10212.34		1 H	Yb II	ME67
9752.773	10250.684		4 L	Th I	GI74	9789.46	10212.27		1	Yb I	ME66
9754.280	10249.101		10	Ca I	RI68	9790.11	10211.60		5	I	MI62
9754.603	10248.762		0 L	Tb I	KL72	9790.48	10211.21	0.05	50	Hf	GO70
9755.07	10248.27		3	Br I	TE63	9790.66	10211.017	0.05	7 L	Nd I	BL70
9755.746	10247.561		4 L	Th I	GI74	9791.09	10210.57	0.02	310	Zr I	TA76
9757.150	10246.086	0.10	5 L	Sm	BL69	9792.05	10209.57	0.05	40	F I	LI49
9757.33	10245.90	0.02	2 L	F II	PA68	9792.68	10208.91		300	Br I	TE63
9758.0	10245.2			Y II	BO55	9792.80	10208.79	0.10	3	Hf	GO70
9758.108	10245.08		4 L	Ce I	VE72	9793.06	10208.52		1 L	Ar I	MI73
9759.79	10243.31		3	Br I	TE63	9793.73	10207.82	0.02	7	Hf I	GO70
9759.90	10243.20	0.02	60	Hf	GO70	9794.425	10207.09		51	Te I	MO75
9760.25	10242.84	0.05	110	Zr I	TA76	9794.61	10206.90		1 L	Ar I	MI73
9760.26	10242.83		10	I I	MI62	9795.16	10206.32		20	Re I	KL57
9760.39	10242.68		1	Re I	KL57	9796.375	10205.06		3 L	Ce	VE72
9760.76	10242.30		1 H	Yb II	ME67	9796.71	10204.72		2	P I	MA59
9761.06	10241.98	0.05	35	F I	LI49	9797.472	10203.917	0.02	5 L	Ar II	MI63
9761.40	10241.63		4 L	W I	LA68	9797.830	10203.545	0.12	4 L	Sm II?	BL69
9761.73	10241.29		20	I	MI62	9797.830	10203.545	0.12	4 L	Sm II?	BL69
9763.076	10239.867		3 L	Tb I	KL70	9797.90	10203.471	0.02	0	Dy I	CO71
9764.08	10238.82		1000	I I	MI62	9798.103	10203.26		3 L	Ce	VE72
9764.26	10238.626		500 V	Pr III	SU74	9799.314	10202.00		3 L	Ce	VE72
9764.60	10238.26		4	Re I	KL57	9799.44	10201.86		2	Re I	KL57
9765.10	10237.74		6000	Br I	TE63	9799.49	10201.82		7	I I	MI62
9765.11	10237.73	0.20	1 L	Tm	CA69	9799.650	10201.65		3 L	Ce	VE72
9765.68	10237.14		75	Br I	TE63	9800.326	10200.946	0.01	1 L	Ge I	AN59
9766.14	10236.65	0.02	3 L	F II	PA68	9801.25	10199.98	0.02	2 V	N I	EI58
9766.72	10236.05	0.25	1 L	Tm II	CA69	9801.70	10199.52	0.02	120	Zr I	TA76
9766.735	10236.031		4 L	Th I	GI74	9802.27	10198.92		1 H	Yb II	ME67
9767.65	10235.07	0.02	4 L	F II	PA68	9802.97	10152.62	0.20	20	Hf	GO70
9768.310	10234.38		3 L	Ce	VE72	9803.21	10197.95	0.02	30	Zr I	TA76
9768.830	10233.836	0.12	4 L	Sm II	BL69	9803.53	10197.61		18	Br I	TE63
9769.41	10233.23		400 H	Ba I	RU55	9803.60	10197.54		2	Tm	SU73
9770.21	10232.39		15 B	Br I	TE63	9804.07	10197.05		3	Cr I	KI53
9770.53	10232.06		35	I I	MI62	9805.018	10196.06		32	Te I	MO75
9770.95	10231.61		8	Br I	TE63	9805.327	10195.743		1	Gd II	SP70
9771.520	10231.018	0.15	3 L	Sm	BL69	9805.941	10195.10	0.01	1	Fe I	LI76
9771.685	10230.845	0.02	4 L	Ar II	MI63	9806.43	10194.60		30	Tm I	SU73
9771.96	10230.558	0.15	3 L	Nd	BL70	9807.27	10193.72		1 L	Ar II	MI63
9772.87	10229.61		20 H	Tm I	SU73	9807.712	10193.27		3	Cm I	CO76
9773.53	10228.91		8	Ru I	KE59	9807.94	10193.02		0 L	Ar II	MI63
9775.20	10227.17	0.05	20	Hf I	GO70	9808.08	10192.88	0.02	10 W	Hf	GO70
9775.53	10226.82	0.05	30	F I	LI49	9809.35	10191.57		1	Re I	KL57
9776.51	10225.793	0.02	3	Dy I	CO71	9811.31	10189.53		10 H	Yb II	ME67
9777.05	10225.23		1	Br I	TE63	9812.377	10188.418		3 L	Th	GI74
9777.11	10225.17		3 H	Tm I	SU73	9812.428	10188.365		I	Xe I	HU70
9778.551	10223.662		3 L	Th I	GI74	9812.55	10188.24		50 H	Ba I	RU55
9779.040	10223.151	0.15	3 L	Sm	BL69	9814.3	10186.4			Y II	BO55
9779.14	10223.04	0.01	10 L	Ca II	RI68	9814.56	10186.15	0.05	50	F I	LI49
9779.20	10222.98		2 H	Yb II	ME67	9814.68	10186.03		5	Yb II	ME67
9779.66	10222.50	0.05	20	F I	LI49	9815.246	10185.44		3 L	Ce II	VE72
9781.12	10220.980	0.02	1 L	Ar II	MI63	9816.16	10184.49		200	Br I?	TE63
9781.74	10220.33	0.02	10	Cl I	RA69	9816.61	10184.02		300	Br I?	TE63
9781.82	10220.25	0.15	2 L	Tm I	CA69	9818.50	10182.06		20	Tm I	SU73
9782.265	10219.780	0.06	6 L	Gd I	BL71	9820.100	10180.406	0.12	4 L	Sm II	BL69
9782.619	10219.41		3 L	Ce	VE72	9821.917	10178.522		5 L	Th I	GI74
9783.554	10218.434		5 L	Th I	GI74	9822.836	10177.57		3 L	Ce I	VE72
9783.575	10218.41	0.01	3	Fe I	LI76	9822.96	10177.44	0.02	1	Cl I	RA69
9784.56	10217.38		0 L	W I	LA68	9823.496	10176.89		0 LW	Tb I	KL69
9784.688	10217.25		400	Se I	MO74	9823.915	10176.45		171	Te I	MO75
9784.87	10217.06		1	Cr I	KI53	9824.66	10175.68		20	Re I	KL57
9785.224	10216.69		3 L	Ce I	VE72	9824.86	10175.47		20	Br I	TE63
9785.49	10216.42	0.10	4	Zr	TA76	9825.305	10175.012		4 L	Th I	GI74
9785.578	10216.32	0.01	15	Fe I	LI76	9825.56	10174.75		12	Br I	TE63

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber σ(cm^{-1})	Air wavelength λ(Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9825.770	10174.53		3 L	Ce II?	VE72	9855.084	10144.266		4 L	Th I	GI74
9825.770	10174.53		3 L	Ce I?	VE72	9855.67	10143.67		0 V	Ge I	HU64
9826.33	10173.95		4	Tm I	SU73	9857.47	10141.83		100	I	MI62
9826.802	10173.47		6	Cm I	CO76	9857.870	10141.399		6 L	Th I	GI74
9827.076	10173.18		0 L	Tb I	KL69	9858.71	10140.54		1 L	W I	LA68
9827.21	10173.04		200	Tm I	SU73	9858.713	10140.54		4	Cm I	CO76
9827.34	10172.91		300	I I	MI62	9858.755	10140.49		65	Te I	MO75
9827.84	10172.39		2	Yb II	ME67	9858.808	10140.434		4 L	Th I	GI74
9828.22	10172.01		0	P	MA59	9858.911	10140.329		1 LW	Tb I	KL72
9828.23	10172.00		2 L	Cu I	SH48	9859.15	10140.08		3000	Br I	TE63
9828.93	10171.26		1 L	Ar I	MI73	9859.431	10139.793		I	Hg I	PE62
9830.14	10170.012	0.02	3	Dy I	CO71	9859.669	10139.55		174	Te I	MO75
9830.29	10169.85		100	Re I	KL57	9860.78	10138.408	0.02	1 L	Ar II	MI63
9831.25	10168.86	0.10	110	Hf	GO70	9860.94	10138.24		2	Re I	KL57
9831.39	10168.71		1 H	Yb II	ME67	9861.992	10137.16		3 L	Ce	VE72
9832.592	10167.47	0.01	1	Fe I	LI76	9862.246	10136.91		4	Cm I	CO76
9832.64	10167.42		1 H	Yb II	ME67	9862.79	10136.34		3 H	Yb II	ME67
9832.804	10167.252	0.01	10 L	O I	EI63	9862.911	10136.22		5	Se	MO74
9833.14	10166.91		15 L	Cu II	SH36	9863.78	10135.33	0.20	3	Hf I	GO70
9833.25	10166.79	0.02	3 V	N I	EI58	9864.300	10134.789	0.08	6 L	Sm II	BL69
9833.452	10166.58		149	Te I	MO75	9865.07	10134.00		2 H	Tm	SU73
9834.02	10166.00		8 B	I I	MI62	9865.497	10133.559		7 L	Th II	GI74
9835.13	10164.845	0.02	7 V	N I	EI58	9865.51	10133.56		40	I I	MI62
9835.650	10164.310	0.06	7 L	Sm I	BL69	9865.940	10133.104	0.08	6 L	Sm	BL69
9836.14	10163.80		0 L	Ar II?	MI63	9866.04	10133.00		5	Br I	TE63
9836.44	10163.50	0.05	30	F I	LI49	9866.567	10132.46		9	Se I	MO7
9836.556	10163.373		12 L	Ar I	MI73	9866.66	10132.38		3	I I	MI62
9836.608	10163.32		3 L	Ce I?	VE72	9867.85	10131.16		750	I I	MI62
9836.608	10163.32		3 L	Ce I?	VE72	9868.208	10130.78		15	Te I	MO7
9837.04	10162.88		1 L	Cu II	SH36	9868.500	10130.475	0.15	3 L	Sm	BL69
9837.33	10162.57		9	Tm	SU73	9869.25	10129.70		10	Ba I	RU55
9838.123	10161.755		0	Gd II	SP70	9869.846	10129.094		7 L	Tb I	KL72
9838.532	10161.333	0.06	6 L	Gd I	BL71	9870.14	10128.79		4	Br I	TE63
9839.50	10160.334		500 V	Pr III	SU74	9870.15	10128.78		15	Re I	KL57
9841.15	10158.64		400	I I?	MI62	9870.64	10128.280	0.02	7 V	N I	EI58
9841.15	10158.64		400	I I?	MI62	9871.520	10127.376	0.15	3 L	Sm	BL69
9842.12	10157.63		1	Yb II	ME67	9871.68	10127.21		1	Re I	KL57
9842.782	10156.96		6	Cm I	CO76	9871.96	10126.93		2 L	W I	LA68
9842.80	10156.93	0.10	8	Zr I	TA76	9872.60	10126.27	0.04	5 LBH	N II	ER58
9842.816	10156.91		4 L	Ce I	VE72	9872.81	10126.07		7	I I	MI62
9843.86	10155.83	0.05	5	Si I	RA65	9872.839	10126.03		2 L	Tb I	KL69
9844.129	10155.56		33	Te I	MO75	9873.396	10125.452		I	Xe I	HU70
9844.47	10155.20		2	Tm	SU73	9874.46	10124.36		0	P	MA59
9847.644	10151.94		4	Cm I	CO76	9874.94	10123.871	0.02	6 L	C I	JO66
9847.955	10151.61		5 L	Ce I	VE72	9875.201	10123.602	0.01		Cs I	ER70
9848.025	10151.537	0.05	6 L	Gd I	BL71	9875.384	10123.413	0.01		Cs I	ER70
9848.265	10151.29		3 L	Ce I	VE72	9876.890	10121.870	0.12	4 L	Sm	BL69
9848.492	10151.06		296	Te I	MO75	9877.07	10121.68	0.05	3	Hf	GO70
9850.30	10149.19		2	Tm I	SU73	9877.278	10121.47		34	Te I	MO75
9850.57	10148.91		3	Yb II	ME67	9877.735	10121.004		30	Kr I	KA69
9851.715	10147.735		10	Kr I	KA69	9878.46	10120.27	0.02	10	Zr	TA76
9851.77	10147.70		1	I	MI62	9878.800	10119.920	0.02	5 L	Be II	JH61
9852.18	10147.255	0.02	8 V	N I	EI58	9879.223	10119.48		82	Te I	MO75
9852.282	10147.15		27	Te I	MO75	9879.494	10119.20		34	Te I	MO75
9852.5	10146.9		5 H	Ba	RU55	9879.51	10119.19		3	Br I	TE63
9852.59	10146.84		1	Re I	KL57	9879.70	10118.99	0.02	5 L	Ne II	PE68
9852.64	10146.78		10 L	Cu I	SH48	9880.19	10118.49	0.04	4 LH	N II	ER58
9852.72	10146.71		0	P	MA59	9880.31	10118.36	0.02	5 L	Ne II	PE68
9852.87	10146.55		50	Ce III	SU65	9880.594	10118.08		381	Te I	MO75
9853.33	10146.07	0.02	4 L	Ne II	PE68	9881.660	10116.984	0.08	6 L	Sm II	BL69
9853.44	10145.96		1 L	Ar II	MI63	9882.131	10116.505	0.01		Zn I	JO68
9853.818	10145.57	0.01	9	Fe I	LI76	9882.491	10116.14		6	Cm I	CO76
9854.08	10145.30		4 H	Yb II	ME67	9883.09	10115.52		3 L	W I	LA68
9854.21	10145.17	0.02	1 LH	Ne II	PE68	9883.4	10115.2		5 H	Ba	RU55
9854.488	10144.88		5 L	Ce I	VE72	9883.401	10115.202	0.01		Zn I	JO68
9854.912	10144.443		10	As II	AN71	9883.95	10114.644	0.02	13 V	N I	EI58

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9884.83	10113.74		2	Br I	TE63	9913.77	10084.22		25	P I	MA59
9885.769	10112.78		9	Te I	MO75	9914.17	10083.81		0 L	Ar II	MI63
9886.06	10112.483	0.02	12 V	N I	EI58	9914.190	10083.788		5 L	Th I	GI74
9886.34	10112.19	0.02	4	Hf I	GO70	9914.760	10083.209	0.06	7 L	Sm II	BL69
9886.507	10112.02		12	Te I	MO75	9914.80	10083.17		5	Cr I	KI53
9886.63	10111.90		1	Cr I	KI53	9915.03	10082.93		30	Ru I	KE59
9886.926	10111.585	0.02	8 L	Ar II	MI63	9915.083	10082.880		4 L	Th I	GI74
9887.120	10111.40		33	Te I	MO75	9915.13	10082.83	0.10	3	Hf	GO70
9887.64	10110.87		10	Yb I	ME66	9916.888	10081.045	0.01	1	Pb I	AN68
9887.841	10110.660	0.02	3 L	Ar II	MI63	9917.46	10080.47		10 L	Cu II	SH36
9888.79	10109.70		5	I I	MI62	9917.60	10080.32		15	Cr I	KI53
9889.57	10108.893	0.02	11 V	N I	EI58	9917.996	10079.92		8	Se	MO74
9890.020	10108.432	0.08	6 L	Sm II	BL69	9918.16	10079.75		10	Br I	TE63
9890.50	10107.06		150	Br I?	TE63	9918.39	10079.52		1 L	W I	LA68
9890.801	10107.63		39	Se I	MO74	9918.808	10079.10		1 L	Tb I	KL69
9890.83	10107.60		100	Br I?	TE63	9919.85	10078.04	0.02	4 L	Ne II	PE68
9891.067	10107.362		I	Xe I	HU70	9920.178	10077.702		10	Kr I	KA69
9891.33	10107.09		1	Yb II	ME67	9920.35	10077.53	0.02	5 L	Ne II	PE68
9892.350	10106.05		279	Te I	MO75	9920.948	10076.920	0.01	2	Pb I	AN68
9892.87	10105.52	0.10	4	Hf	GO70	9921.17	10076.69	0.02	3 L	Ne II	PE68
9892.9	10105.5			Y II	BO55	9921.57	10076.29	0.05	3	Zr	TA76
9892.976	10105.41		49	Te I	MO75	9922.27	10075.57	0.02	2 L	Ne II	PE68
9892.99	10105.396	0.02	3	Dy I	CO71	9923.65	10074.17	0.05	10	F I	LI49
9893.25	10105.130	0.02	10 V	N I	EI58	9923.71	10074.13		7	I I	MI62
9893.56	10104.82		4 L	Ar I	MI73	9924.94	10072.87	0.05	20	Hf	GO70
9894.44	10103.91		2 L	W	LA68	9927.37	10070.401	0.08	5 L	Nd I	BL70
9894.50	10103.86	0.10	4	Hf I	GO70	9927.64	10070.12	0.04	6 LH	N II	ER58
9895.10	10103.24		3	Yb II	ME67	9928.37	10069.385	0.02	3	Dy I	CO71
9895.51	10102.82		12	Br I	TE63	9928.96	10068.79		2 H	Yb II	ME67
9896.563	10101.75		3 L	Tb I	KL69	9929.52	10068.22	0.10	2	Si I	RA65
9896.64	10101.67		1 L	W	LA68	9929.93	10067.80		1	Tm	SU73
9897.160	10101.14		49	Te I	MO75	9930.26	10067.47		1	Yb II	ME67
9897.89	10100.39		1 H	Yb II	ME67	9930.958	10066.76		44	Te	MO75
9898.14	10100.14	0.02	7 LB	Ne II	PE68	9931.01	10066.72		7	I I	MI62
9898.696	10099.57		104	Te I	MO75	9931.41	10066.30		5	Yb II	ME67
9899.01	10099.25		0 L	Ar II?	MI63	9931.744	10065.965		10	Kr I	KA69
9899.70	10098.55	0.10	1	Si	RA65	9932.55	10065.15	0.04	7 LBH	N II	ER58
9900.727	10097.50		3 L	Ce	VE72	9932.646	10065.05	0.01	6	Fe I	LI76
9901.24	10096.98	0.05	3	Hf	GO70	9933.16	10064.53		70	Tm I	SU73
9902.460	10095.730	0.02	3 L	Be II	JH61	9933.44	10064.25	0.02	5 L	Ne II	PE68
9902.670	10095.520	0.02	2 L	Be II	JH61	9933.45	10064.25	0.05	40	F I	LI49
9903.000	10095.19		3 L	Tb I	KL69	9933.66	10064.02		2	Re I	KL57
9903.903	10094.262		4 L	Ar I	MI73	9934.25	10063.42	0.02	4 L	Ne II	PE68
9904.26	10093.91	0.10	5	Zr	TA76	9934.45	10063.22		2 H	Yb II	ME67
9905.12	10093.016	0.02	1 L	Ar II	MI63	9935.97	10061.68		25	Br I?	TE63
9905.26	10092.87	0.10	3	Hf	GO70	9936.12	10061.53		25	Br I?	TE63
9905.88	10092.27		0 L	Cu II	SH36	9936.602	10061.04		2	Se	MO74
9905.97	10092.16	0.02	14 LB	Mg II	RI55	9936.651	10060.994		I	Xe I	HU70
9906.415	10091.703	0.01	150	Cl I	RA69	9937.713	10059.920	0.01		Zn I	JO68
9907.094	10091.01		4097	Te I	MO75	9938.560	10059.062	0.01		Zn I	JO68
9908.48	10089.61		2	Cr I	KI53	9938.799	10058.82		4 L	Ce	VE72
9908.935	10089.136		7 L	Th I?	GI74	9939.02	10058.60		50	Ce	SU65
9908.935	10089.136		7 L	Th I?	GI74	9939.61	10058.00		2	Tm	SU73
9909.002	10089.068	0.01	1	Pb I	AN68	9940.73	10056.87		15	Br I	TE63
9909.29	10088.78		6 H	Tm I	SU73	9941.6	10056.0	0.02	2 LD	F II?	PA68
9909.51	10088.55	0.10	23	Hf I	GO70	9941.6	10056.0	0.02	2 LD	F II?	PA68
9909.75	10088.31		10	Br I	TE63	9941.66	10055.93	0.03	1	Cl I	RA69
9910.11	10087.94		1	Br I	TE63	9942.56	10055.02		30 L	Cu II	SH36
9910.91	10087.13	0.05	60	F I	LI49	9943.31	10054.259	0.02	4 V	N I	EI58
9911.36	10086.67		1	Yb II	ME67	9944.73	10052.82	0.02	7 LD	F II?	PA68
9911.395	10086.63		6	Se I	MO74	9945.483	10052.059		25 L	Ar I	MI73
9912.03	10085.99		35	Br I	TE63	9945.487	10052.056		6 LW	Tb I	KL72
9912.116	10085.90		27	Te I	MO75	9946.122	10051.41		5950	Te I	MO75
9913.03	10084.97	0.10	3	Hf	GO70	9946.42	10051.12		3 L	Cu II	SH36
9913.15	10084.86	0.02	380	Zr I	TA76	9946.49	10051.04		2	Tm	SU73
9913.195	10084.800		I	Xe I	HU70	9947.22	10050.31		4 L	W I	LA68

Section II. Wavenumber Table (Finding List) –Continued

Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference	Vacuum wavenumber $\sigma(cm^{-1})$	Air wavelength $\lambda(Å)$	$\Delta\sigma$ (cm^{-1})	Intensity and character	Spectrum	Reference
9947.42	10050.11		2 W	I	MI62	9976.61	10020.70		1	Yb II	ME67
9947.59	10049.93		8	Tm I	SU73	9977.99	10019.31		6 V	Ge I	HU64
9947.65	10049.88		1 L	Cu II	SH36	9978.09	10019.21		7	Re I	KL57
9948.05	10049.47	0.02	4 L	Ne II	PE68	9978.816	10018.483	0.01	4 L	S I	JA67
9949.06	10048.45	0.02	3 L	Ne II	PE68	9979.47	10017.822	0.02	5 V	N I	EI58
9949.227	10048.278		0	Gd II	SP70	9979.50	10017.79	0.02	4 L	Ne II	PE68
9949.461	10048.041		3 L	Th I	GI74	9979.99	10017.31	0.05	30	Zr	TA76
9949.52	10047.98	0.02	8 LD	F II?	PA68	9980.51	10016.78		15	Yb II	ME67
9949.93	10047.57		9	Tm I	SU73	9981.65	10015.63	0.02	4 L	Ne II	PE68
9950.54	10046.95		2	Yb II	ME67	9983.87	10013.41		1 L	Ar II	MI63
9951.77	10045.71		3 HB	Br I	TE63	9984.16	10013.12		1 L	Ar II	MI63
9952.25	10045.23	0.05	150	Zr I	TA76	9984.82	10012.46		5 B	Lu I?	KI54
9953.58	10043.88	0.02	2	Cl II	RA74	9984.82	10012.46		5 B	Lu I?	KI54
9955.62	10041.83		2	Tm	SU73	9985.61	10011.68		20	I I	MI62
9956.91	10040.53		0 L	Cu II	SH36	9985.877	10011.398		3 L	Th I	GI74
9957.06	10040.37		30	Tm I	SU73	9985.90	10011.38		5	Tm	SU73
9957.53	10039.90		1	Yb II	ME67	9986.372	10010.91		5 L	Tb I	KL69
9957.75	10039.68		2 L	Ar I	MI73	9987.90	10009.37		2 H	Tm	SU73
9957.998	10039.427	0.01	3 L	Ge I	AN59	9989.31	10007.96		3	Yb II	ME67
9958.060	10039.364		7 L	Th I	GI74	9989.585	10007.682		1	As II	AN71
9959.23	10038.19		15 L	Cu II	SH36	9989.73	10007.54		3 L	Ar I	MI73
9959.39	10038.03	0.05	35	F I	LI49	9990.59	10006.68		10 L	Cu II	SH36
9960.89	10036.51	0.02	90	Hf I	GO70	9992.463	10004.799		0 LW	Tb I	KL72
9961.074	10036.33		4 L	Tb I	KL69	9993.88	10003.38		4	Yb II	ME67
9961.08	10036.32		5 L	Cu II	SH36	9994.06	10003.20		6 V	Ge I	HU64
9961.44	10035.96		1 L	Ar II	MI63	9994.20	10003.06		350	I I	LU75
9961.64	10035.76		10	Tm I	SU73	9994.21	10003.055	0.02	5 V	N I	EI58
9961.95	10035.45	0.04	7 LH	N II	ER58	9994.61	10002.65		15 L	W I	LA68
9962.603	10034.786	0.05	5 L	Gd I	BL71	9995.03	10002.23	0.02	4	Cl I	RA69
9962.76	10034.64		2	I I	MI62	9995.30	10001.96		10	Br I	TE63
9962.940	10034.447	0.01	1 L	S I	JA67	9995.710	10001.56		4	Cm I	CO76
9963.234	10034.151	0.01	2 L	S I	JA67	9996.18	10001.08		300	Ba I	RU55
9964.276	10033.102	0.01		Zn I	JO68	9996.60	10000.66		1 L	W	LA68
9964.57	10032.81	0.02	2 LD	Li I	JO59	9996.87	10000.392	0.02	1	Dy	CO71
9964.82	10032.55		50	Yb II	ME67	9998.457	9998.802	0.03	8 L	O I	ER68
9965.06	10032.31		2 H	Tm I	SU73	9998.46	9998.81	0.20	2	Zr	TA76
9965.168	10032.21		4 L	Tb I	KL69	9999.352	9997.91		2 L	Tb I	KL69
9965.210	10032.161	0.01	2 L	S I	JA67	9999.51	9997.750	0.02	4 V	N I	EI58
9965.27	10032.10		200	Ba I	RU55						
9965.315	10032.06		4 L	Tb I	KL69						
9965.429	10031.941	0.01	2 L	S I	JA67						
9966.27	10031.098		500 V	Pr III	SU74						
9966.433	10030.930	0.01	1 L	S I	JA67						
9967.03	10030.35		2	I I?	MI62						
9967.03	10030.35		2	I I?	MI62						
9967.098	10030.261	0.01	1 L	S I	JA67						
9967.54	10029.82	0.02	3 LH	Ne II	PE68						
9967.697	10029.658		10 L	Ar I	MI73						
9968.12	10029.24	0.02	3 L	Ne II	PE68						
9968.56	10028.80	0.10	38 W	Zr I	TA76						
9970.38	10026.96		5	Re I	KL57						
9970.41	10026.93		1 L	Cu II	SH36						
9971.52	10025.81	0.10	2	Si I	RA65						
9972.10	10025.23		4 H	Br I	TE63						
9972.34	10024.99		15 H	Ru I?	KE59						
9972.34	10024.99		15 H	Ru I?	KE59						
9972.970	10024.355	0.01		Cs I	ER70						
9973.611	10023.711		I	Xe I	HU70						
9973.694	10023.628		I	Xe I	HU70						
9974.01	10023.31	0.05	3	Hf I	GO70						
9974.05	10023.27	0.04	8 LBH	N II	ER58						
9974.24	10023.10		22	I I	MI62						
9974.27	10023.05		30 L	Cu II	SH36						
9975.036	10022.278	0.02	4 L	Ar II	MI63						
9975.81	10021.50		2 L	W	LA68						
9976.18	10021.13	0.10	60	Hf	GO70						

Section III. Wavenumber Tables Arranged by Element

Aluminium

Al, Z = 13

Al I Normal state of valence electrons $3s^2 3p\ ^2P^o_{1/2}$ I.P. = 48278 cm^{-1}

Al II Normal state of valence electrons $3s^2\ ^1S_0$ I.P. = 151860 cm^{-1}

Al

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4723.772	21163.75	0.01	13 L	*32965* – 37689	1½ – ½	Al I	ER63
4739.606	21093.04	0.01	12 L	*32949* – 37689	½ – ½	Al I	ER63
5963.763	16763.36	0.01	9 L	*32965* – 38929	1½ – 1½	Al I	ER63
5968.318	16750.56	0.01	12 L	*32965* – 38933	1½ – 2½	Al I	ER63
5979.601	16718.96	0.01	11 L	*32949* – 38929	½ – 1½	Al I	ER63
7602.047	13150.76	0.01	14 L	25347 – *32949*	½ – ½	Al I	ER63
7617.888	13123.41	0.01	15 L	25347 – *32965*	½ – 1½	Al I	ER63
8882.602	11254.881	0.02	15 L	32436 – *41319*	2½ – 3½	Al I	ER63
8883.936	11253.190	0.02	14 L	32435 – *41319*	1½ – 2½	Al I	ER63
9178.761	10891.733	0.02	11 L	*32965* – 42144	1½ – ½	Al I	ER63
9194.596	10872.975	0.02	10 L	*32949* – 42144	½ – ½	Al I	ER63
9268.077	10786.770	0.02	4 L	*32965* – 42233	1½ – 1½	Al I	ER63
9272.138	10782.045	0.02	9 L	*32965* – 42237	1½ – 2½	Al I	ER63
9283.919	10768.364	0.02	8 L	*32949* – 42233	½ – 1½	Al I	ER63

Al Reference

ER63 Eriksson, K. B. S., and Isberg, H. B. S., Ark. Fys. **23**, 527–541 (1963).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer for wavelengths above 12000 Å
b) 5.5 m Czerny-Turner spectrograph for wavelengths below 12000 Å
Detector: a) PbS
b) Photographic

Argon

Ar, Z = 18

Ar I Normal state of valence electrons $3s^2\,3p^6\ {}^1S_0$ I.P. = 127110 cm^{-1}

Ar II Normal state of valence electrons $3s^2 3p^5\ {}^2P^\circ_{3/2}$ I.P. = 222848 cm^{-1}

Ar

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2445.513	40880.069		4	116999 – *119444*	2 – 2	Ar I	HU73
2499.491	39997.240		4	117183 – *119683*	2 – 2	Ar I	HU73
2510.334	39824.470		1	*114641* – 117151	2 – 1	Ar I	HU73
2531.754	39487.540		1	117151 – *119683*	1 – 2	Ar I	HU73
2542.598	39319.127		2	*114641* – 117183	2 – 2	Ar I	HU73
2552.316	39169.420		1	118459 – *121011*	1 – 1	Ar I	HU73
2566.673	38950.321		4	116999 – *119566*	2 – 3	Ar I	HU73
2576.577	38800.601		4	117183 – *119760*	2 – 1	Ar I	HU73
2587.936	38630.293		2	*114975* – 117562	1 – 0	Ar I	HU73
2604.483	38384.869		1	118407 – *121011*	1 – 1	Ar I	HU73
2608.840	38320.762		2	117151 – *119760*	1 – 1	Ar I	HU73
2623.245	38110.332		9	116942 – *119566*	3 – 3	Ar I	HU73
2637.003	37911.499		1	118459 – *121096*	1 – 0	Ar I	HU73
2683.755	37251.067		8	116999 – *119683*	2 – 2	Ar I	HU73
2689.170	37176.057		6	118407 – *121096*	1 – 0	Ar I	HU73
2692.258	37133.416		9	118469 – *121161*	2 – 1	Ar I	HU73
2696.442	37075.797		14	117151 – *119847*	1 – 1	Ar I	HU73
2701.711	37003.491		9	118459 – *121161*	1 – 1	Ar I	HU73
2740.327	36482.046		30	116942 – *119683*	3 – 2	Ar I	HU73
2744.964	36420.419		5	*118512* – 121257	0 – 1	Ar I	HU73
2747.627	36385.119		10 B	*118906* – 121654	2 – 3	Ar I?	HU73
2747.973	36380.538		10 B	*118906* – 121654	2 – 2	Ar I?	HU73
2753.878	36302.529		15	118407 – *121161*	1 – 1	Ar I	HU73
2760.841	36210.972		25	116999 – *119760*	2 – 1	Ar I	HU73
2818.840	35465.914		10	*118651* – 121470	1 – 0	Ar I	HU73
2838.390	35221.64		15 B	*119847* – 122686	1 – 1	Ar I?	HU73
2838.590	35219.15		15 B	*119847* – 122686	1 – 2	Ar I?	HU73
2848.443	35097.327		2	116999 – *119847*	2 – 1	Ar I	HU73
2851.594	35058.546		2	*114147* – 116999	1 – 2	Ar I	HU73
2860.370	34950.98		30	*119847* – 122708	1 – 2	Ar I	HU73
2947.972	33912.38		3	*119760* – 122708	1 – 2	Ar I	HU73
2976.100	33591.86		8	*121161* – 124137	1 – 2	Ar I	HU73
3003.594	33284.366		80	*114147* – 117151	1 – 1	Ar I	HU73
3016.733	33139.400		95	*113643* – 116660	1 – 1	Ar I	HU73
3023.087	33069.750		90	116660 – *119683*	1 – 2	Ar I	HU73
3035.858	32930.634		8	*114147* – 117183	1 – 2	Ar I	HU73
3040.564	32879.664		40	*115366* – 118407	1 – 1	Ar I	HU73
3061.927	32650.266		11	118870 – *121932*	0 – 1	Ar I	HU73
3092.732	32325.060		50	*115366* – 118459	1 – 1	Ar I	HU73
3095.409	32297.104		12	108722 – *111818*	0 – 1	Ar I	HU73
3100.173	32247.469		30	116660 – *119760*	1 – 1	Ar I	HU73
3102.185	32226.556		20	*115366* – 118469	1 – 2	Ar I	HU73
3120.360	32038.85		9	*119566* – 122686	3 – 2	Ar I	HU73
3125.495	31986.21		25	*121011* – 124137	1 – 2	Ar I	HU73
3129.660	31943.64		20	*119566* – 122695	3 – 4	Ar I	HU73
3141.900	31819.20		18 B	*119566* – 122707	3 – 3	Ar I?	HU73
3142.140	31816.76		18 B	*119566* – 122708	3 – 2	Ar I?	HU73
3151.860	31718.65		50 B	*119566* – 122717	3 –	Ar I	HU73
3191.520	31324.485		800 I	*113468* – 116660	2 – 1	Ar I	HU73
3226.199	30987.774		80	*113716* – 116942	3 – 3	Ar I	HU73
3263.060	30637.72		20 B	*119444* – 122707	2 – 3	Ar I?	HU73
3263.300	30635.47		20 B	*119444* – 122708	2 – 2	Ar I?	HU73
3273.020	30544.49		55	*119444* – 122717	2 – 3	Ar I	HU73
3282.771	30453.764		60	*113716* – 116999	3 – 2	Ar I	HU73
3327.356	30045.697		5	120230 – *123557*	2 – 3	Ar I	HU73
3327.669	30042.871		11	120230 – *123557*	3 – 3	Ar I	HU73

Ar—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3356.066	29788.667		1200 I	120229 – *123557*	1 – 2	Ar I	HU73
3302.230	29550.23		40 B	*120753* – 124135	3 –	Ar I	HU73
3415.223	29272.677		90	*114147* – 117562	1 – 0	Ar I	HU73
3417.301	29254.880		60	117183 – *120600*	2 – 2	Ar I	HU73
3432.411	29126.092		300	*114975* – 118407	1 – 1	Ar I	HU73
3435.424	29100.550		40	117183 – *120619*	2 – 2	Ar I	HU73
3449.564	28981.265		12	117151 – *120600*	1 – 2	Ar I	HU73
3467.035	28835.223		450	*113716* – 117183	3 – 2	Ar I	HU73
3474.281	28775.083		2500 I	*113468* – 116942	2 – 3	Ar I	HU73
3482.770	28704.95		60	*119212* – 122695	3 – 4	Ar I	HU73
3484.578	28690.049		300	*114975* – 118459	1 – 1	Ar I	HU73
3494.032	28612.427		1000	*114975* – 118469	1 – 2	Ar I	HU73
3504.051	28530.615		55	*115366* – 118870	1 – 0	Ar I	HU73
3504.970	28523.13		30 B	*119212* – 122717	3 –	Ar I	HU73
3508.066	28497.958		900	*113643* – 117151	1 – 1	Ar I	HU73
3516.790	28427.265		45	*113426* – 116942	2 – 3	Ar I	HU73
3518.235	28415.59		12 B	*120619* – 124137	2 – 3	Ar I?	HU73
3518.395	28414.30		12 B	*120619* – 124137	2 – 2	Ar I?	HU73
3530.853	28314.045		300	*113468* – 116999	2 – 2	Ar I	HU73
3534.808	28282.36		6	*120600* – 124135	2 – 3	Ar I	HU73
3536.358	28269.97		12 B	*120600* – 124137	2 – 3	Ar I?	HU73
3536.518	28268.69		12 B	*120600* – 124137	2 – 2	Ar I?	HU73
3540.330	28238.250		400	*113643* – 117183	1 – 2	Ar I	HU73
3545.795	28194.726		300	*114861* – 118407	0 – 1	Ar I	HU73
3569.879	28004.514		11	117183 – *120753*	2 – 3	Ar I	HU73
3573.362	27977.219		150	*113426* – 116999	2 – 2	Ar I	HU73
3578.450	27937.439		15 B	120230 – *123808*	2 – 2	Ar I?	HU73
3578.763	27934.995		15 B	120229 – *123808*	3 – 2	Ar I?	HU73
3597.962	27785.928		75	*114861* – 118459	0 – 1	Ar I	HU73
3654.462	27356.342		150	*114805* – 118459	2 – 1	Ar I	HU73
3663.916	27285.760		30	*114805* – 118469	2 – 2	Ar I	HU73
3672.012	27225.60		50 B	*119023* – 122695	4 –	Ar I	HU73
3682.853	27145.454		100	*113468* – 117151	2 – 1	Ar I	HU73
3715.117	26909.711		1000	*113468* – 117183	2 – 2	Ar I	HU73
3725.362	26835.705		200	*113426* – 117151	2 – 1	Ar I	HU73
3757.626	26605.288		75	*113426* – 117183	2 – 2	Ar I	HU73
3766.438	26543.041		200	*114641* – 118407	2 – 1	Ar I	HU73
3810.715	26234.637		30	116942 – *120753*	3 – 3	Ar I	HU73
3895.898	25661.022		450	*114975* – 118870	1 – 0	Ar I	HU73
3919.695	25505.228		400	*113643* – 117562	1 – 0	Ar I	HU73
3922.399	25487.646		120	*113020* – 116942	3 – 3	Ar I	HU73
3978.971	25125.271		900	*113020* – 116999	3 – 2	Ar I	HU73
4034.762	24777.85		12 B	*118651* – 122686	1 – 1	Ar I?	HU73
4034.962	24776.62		12 B	*118651* – 122686	1 – 2	Ar I?	HU73
4163.235	24013.230		15	*113020* – 117183	3 – 2	Ar I	HU73
4171.349	23966.518		900	107496 – *111667*	1 – 0	Ar I	HU73
4173.966	23951.49		12	*118512* – 122686	0 – 1	Ar I	HU73
4182.125	23904.766		20	*119023* – 123205	4 – 3	Ar I	HU73
4192.601	23845.035		2000	*112750* – 116942	4 – 3	Ar I	HU73
4321.611	23133.204		1000	107496 – *111818*	1 – 1	Ar I	HU73
4354.921	22956.264		40	*118906* – 123261	2 – 2	Ar I	HU73
4358.078	22939.64		6 B	*119683* – 124041	2 – 1	Ar I?	HU73
4358.258	22938.69		6 B	*119683* – 124041	2 – 2	Ar I?	HU73
4436.607	22533.597		8	116660 – *121096*	1 – 0	Ar I	HU73
4492.320	22254.14		30 B	*119566* – 124058	3 –	Ar I	HU73
4501.315	22209.669		5	116660 – *121161*	1 – 1	Ar I	HU73
4521.069	22112.626		100	*112138* – 116660	2 – 1	Ar I	HU73
4528.328	22077.181		900	107289 – *111818*	2 – 1	Ar I	HU73
4536.057	22039.561		250	107131 – *111667*	1 – 0	Ar I	HU73
4613.480	21669.70		15	*119444* – 124058	2 – 3	Ar I	HU73
4642.507	21534.207		750	107496 – *112138*	1 – 2	Ar I	HU73
4659.720	21454.661		12	*118512* – 123171	0 – 1	Ar I	HU73
4686.319	21332.885		120	107131 – *111818*	1 – 1	Ar I	HU73
4752.496	21035.834		44	*113716* – 118469	3 – 2	Ar I	HU73
4763.756	20986.111		1200	107054 – *111818*	0 – 1	Ar I	HU73
4803.830	20811.042		110	*112138* – 116942	2 – 3	Ar I	HU73

Ar—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4821.366	20735.350		120 B	*115366* – 120188	1 – 1	Ar I?	HU73
4821.765	20733.634		120 B	*115366* – 120188	1 – 2	Ar I?	HU73
4825.791	20716.338		22	*113643* – 118469	1 – 2	Ar I	HU73
4833.710	20682.40		25	*119212* – 124046	3 – 4	Ar I	HU73
4841.965	20647.135		150	*111818* – 116660	1 – 1	Ar I	HU73
4849.224	20616.229		2500	107289 – *112138*	2 – 2	Ar I	HU73
4860.402	20568.816		75	*112138* – 116999	2 – 2	Ar I	HU73
4863.197	20556.994		1	*115366* – 120230	1 – 2	Ar I	HU73
4920.641	20317.011		160	108722 – *113643*	0 – 1	Ar I	HU73
4981.466	20068.932		25	*113426* – 118407	2 – 1	Ar I	HU73
4991.125	20030.097		30	*113468* – 118459	2 – 1	Ar I	HU73
4992.227	20025.672		60	*111667* – 116660	0 – 1	Ar I	HU73
5000.578	19992.232		4	*113468* – 118469	2 – 2	Ar I	HU73
5007.215	19965.730		160	107131 – *112138*	1 – 2	Ar I	HU73
5012.402	19945.068		25	*112138* – 117151	2 – 1	Ar I	HU73
5022.952	19903.18		12 B	*119023* – 124046	4 –	Ar I	HU73
5033.634	19860.943		1	*113426* – 118459	2 – 1	Ar I	HU73
5044.666	19817.508		550	*112138* – 117183	2 – 2	Ar I	HU73
5134.552	19470.58		2 B	*118906* – 124041	2 – 1	Ar I?	HU73
5134.732	19469.90		2 B	*118906* – 124041	2 – 2	Ar I?	HU73
5146.081	19426.959		30	117183 – *122329*	2 – 3	Ar I	HU73
5181.298	19294.916		25	*111818* – 116999	1 – 2	Ar I	HU73
5213.213	19176.793		12 B	*114975* – 120188	1 – 1	Ar I?	HU73
5213.610	19175.332		12 B	*119444* – 124658	2 – 2	Ar I?	HU73
5213.612	19175.325		12 B	*114975* – 120188	1 – 2	Ar I?	HU73
5227.657	19123.807		5	*113643* – 118870	1 – 0	Ar I	HU73
5255.044	19024.142		6	*114975* – 120230	1 – 2	Ar I	HU73
5333.298	18745.005		40	*111818* – 117151	1 – 1	Ar I	HU73
5365.562	18632.289		60	*111818* – 117183	1 – 2	Ar I	HU73
5383.097	18571.596		24 B	*114805* – 120188	2 – 1	Ar I?	HU73
5383.496	18570.219		24 B	*114805* – 120188	2 – 2	Ar I?	HU73
5385.236	18564.219		26	*114821* – 120207	3 – 4	Ar I	HU73
5407.811	18486.723		22 B	*114821* – 120229	3 – 3	Ar I?	HU73
5408.121	18485.663		22 B	118407 – *123815*	1 – 1	Ar I?	HU73
5408.124	18485.653		22 B	*114821* – 120230	3 – 2	Ar I?	HU73
5424.615	18429.455		200 B	*114805* – 120229	2 – 3	Ar I?	HU73
5424.928	18428.392		200 B	*114805* – 120230	2 – 2	Ar I?	HU73
5425.113	18427.765		120	108722 – *114147*	0 – 1	Ar I	HU73
5427.937	18418.176		90 B	*114821* – 120249	3 – 3	Ar I?	HU73
5427.975	18418.047		90 B	*114821* – 120249	3 – 4	Ar I?	HU73
5444.741	18361.332		9	*114805* – 120249	2 – 3	Ar I	HU73
5448.696	18348.006		14	*113020* – 118469	3 – 2	Ar I	HU73
5483.560	18231.349		15	*111667* – 117151	0 – 1	Ar I	HU73
5497.310	18185.749		18	116942 – *122440*	3 – 2	Ar I	HU73
5547.240	18022.061		6 B	*114641* – 120188	2 – 1	Ar I?	HU73
5547.639	18020.765		6 B	*114641* – 120188	2 – 2	Ar I?	HU73
5580.476	17914.726		1500 B	106237 – *111818*	2 – 1	Ar I?	HU73
5580.506	17914.629		1500 B	106087 – *111667*	1 – 0	Ar I?	HU73
5588.758	17888.178		35 B	*114641* – 120229	2 – 3	Ar I?	HU73
5589.071	17887.176		35 B	*114641* – 120230	2 – 2	Ar I?	HU73
5608.884	17823.991		150	*114641* – 120249	2 – 3	Ar I	HU73
5730.655	17445.248		300 B	107289 – *113020*	2 – 3	Ar I?	HU73
5730.768	17444.903		300 B	106087 – *111818*	1 – 1	Ar I?	HU73
5744.927	17401.908		22	*111818* – 117562	1 – 0	Ar I	HU73
5780.070	17296.104		8	116660 – *122440*	1 – 2	Ar I	HU73
5901.372	16940.584		5000 I	106237 – *112138*	2 – 2	Ar I	HU73
5929.547	16860.088		14	107496 – *113426*	1 – 2	Ar I	HU73
5972.056	16740.078		300	107496 – *113468*	1 – 2	Ar I	HU73
6040.500	16550.400		250 B	*114147* – 120188	1 – 1	Ar I?	HU73
6040.899	16549.306		250 B	*114147* – 120188	1 – 2	Ar I?	HU73
6051.664	16519.867		500	106087 – *112138*	1 – 2	Ar I	HU73
6082.331	16436.575		400 I	*114147* – 120230	1 – 2	Ar I	HU73
6146.843	16264.070		16	107496 – *113643*	1 – 1	Ar I	HU73
6178.773	16180.023		90	107289 – *113468*	2 – 2	Ar I	HU73
6200.758	16122.656		12	105617 – *111818*	2 – 1	Ar I	HU73
6252.400	15989.491		400	108722 – *114975*	0 – 1	Ar I	HU73

Ar—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6282.138	15913.799		2	*114975* – 121257	1 – 1	Ar I	HU73
6287.714	15899.687		240 I	*115366* – 121654	1 – 2	Ar I	HU73
6294.255	15883.164		40	107131 – *113426*	1 – 2	Ar I	HU73
6320.674	15816.777		18	*112138* – 118459	2 – 1	Ar I	HU73
6330.127	15793.157		5	*112138* – 118469	2 – 2	Ar I	HU73
6336.764	15776.614		2	107131 – *113468*	1 – 2	Ar I	HU73
6353.560	15734.909		8	107289 – *113643*	2 – 1	Ar I	HU73
6426.855	15555.460		6	107289 – *113716*	2 – 3	Ar I	HU73
6472.076	15446.772		10	*113716* – 120188	3 – 2	Ar I	HU73
6490.620	15402.640		120	*113716* – 120207	3 – 4	Ar I	HU73
6511.551	15353.128		60	107131 – *113643*	1 – 1	Ar I	HU73
6513.195	15349.253		120 B	*113716* – 120229	3 – 3	Ar I?	HU73
6513.508	15348.516		120 B	*113716* – 120230	3 – 2	Ar I?	HU73
6521.654	15329.344		150	105617 – *112138*	2 – 2	Ar I	HU73
6533.321	15301.970		500 B	*113716* – 120249	3 – 3	Ar I?	HU73
6533.359	15301.881		500 B	*113716* – 120249	3 – 4	Ar I?	HU73
6544.972	15274.730		3 B	*113643* – 120188	1 – 1	Ar I?	HU73
6545.371	15273.799		3 B	*113643* – 120188	1 – 2	Ar I?	HU73
6586.803	15177.724		4	*113643* – 120230	1 – 2	Ar I	HU73
6588.988	15172.691		300	107054 – *113643*	0 – 1	Ar I	HU73
6641.570	15052.567		12	*111818* – 118459	1 – 1	Ar I	HU73
6644.247	15046.503		700	108722 – *115366*	0 – 1	Ar I	HU73
6651.023	15031.174		30 B	*111818* – 118469	1 – 2	Ar I	HU73
6651.315	15030.513		30 B	107496 – *114147*	1 – 1	Ar I	HU73
6676.164	14974.568		3	105462 – *112138*	3 – 2	Ar I	HU73
6679.561	14966.953		6	*114975* – 121654	1 – 2	Ar I	HU73
6710.415	14898.136		2	116942 – *123653*	3 – 4	Ar I	HU73
6719.759	14877.420		11 B	*113468* – 120188	2 – 1	Ar I	HU73
6720.158	14876.537		11 B	*113468* – 120188	2 – 2	Ar I	HU73
6739.664	14833.480		5	*111667* – 118407	0 – 1	Ar I	HU73
6761.277	14786.064		40 B	*113468* – 120229	2 – 3	Ar I?	HU73
6761.590	14785.380		40 B	*113468* – 120230	2 – 2	Ar I?	HU73
6762.268	14783.897		8 B	*113426* – 120188	2 – 1	Ar I?	HU73
6762.667	14783.025		8 B	*113426* – 120188	2 – 2	Ar I?	HU73
6782.803	14739.139		75	106237 – *113020*	2 – 3	Ar I	HU73
6791.832	14719.546		6	*111667* – 118459	0 – 1	Ar I	HU73
6803.786	14693.683		90 B	*113426* – 120229	2 – 3	Ar I?	HU73
6804.099	14693.007		90 B	*113426* – 120230	2 – 2	Ar I?	HU73
6807.973	14684.646		2 B	116660 – *123468*	1 – 1	Ar I?	HU73
6809.187	14682.028		2 B	116999 – *123808*	2 – 2	Ar I?	HU73
6816.226	14666.866		2	116999 – *123815*	2 – 1	Ar I	HU73
6823.912	14650.346		450	*113426* – 120249	2 – 3	Ar I	HU73
6831.299	14634.504		500 B	*114821* – 121653	3 – 3	Ar I?	HU73
6831.341	14634.414		500 B	*114821* – 121653	3 – 4	Ar I?	HU73
6849.099	14596.471		300 B	*114805* – 121654	2 – 3	Ar I?	HU73
6849.445	14595.733		300 B	*114805* – 121654	2 – 2	Ar I?	HU73
6858.032	14577.458		15	107289 – *114147*	2 – 1	Ar I	HU73
6921.001	14444.828		4	*114147* – 121068	1 – 1	Ar I	HU73
7012.246	14256.868		450 B	*114641* – 121653	2 – 3	Ar I?	HU73
7013.242	14254.844		450 B	*114641* – 121654	2 – 3	Ar I?	HU73
7013.588	14254.140		450 B	*114641* – 121654	2 – 2	Ar I?	HU73
7016.023	14249.193		120	107131 – *114147*	1 – 1	Ar I	HU73
7044.063	14192.472		1	*114147* – 121191	1 – 2	Ar I	HU73
7052.889	14174.712		8	*111818* – 118870	1 – 0	Ar I	HU73
7093.460	14093.640		2000	107054 – *114147*	0 – 1	Ar I	HU73
7109.425	14061.991		2	*114147* – 121257	1 – 1	Ar I	HU73
7144.575	13992.808		30	107496 – *114641*	1 – 2	Ar I	HU73
7186.820	13910.556		1200 I	*113020* – 120207	3 – 4	Ar I	HU73
7188.412	13907.476		100	106237 – *113426*	2 – 2	Ar I	HU73
7209.395	13866.998		50 B	*113020* – 120249	3 – 3	Ar I?	HU73
7209.708	13866.396		50 B	*113020* – 120230	3 – 2	Ar I?	HU73
7229.521	13828.394		200 B	*113020* – 120249	3 – 3	Ar I?	HU73
7229.559	13828.321		200 B	*113020* – 120249	3 – 4	Ar I?	HU73
7230.921	13825.717		300	106237 – *113468*	2 – 2	Ar I	HU73
7287.393	13718.577		10000 I	105462 – *112750*	3 – 4	Ar I	HU73
7308.718	13678.549		5000 I	107496 – *114805*	1 – 2	Ar I	HU73

Ar—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7319.293	13658.78		8 B	*115366* – 122686	1 – 1	Ar I?	HU73
7319.493	13658.41		8 B	*115366* – 122686	1 – 2	Ar I?	HU73
7322.505	13652.795		6	*114147* – 121470	1 – 0	Ar I	HU73
7338.704	13622.659		7500 I	106087 – *113426*	1 – 2	Ar I	HU73
7351.292	13599.333		1500 I	107289 – *114641*	2 – 2	Ar I	HU73
7365.218	13573.618		750	107496 – *114861*	1 – 0	Ar I	HU73
7381.213	13544.205		500	106087 – *113468*	1 – 2	Ar I	HU73
7403.085	13504.190		9500 I	105617 – *113020*	3 – 3	Ar I	HU73
7405.708	13499.406		1200	106237 – *113643*	2 – 1	Ar I	HU73
7448.812	13421.289		2	*113716* – 121165	3 – 3	Ar I	HU73
7456.981	13406.586		2500 B	*112750* – 120207	4 – 5	Ar I?	HU73
7457.022	13406.513		2500 B	*112750* – 120207	4 – 4	Ar I?	HU73
7479.003	13367.110		8500 I	106237 – *113716*	2 – 3	Ar I	HU73
7499.723	13330.180		25 B	*112750* – 120249	4 – 3	Ar I?	HU73
7499.761	13330.112		25 B	*112750* – 120249	4 – 4	Ar I?	HU73
7506.848	13317.528		20	*114147* – 121654	1 – 2	Ar I	HU73
7509.283	13313.209		5500 I	107131 – *114641*	1 – 2	Ar I	HU73
7515.435	13302.312		225	107289 – *114805*	2 – 2	Ar I	HU73
7532.239	13272.635		6000 I	107289 – *114821*	2 – 3	Ar I	HU73
7548.535	13243.981		12	*113643* – 121191	1 – 2	Ar I	HU73
7556.000	13230.897		1200	106087 – *113643*	1 – 1	Ar I	HU73
7557.595	13228.104		2500 I	105462 – *113020*	2 – 3	Ar I	HU73
7565.667	13213.991		3000	104102 – *111667*	1 – 0	Ar I	HU73
7600.260	13153.847		4	*113468* – 121068	2 – 1	Ar I	HU73
7613.897	13130.287		6	*113643* – 121257	1 – 1	Ar I	HU73
7626.195	13109.113		1	*114975* – 122601	1 – 1	Ar I	HU73
7627.357	13107.116		2	*113643* – 121270	1 – 2	Ar I	HU73
7660.032	13051.206		12	*114975* – 122635	1 – 2	Ar I	HU73
7673.426	13028.425		90	107131 – *114805*	1 – 2	Ar I	HU73
7685.319	13008.264		2500	107289 – *114975*	2 – 1	Ar I	HU73
7696.894	12988.701		25	*113468* – 121165	2 – 3	Ar I	HU73
7715.929	12956.658		4000	104102 – *111818*	1 – 1	Ar I	HU73
7729.926	12933.196		750	107131 – *114861*	1 – 0	Ar I	HU73
7748.002	12903.024		9	*114861* – 122609	0 – 1	Ar I	HU73
7765.831	12873.400		12	*113426* – 121191	2 – 2	Ar I	HU73
7802.144	12813.484		15	*113468* – 121270	2 – 2	Ar I	HU73
7808.694	12802.737		2500 I	105617 – *113426*	2 – 2	Ar I	HU73
7831.193	12765.954		12	*113426* – 121257	2 – 1	Ar I	HU73
7843.310	12746.232		400	107131 – *114975*	1 – 1	Ar I	HU73
7851.203	12733.418		600	105617 – *113468*	2 – 2	Ar I	HU73
7870.449	12702.280		1250	107496 – *115366*	1 – 1	Ar I	HU73
7873.720	12697.00		8	*114821* – 122695	3 – 4	Ar I	HU73
7881.024	12685.24		9 B	*114805* – 122686	2 – 1	Ar I	HU73
7881.224	12684.91		9 B	*114805* – 122686	2 – 2	Ar I	HU73
7895.920	12661.31		15 B	*114821* – 122717	3 –	Ar I	HU73
7902.764	12650.34		20 B	*114805* – 122707	2 – 3	Ar I?	HU73
7903.004	12649.96		20 B	*114805* – 122708	2 – 2	Ar I?	HU73
7910.180	12638.480		25	106237 – *114147*	2 – 1	Ar I	HU73
7920.747	12621.619		90	107054 – *114975*	0 – 1	Ar I	HU73
7936.683	12596.276		40 B	*113716* – 121653	3 – 3	Ar I?	HU73
7936.725	12596.209		40 B	*113716* – 121653	3 – 4	Ar I?	HU73
7963.204	12554.324		75	105462 – *113426*	3 – 2	Ar I	HU73
8005.713	12487.663		2500 I	105462 – *113468*	3 – 2	Ar I	HU73
8006.64	12486.22		1 L			Ar II?	MI63
8025.990	12456.114		2000	105617 – *113643*	2 – 1	Ar I	HU73
8036.825	12439.321		5000 I	104102 – *112138*	1 – 2	Ar I	HU73
8049.308	12420.030		60	*112138* – 120188	2 – 1	Ar I	HU73
8049.707	12419.414		150	*112138* – 120188	2 – 2	Ar I	HU73
8060.472	12402.828		2000	106087 – *114147*	1 – 1	Ar I	HU73
8077.166	12377.194		22	107289 – *115366*	2 – 1	Ar I	HU73
8090.82	12356.30		1 L	*112138* – 120229	2 – 3	Ar I	MI73
8090.826	12356.296		450 I	*112138* – 120229	2 – 3	Ar I	HU73
8099.285	12343.392		900 I	105617 – *113716*	2 – 3	Ar I	HU73
8171.440	12234.397		30	*113020* – 121191	3 – 2	Ar I	HU73
8227.274	12151.369		80	*113426* – 121653	2 – 3	Ar I	HU73
8235.157	12139.737		700	107131 – *115366*	1 – 1	Ar I	HU73

Ar—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8253.795	12112.324		1300 I	105462 – *113716*	3 – 3	Ar I	HU73
8312.594	12026.648		80	107054 – *115366*	0 – 1	Ar I	HU73
8366.93	11948.54		1 L			Ar	MI63
8370.24	11943.82		3 L	*111818* – 120188	1 – 1	Ar I	MI73
8370.614	11943.285		4 L	*111818* – 120188	1 – 2	Ar I	MI73
8412.044	11884.463		2 L	*111818* – 120230	1 – 2	Ar I	MI73
8494.21	11769.50		1 L	149179 – *157673*	3½ – 2½	Ar II?	MI63
8520.477	11733.220		5 L	*111667* – 120188	0 – 1	Ar I	MI73
8538.71	11708.16		1 L	*114147* – 122686	1 – 2	Ar I	MI73
8560.41	11678.48		2 L	*114147* – 122708	1 – 2	Ar I	MI73
8632.929	11580.384		4 L	*113020* – 121653	3 – 4	Ar I	MI73
8715.84	11470.22		1 L	163299 – *196119*	2½ – 3½	Ar II?	MI63
8770.575	11398.640		4 L	*115366* – 124137	1 – 2	Ar I	MI73
8799.83	11360.74		1 L			Ar	MI63
8883.70	11253.496	0.02	1 L	183090 – *191974*	1½ – 1½	Ar II	MI63
8917.21	11211.20		0 L	181594 – *190511*	2½ – 2½	Ar II	MI63
8918.40	11209.71		1 LB	150474 – *173347*	1½ – 1½	Ar II	MI63
8941.42	11181.36		0 L	*199981* – *208923*	1½ – 1½	Ar II?	MI63
8947.484	11173.266	0.02	2 L	183090 – *191169*	1½ – 1½	Ar II	MI63
8969.86	11145.40		1 LW	*113716* – 122686	3 – 2	Ar I	MI73
8979.148	11133.865		7 L	*113716* – 122695	3 – 4	Ar I	MI73
8991.348	11118.757		8 L	*113716* – 122707	3 – 3	Ar I	MI73
9001.300	11106.464		20 L	*113716* – 122717	3 – 4	Ar I	MI73
9016.55	11087.68		1 L	200234 – *209251*	2½ – 2½	Ar II	MI63
9032.22	11068.44		1 L	190106 – *199138*	1½ – 1½	Ar II	MI63
9032.640	11067.929	0.02	2 L	187589 – *196621*	2½ – 3½	Ar II	MI63
9062.59	11031.35		0 L	195866 – *204929*	1½ – ½	Ar II	MI63
9064.85	11028.60		2 L	*113643* – 122708	1 – 2	Ar I	MI73
9102.999	10982.382	0.02	2 L	200234 – *209337*	2½ – 3½	Ar II	MI63
9109.68	10974.33		1 L	200138 – *209248*	3½ – 3½	Ar II	MI63
9110.12	10973.80		2 L	186171 – *195281*	½ – ½	Ar II	MI63
9126.37	10954.260	0.02	2 L	186171 – *195976*	½ – 1½	Ar II	MI63
9152.120	10923.438	0.02	7 L	151087 – *160239*	2½ – 1½	Ar II	MI63
9157.79	10916.67		1 L	*189654* – 198812	2½ – 2½	Ar II	MI63
9160.21	10913.79		0 L	*196089* – 205250	2½ – 3½	Ar II?	MI63
9162.44	10911.14		1 L	*114975* – 124137	1 – 2	Ar I	MI73
9173.57	10897.90		0 L	*196076* – 205249	1½ – 2½	Ar II?	MI63
9197.368	10869.698	0.02	2 L	186815 – *194822*	3½ – 3½	Ar II	MI63
9198.92	10867.87		1 L	186890 – *196089*	2½ – 2½	Ar II	MI63
9199.361	10867.343	0.02	3 L	*200138* – *209338*	3½ – 4½	Ar II	MI63
9217.941	10845.438		2 L	*113468* – 122686	2 – 2	Ar I	MI73
9222.53	10840.04		1 L	*191012* – 200234	1½ – 2½	Ar II	MI63
9224.74	10837.45		1 L	*114821* – 124046	3 – 4	Ar I	MI73
9229.46	10831.90		1 L	*114821* – 124051	3 – 3	Ar I	MI73
9231.55	10829.452	0.02	3 L	150474 – *159706*	1½ – ½	Ar II	MI63
9236.19	10824.01		1 L	*114805* – 124041	2 – 2	Ar I?	MI73
9236.19	10824.01		1 L	*114821* – 124058	3 – 4	Ar I?	MI73
9239.436	10820.207		6 L	*113468* – 122707	2 – 3	Ar I	MI73
9239.75	10819.84		0 LP	*113468* – 122708	2 – 2	Ar I	MI73
9241.44	10817.858	0.02	1 L	199679 – *208921*	2½ – 2½	Ar II	MI63
9242.61	10816.49		1 L	*183090* – *192333*	1½ – ½	Ar II	MI63
9245.680	10812.901	0.02	12 L	150147 – *159393*	2½ – 1½	Ar II	MI63
9260.11	10796.05		3 LH	*113426* – 122686	2 – 1	Ar I	MI73
9269.49	10785.13		1 L	200138 – *209251*	1½ – 2½	Ar II	MI63
9282.160	10770.404		12 L	*113426* – 122708	2 – 2	Ar I	MI73
9287.356	10764.378	0.02	8 L	186815 – *196103*	3½ – 4½	Ar II	MI63
9291.856	10759.165		20 L	*113426* – 122717	2 – 3	Ar I	MI73
9313.756	10733.866		20 L	*114821* – 124135	3 – 4	Ar I	MI73
9315.28	10732.11		4 L	*114821* – 124137	3 – 3	Ar I	MI73
9325.34	10720.530		1 L	148842 – *158167*	2½ – 1½	Ar II	MI63
9330.50	10714.60		1 L	*114805* – 124135	2 – 3	Ar I	MI73
9332.088	10712.780		15 L	*114805* – 124137	2 – 3	Ar I	MI73
9358.06	10683.050		12 L	147875 – *157233*	2½ – 3½	Ar II	MI63
9374.30	10664.54		1 L	145668 – *155043*	1½ – 2½	Ar II	MI63
9377.42	10660.99		2 L	*190732* – 200110	½ – ½	Ar II	MI63
9396.05	10639.86		1 L	199525 – *208921*	1½ – 2½	Ar II	MI63

Ar—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9397.581	10638.121	0.02	8 L	*189414* – 198812	3½ – 2½	Ar II	MI63
9410.62	10623.38		2 L	*114641* – 124051	2 – 2	Ar I	MI73
9414.097	10619.458	0.02	7 L	186890 – *196305*	2½ – 3½	Ar II	MI63
9417.26	10615.89		1 L	*114641* – 124058	2 – 3	Ar I	MI73
9418.93	10614.01		1 L	*190106* – 199525	1½ – 1½	Ar II	MI63
9424.54	10607.69		0 L	186890 – *196315*	2½ – 2½	Ar II	MI63
9448.47	10580.83		2 L	*190511* – 199959	2½ – 2½	Ar II	MI63
9470.78	10555.90		1 L	*190511* – 199981	2½ – 1½	Ar II	MI63
9476.87	10549.12		1 L	199446 – *208923*	½ – 1½	Ar II	MI63
9483.671	10541.552	0.02	5 L	*189654* – 199138	2½ – 1½	Ar II	MI63
9489.10	10535.52		2 L	200138 – *196305*	3½ – 3½	Ar II	MI63
9494.677	10529.332		20 L	*114641* – 124135	2 – 3	Ar I	MI73
9496.427	10527.392		4 L	*114641* – 124137	2 – 2	Ar I	MI73
9503.542	10519.510		9 L	185624 – *195128*	3½ – 4½	Ar II	MI63
9505.89	10516.91		0 L	179931 – *189437*	1½ – ½	Ar II?	MI63
9515.314	10506.495		25 L	*112138* – 121654	2 – 3	Ar I	MI73
9515.64	10506.13		2 LP	*112138* – 121654	2 – 2	Ar I	MI73
9521.008	10500.212	0.02	6 L	*190511* – 200032	2½ – 1½	Ar II	MI63
9524.882	10495.941	0.02	2 L	*190507* – 200032	1½ – 1½	Ar II	MI63
9544.99	10473.83		1 L	*113716* – 123261	3 – 2	Ar I	MI73
9551.06	10467.173	0.02	20 L	149179 – *173393*	3½ – 2½	Ar II	MI63
9568.797	10447.771	0.02	2 L	199679 – *209248*	2½ – 3½	Ar II	MI63
9573.56	10442.57		1 L	*190106* – 199679	1½ – 2½	Ar II	MI63
9575.451	10440.511	0.02	6 L	181594 – *191169*	2½ – 1½	Ar II	MI63
9577.44	10438.34		1 L	*113643* – 123220	1 – 2	Ar I	MI73
9603.03	10410.53		2 L	*190507* – 200110	1½ – ½	Ar II	MI63
9606.10	10407.20		1 L	190592 – *196076*	1½ – 1½	Ar II	MI63
9611.36	10401.510	0.02	1 L	*191012* – 200623	1½ – ½	Ar II	MI63
9614.68	10397.91		1 L	*113020* – 122635	3 – 2	Ar I	MI73
9619.591	10392.604	0.02	5 L	186470 – *196089*	1½ – 2½	Ar II	MI63
9627.66	10383.900	0.02	1 L	*190511* – 200138	2½ – 3½	Ar II	MI63
9640.49	10370.08		1 L	*190511* – 201345	2½ – 1½	Ar II	MI63
9644.32	10365.96		0 LH	*190507* – 200151	1½ – 1½	Ar II	MI63
9652.220	10357.472		2 L	*111818* – 121470	1 – 0	Ar I	MI73
9675.337	10332.725		20 L	*113020* – 122695	3 – 4	Ar I	MI73
9681.06	10326.62		1 L	*190942* – 200623	½ – ½	Ar II	MI63
9682.26	10325.34		1 L	145668 – *155351*	1½ – 1½	Ar II	MI63
9683.41	10324.11		1 L	*114975* – 124658	1 – 2	Ar I	MI73
9687.54	10319.71		2 LP	*113020* – 122707	3 – 3	Ar I	MI73
9687.76	10319.47		1 LP	*113020* – 122708	3 – 2	Ar I	MI73
9697.473	10309.139		12 L	*113020* – 122717	3 – 3	Ar I	MI73
9700.79	10305.616	0.02	1 L	*189437* – 199138	½ – 1½	Ar II	MI63
9703.46	10302.78		1 L	*113468* – 123171	2 – 1	Ar I	MI73
9706.947	10299.077	0.02	5 L	185093 – *194800*	4½ – 4½	Ar II	MI63
9727.52	10277.30		0 L	*190507* – 200234	1½ – 2½	Ar II?	MI63
9728.90	10275.84		0 L	185093 – *194822*	4½ – 3½	Ar II	MI63
9730.934	10273.689	0.02	5 L	186890 – *196621*	2½ – 3½	Ar II	MI63
9736.023	10268.320	0.02	2 L	*203197* – 212933	3½ – 2½	Ar II	MI63
9737.30	10266.97		2 L	*113468* – 123205	2 – 3	Ar I	MI73
9741.81	10262.22		2 L	*113643* – 123385	1 – 0	Ar I	MI73
9742.00	10262.02		0 LB	186890 – *196633*	2½ – 2½	Ar II	MI63
9771.685	10230.845	0.02	4 L	*189040* – 198812	1½ – 2½	Ar II	MI63
9781.12	10220.980	0.02	1 L	*203151* – 212932	2½ – 1½	Ar II	MI63
9793.06	10208.52		1 L	*113468* – 123261	2 – 2	Ar I	MI73
9794.61	10206.90		1 L	*113426* – 123220	2 – 2	Ar I	MI73
9797.472	10203.917	0.02	5 L	147875 – *157673*	2½ – 2½	Ar II	MI63
9807.27	10193.72		1 L	*160239* – 201781	1½ – 2½	Ar II	MI63
9807.94	10193.02		0 L	148620 – *158428*	1½ – ½	Ar II	MI63
9828.93	10171.26		1 L	*113426* – 123254	2 – 1	Ar I	MI73
9836.14	10163.80		0 L	*190196* – 200032	½ – 1½	Ar II?	MI63
9836.556	10163.373		12 L	*111818* – 121654	1 – 2	Ar I	MI73
9853.44	10145.96		1 L	*190106* – 204585	1½ – 2½	Ar II	MI63
9860.78	10138.408	0.02	1 L	*191169* – 201030	1½ – ½	Ar II	MI63
9886.926	10111.585	0.02	8 L	163506 – *173393*	3½ – 2½	Ar II	MI63
9887.841	10110.660	0.02	3 L	148842 – *158730*	2½ – 2½	Ar II	MI63
9893.56	10104.82		4 L	*114147* – 124041	1 – 2	Ar I	MI73

Ar—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9899.01	10099.25		0 L	*190507* – 200406	1½ – ½	Ar II?	MI63
9903.903	10094.262		4 L	*114147* – 124051	1 – 2	Ar I	MI73
9905.12	10093.016	0.02	1 L	186171 – *196076*	½ – 1½	Ar II	MI63
9914.17	10083.81		0 L	*190196* – 200110	½ – ½	Ar II	MI63
9945.483	10052.059		25 L	*112750* – 122695	4 – 5	Ar I	MI73
9957.75	10039.68		2 L	*112750* – 122707	4 – 3	Ar I	MI73
9961.44	10035.96		1 L	151087 – *161048*	2½ – 1½	Ar II	MI63
9967.697	10029.658		10 L	*112750* – 122717	4 – 4	Ar I	MI73
9975.036	10022.278	0.02	4 L	186340 – *194861*	1½ – 2½	Ar II	MI63
9983.87	10013.41		1 L	*209338* – 219322	4½ – 5½	Ar II	MI63
9984.16	10013.12		1 L	*209337* – 219322	3½ – 4½	Ar II	MI63
9989.73	10007.54		3 L	*114147* – 124137	1 – 2	Ar I	MI73

Ar References

MI63 Minnhagen, L., Ark. Fys. **25**, 203–283 (1963).
Source: Electrodeless high frequency discharge
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in λ: For wavelengths given to three decimal places the uncertainty is given as 0.02 Å

HU73 Humphreys, C. J., J. Phys. Chem. Ref. Data **2**, 519–527 (1973).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1 m Littrow spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given—observed wavenumbers calculated from established energy levels

MI73 Minnhagen, L., J. Opt. Soc. Amer. **63**, 1185–1198 (1973).
Source: Electrodeless high frequency discharge
Instrument: 6.3 m Wadsworth spectrograph
Detector: Photographic
Uncertainty in λ: Given as better than 0.01 Å for wavelengths given to three decimal places

Additional References

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Sittner, W. R., and Peck, E. R., J. Opt. Soc. Amer. **39**, 474 (1949).
Humphreys, C. J., and Kostkowski, H. J., J. Res. Nat. Bur. Stds. **49**, 73 (1952).
Hepner, G., Compt. rend. **248**, 8 (1959).
Paul Jr., E., and Humphreys, C. J., J. Opt. Soc. Amer. **49**, 1186 (1959).
Humphreys, C. J., and Paul, E., Jr., NAVWEPS report 5996, 23 (1960).
Humphreys, C. J., and Paul, E., Jr., Cowan, R. D., and Andrew, K. L., J. Opt. Soc. Amer. **57**, 855 (1967).
Li, H., and Humphreys, C. J., J. Opt. Soc. Amer. **64**, 1072 (1974).

Arsenic

As, Z = 33

As I Normal state of valence electrons $4s^24p^3\ {}^4S^\circ_{3/2}$ I.P. = 79165 cm^{-1}

As II Normal state of valence electrons $4s^24p^2\ {}^3P_0$ I.P. = 150290 cm^{-1}

As

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9035.903	11063.932		2	*122842* – 131878	3 – 4	As II	AN71
9139.022	10939.094		1	102392 – *111531*	2 – 2	As II	AN71
9242.974	10816.066		1	*111531* – 120774	2 – 1	As II	AN71
9521.683	10499.468		2	121625 – *131146*	2 – 3	As II	AN71
9631.010	10380.28		2	121816 – *131447*	0 – 1	As II	AN71
9649.357	10360.546		5	*89549* – 99199	3 – 3	As II	AN71
9674.561	10333.554		2	121472 – *131146*	2 – 3	As II	AN71
9690.43	10316.64		10	124965 – *134655*	2 – 3	As II	AN71
9854.912	10144.443		10	99181 – *109036*	1 – 1	As II	AN71
9989.585	10007.682		1	*111531* – 121521	2 – 3	As II	AN71

As Reference

AN71 Hui Li and Andrew, K. L., J. Opt. Soc. Amer. **61**, 96–109 (1971).
Source: Electrodeless dischange tube (2.45 GHz)
Instrument: 9 m Paschen-Runge spectrograph
Detector: Photographic
Uncertainty in λ: Stated as being between 0.006 Å and 0.01 Å

Barium

Ba, Z = 56

Ba I Normal state of valence electrons $5p^6 6s^2\ {}^1S_0$ I.P. = 42035 cm^{-1}

Ba II Normal state of valence electrons $5p^6 6s\ {}^2S_{1/2}$ I.P. = 80687 cm^{-1}

Ba

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3231.96	30932.6		100	9033 – *12266*	1 – 0	Ba I	PA76
3258.02	30685.1		27	20934 – *24192*	2 – 1	Ba I	PA76
3281.29	30467.5		41	21250 – *24531*	3 – 2	Ba I	PA76
3356.16	29787.8		62	21623 – *24979*	4 – 3	Ba I	PA76
3602.66	27749.7		12	9033 – *12636*	1 – 1	Ba I	PA76
3729.62	26805.1		9	21250 – *24979*	3 – 3	Ba I	PA76
8412.01	11884.51		5 H	*24531* – 32943	2 – 2	Ba I	RU55
8546.53	11697.45		40 H	*24979* – 33526	3 – 3	Ba I	RU55
8612.86	11607.36		30 H	*24192* – 32804	1 – 1	Ba I	RU55
8631.0	11583.0		1 H	*22064* – 30695	2 – 1	Ba I	RU55
8751.52	11423.46		20 H	*24192* – 32943	1 – 2	Ba I	RU55
8766.51	11403.92		2			Ba	RU55
8789.67	11373.88		5 H	*25704* – 34493	1 – 0	Ba I	RU55
8844.75	11303.04		80	9215 – *18060*	2 – 1	Ba I	RU55
8866.93	11274.77		10	*25956* – 34823	2 – 1	Ba I	RU55
8880.7	11257.3		2 H	*28554* – 37434	1 – 2	Ba I	RU55
8991.7	11118.3		1 H			Ba	RU55
8994.85	11114.42		50 H	*24531* – 33526	2 – 3	Ba I	RU55
9026.3	11075.7		3	9033 – *18060*	1 – 1	Ba I	RU55
9077.95	11012.69		60 HU	*26816* – 35894	3 – 3	Ba I	RU55
9119.39	10962.65		20	*25704* – 34823	1 – 1	Ba I	RU55
9159.32	10914.85		3			Ba	RU55
9181.36	10888.65		30	*25642* – 34823	0 – 1	Ba I	RU55
9264.23	10791.25		40 HU	*24531* – 33795	2 – 2	Ba I	RU55
9283.2	10769.2		4 H	*28554* – 37837	1 – 2	Ba I	RU55
9387.90	10649.10		30 H	*25956* – 35344	2 – 2	Ba I	RU55
9484.97	10540.10		8	23062 – *32547*	2 – 1	Ba I	RU55
9532.7	10487.3		2 H	*26816* – 36348	3 – 4	Ba I	RU55
9547.34	10471.26		100	*13514* – 23062	2 – 2	Ba I	RU55
9603.8	10409.7		3 H	*24192* – 33795	1 – 2	Ba I	RU55
9640.23	10370.35		10 H	*25704* – 35344	1 – 2	Ba I	RU55
9680.3	10327.4		3			Ba	RU55
9730.59	10274.06		50 H	*23074* – 32804	2 – 1	Ba I	RU55
9769.41	10233.23		400 H	*23757* – 33526	4 – 3	Ba I	RU55
9812.55	10188.24		50 H	*26816* – 36628	3 – 3	Ba I	RU55
9852.5	10146.9		5 H			Ba	RU55
9869.25	10129.70		10	*23074* – 32943	2 – 2	Ba I	RU55
9883.4	10115.2		5 H			Ba	RU55
9965.27	10032.10		200	*13514* – 23480	2 – 1	Ba I	RU55
9996.18	10001.08		300	*22947* – 32943	3 – 2	Ba I	RU55

Ba References

RU55 Russell, H. N., and Moore, C. E., J. Res. Nat. Bur. Stds. **55**, 299–304 (1955). Information gathered from existing literature references.

PA76 Palenius, H. P., Physics Letters **56A**, 451–452 (1976).
Source: Hollow cathode
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given

Beryllium

Be, Z = 4

Be I Normal state of valence electrons $2s^2\ {}^1S_0$ I.P. = 75192 cm^{-1}

Be II Normal state of valence electrons $2s\ {}^2S_{1/2}$ I.P. = 146883 cm^{-1}

Be

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3145.90	31778.70	0.01	5 LB	*58907* – 62053	2 –	Be I	HO69
3146.27	31775.05	0.01	4 LB	*58907* – 62053		Be I	HO69
3304.90	30249.89	0.01	4 L	56882 – *60187*	2 – 1	Be I	HO69
5057.99	19765.29	0.01	4 L	*60187* – 65245	1 – 0	Be I	HO69
5510.10	18143.54	0.02	6 L	54677 – *60187*	0 – 1	Be I	JH62
5598.63	17856.63	0.01	3 L	*58907* – 64506	2 – 1	Be I	HO69
5599.02	17855.38	0.01	2 LB	*58907* – 64506	– 1	Be I	HO69
6187.30	16157.72	0.01	5 LB	62053 – *68241*		Be I	HO69
6826.52	14644.75	0.02	5 LB	52080 – *58907*	1 –	Be I	JH62
6826.91	14643.92	0.02	6 L	52080 – *58907*	1 – 2	Be I	JH62
8263.450	12098.180	0.02	4 L	88231 – *96495*	½ – ½	Be II	JH61
8265.370	12095.360	0.02	6 L	88231 – *96497*	½ – 1½	Be II	JH61
8573.80	11660.25	0.02	1 L	*118761* – *127335*	1½ – ½	Be II	HO69
8599.68	11625.16	0.02	1 LD			Be II	HO69
8696.00	11496.39	0.02	3 LB	62053 – *70749*		Be I	HO69
8947.11	11173.73	0.02	0 LB	*128972* – 137919	1½ –	Be II	HO69
9033.84	11066.46	0.02	4 LB	*58907* – 67941	2 –	Be I	JH62
9034.17	11066.06	0.02	3 LB	*58907* – 67941		Be I	JH62
9676.93	10331.03	0.02	2 LB	62053 – *71730*		Be I	HO69
9878.800	10119.920	0.02	5 L	*119446* – 129325		Be II	JH61
9902.460	10095.730	0.02	3 L	119421 – *129323*	2½ – 3½	Be II	JH61
9902.670	10095.520	0.02	2 L	119421 – *129323*	1½ – 2½	Be II	JH61

Be References

JH61 Johansson, L., Ark. Fys. **20**, 489–498 (1961).
Source: Hollow cathode
Instrument: 21′ Jarrell-Ash grating spectrograph
Detector: Photographic

JH62 Johansson, L., Ark. Fys. **23**, 119–128 (1962).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer
b) 21′ Jarrell-Ash grating spectrograph
Detector: a) PbS
b) Photographic

HO69 Holmström, J. E., and Johansson, L., Ark. Fys. **40**, 133–138 (1969).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer
b) 3 m Czerny-Turner spectrograph
Detector: a) PbS cooled with liquid nitrogen
b) Photographic

Boron

B, Z = 5

B I Normal state of valence electrons $2s^2 2p\ ^2P^o_{1/2}$ I.P. = 66928 cm^{-1}

B II Normal state of valence electrons $2s^2\ ^1S_0$ I.P. = 202887 cm^{-1}

B

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2776.199	36010.65	0.01	25	55010 – *57786*	½ – ½	B I	LI70
2776.835	36002.41	0.01	50	55010 – *57787*	½ – 1½	B I	LI70
3018.740	33117.37	0.01	10	54767 – *57786*	1½ – ½	B I	LI70
3019.225	33112.05	0.01	16 B	54767 – *57787*	– 1½	B I	LI70
5263.291	18994.333	0.01	560 B	54767 – *60031*		B I	LI70
6154.184	16244.670	0.01	650 B	*48613* – 54767	1½ –	B I	LI70
6155.812	16240.375	0.01	400	*48611* – 54767	½ – 1½	B I	LI70
6396.582	15629.080	0.01	150	*48613* – 55010	1½ – ½	B I	LI70
6398.368	15624.715	0.01	70	*48611* – *55010*	½ – ½	B I	LI70
7748.784	12901.721	0.01	55 B	54767 – *62516*		B I	LI70
8572.169	11662.467	0.01	3200	40039 – *48611*	½ – ½	B I	LI70
8573.949	11660.045	0.01	6600	40039 – *48613*	½ – 1½	B I	LI70

B Reference

LI70 Litzén, U., Physica Scripta **1**, 251–252 (1970).
Source: Electrodeless discharge (18 MHz)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Gunnvald, P., and Minnhagen, L., Ark. Fys. **22**, 327 (1962).

Bromine

Br, $Z = 35$

Br I Normal state of valence electrons $4s^24p^5\ ^2P^\circ_{3/2}$ I.P. = 95285 cm^{-1}

Br II Normal state of valence electrons $4s^24p^4\ ^3P_2$ I.P. = 175870 cm^{-1}

Br

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2436.02	41039.38		5	*88848* – 91284	2½ – 1½	Br I	HU72
2444.87	40890.82		15	87191 – *89636*	4½ – 3½	Br I	HU72
2454.96	40722.76		40	*85820* – 88275	2½ – 1½	Br I	HU72
2473.71	40414.15		15	*88425* – 90899	1½ – 2½	Br I	HU71
2474.18	40406.39		10	*88424* – 90899	½ – 1½	Br I	HU71
2476.30	40371.82		15	*85799* – 88275	½ – 1½	Br I	HU72
2501.55	39964.36		120 B	*88392* – 90893		Br I	HU71
2517.83	39705.91		25	*76743* – 79260	1½ – 2½	Br I	HU72
2518.62	39693.50		25	*88371* – 90889	2½ – 3½	Br I	HU71
2525.65	39583.05		20 B	*91496* – 94022		Br I?	HU71
2525.94	39578.41		20 B	*88363* – 90889	1½ – 2½	Br I?	HU71
2531.24	39495.50		55	*88351* – 90882	3½ – 4½	Br I	HU71
2531.55	39490.74		35	*88350* – 90882	2½ – 3½	Br I	HU71
2541.14	39341.75		45	*88340* – 90881	3½ – 4½	Br I	HU71
2542.70	39317.60		70	*88339* – 90881	4½ – 5½	Br I	HU71
2548.77	39223.91		35	*85586* – 88135	1½ – 2½	Br I	HU72
2607.14	38345.75		150	86933 – *89540*	2½ – 1½	Br I	HU72
2615.55	38222.45		10	86933 – *89548*	2½ – 2½	Br I	HU72
2663.69	37531.67		30	*79178* – 81842	1½ – 1½	Br I	HU72
2689.19	37175.78		50	*85586* – 88275	1½ – 1½	Br I	HU72
2698.10	37053.01		15	83101 – *85799*	½ – ½	Br I	HU72
2753.32	36309.89		25	*78676* – 81429	1½ – ½	Br I	HU72
2780.55	35954.30		35	86768 – *89548*	3½ – 2½	Br I	HU72
2786.32	35879.85		25	75890 – *78676*	2½ – 1½	Br I	HU72
2793.54	35787.11		10	*79868* – 82661	½ – 1½	Br I	HU72
2852.90	35042.50		10	86933 – *89786*	2½ – 1½	Br I	HU72
2861.85	34932.90		8	85576 – *88438*	½ – 1½	Br I	HU72
2865.25	34891.45		15	82661 – *85526*	1½ – 2½	Br I	HU72
2867.89	34859.33		10	86279 – *89147*	½ – ½	Br I	HU72
2924.73	34181.87		150	82661 – *85586*	1½ – 1½	Br I	HU72
3057.84	32693.90		120	*79178* – 82236	1½ – 2½	Br I	HU72
3081.34	32444.56		10	87769 – *90851*	1½ – 2½	Br I	HU72
3091.86	32334.17		50	87754 – *90846*	2½ – 3½	Br I	HU72
3096.38	32286.97		60 B	87754 – *90851*	2½ –	Br I	HU72
3099.68	32252.60		40	87769 – *90869*	1½ – 2½	Br I	HU72
3114.72	32096.86		5	87754 – *90869*	2½ – 2½	Br I	HU72
3121.60	32026.12		15	87769 – *90891*	1½ – 1½	Br I	HU72
3137.62	31862.60		300	82661 – *85799*	1½ – ½	Br I	HU72
3158.96	31647.36		15	82661 – *85820*	1½ – 2½	Br I	HU72
3160.68	31630.13		600	*78511* – 81672	2½ – 2½	Br I	HU72
3233.06	30922.02		6 B	*79868* – 83101	½ – ½	Br I?	HU72
3233.29	30919.82		6 B	85191 – *88424*	1½ – ½	Br I?	HU72
3233.89	30914.08		5	85191 – *88425*	1½ – 1½	Br I	HU72
3261.01	30656.98		110	86279 – *89540*	½ – 1½	Br I	HU72
3277.65	30501.34		150	85435 – *88712*	1½ – ½	Br I	HU72
3282.29	30458.23		200	82661 – *85943*	1½ – 1½	Br I	HU72
3290.65	30380.85		500	82236 – *85526*	2½ – 2½	Br I	HU72
3306.56	30234.66		8	*87259* – 90565	1½ – 2½	Br I	HU72
3330.42	30018.05		6	*78511* – 81842	2½ – 1½	Br I	HU72
3347.45	29865.34		250	*75697* – 79044	2½ – 3½	Br I	HU72
3350.13	29841.45		350	82236 – *85586*	2½ – 1½	Br I	HU72
3353.97	29807.28		40	*78076* – 81429	½ – ½	Br I	HU72
3376.83	29605.50		250	85576 – *88953*	½ – 1½	Br I	HU72
3395.55	29442.28		30	84945 – *88340*	2½ – 3½	Br I	HU72
3405.20	29358.84		40	*79695* – 83101	1½ – ½	Br I	HU72
3405.62	29355.22		15 B	84945 – *88350*	2½ – 2½	Br I?	HU72

Br—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3405.94	29352.46		15 B	84945 – *88351*	2½ – 3½	Br I?	HU72
3412.68	29294.49		300	85435 – *88848*	1½ – 2½	Br I	HU72
3433.76	29114.65		100	87440 – *90873*	3½ – 4½	Br I	HU72
3454.91	28936.42		20	85576 – *89031*	½ – 1½	Br I	HU72
3483.24	28701.07		5	*79178* – 82661	1½ – 1½	Br I	HU72
3485.40	28683.29		30	86279 – *89764*	½ – ½	Br I	HU72
3506.77	28508.49		80	86279 – *89786*	½ – 1½	Br I	HU72
3523.00	28377.16		350	*75521* – 79044	3½ – 3½	Br I	HU72
3526.81	28346.50		500	82236 – *85762*	2½ – 3½	Br I	HU72
3559.52	28086.01		60	*78676* – 82236	1½ – 2½	Br I	HU72
3563.86	28051.81		120	*75697* – 79260	2½ – 2½	Br I	HU72
3570.37	28000.66		80	85576 – *89147*	½ – ½	Br I	HU72
3596.51	27797.15		150	85435 – *89031*	1½ – 1½	Br I	HU72
3599.28	27775.76		20 B	84825 – *88424*	½ – ½	Br I?	HU72
3599.88	27771.13		20 B	84825 – *88425*	½ – 1½	Br I?	HU72
3626.47	27567.50		15	86279 – *89905*	½ – ½	Br I	HU72
3653.58	27362.95		10	87191 – *90845*	4½ – 4½	Br I	HU72
3681.73	27153.74		60 B	87191 – *90873*	4½ – 5½	Br I?	HU72
3681.81	27153.15		60 B	87191 – *90873*	4½ – 4½	Br I?	HU72
3684.80	27131.11		350	81842 – *85526*	1½ – 2½	Br I	HU72
3707.69	26963.62		200	82236 – *85943*	2½ – 1½	Br I	HU72
3719.65	26876.92		4	87131 – *90851*	1½ – 2½	Br I	HU72
3724.57	26841.41		8	*78511* – 82236	2½ – 2½	Br I	HU72
3739.41	26734.89		250	*75521* – 79260	3½ – 2½	Br I	HU72
3766.02	26545.99		10	*78076* – 81842	½ – 1½	Br I	HU72
3805.56	26270.17		15	75890 – *79695*	2½ – 1½	Br I	HU72
3816.67	26193.70		70	*75814* – 79630	½ – 1½	Br I	HU72
3882.61	25748.85		120	*79695* – 83578	1½ – 1½	Br I	HU72
3914.02	25542.21		30	81672 – *85586*	2½ – 1½	Br I	HU72
3922.76	25485.30		120	*79178* – 83101	1½ – ½	Br I	HU72
3933.62	25414.94		140	*75697* – 79630	2½ – 1½	Br I	HU72
3957.17	25263.69		25	81842 – *85799*	1½ – ½	Br I	HU72
3959.50	25248.82		60	75908 – *79868*	1½ – ½	Br I	HU72
3978.51	25128.18		40	81842 – *85820*	1½ – 2½	Br I	HU72
4008.60	24939.56		10	84945 – *88953*	2½ – 1½	Br I	HU72
4027.19	24824.44		80	*79695* – 83723	1½ – 2½	Br I	HU72
4034.95	24776.69		25	84305 – *88340*	2½ – 3½	Br I	HU72
4045.02	24715.01		20 B	84305 – *88350*	2½ – 3½	Br I?	HU72
4045.34	24713.06		20 B	84305 – *88351*	2½ – 3½	Br I?	HU72
4078.13	24514.35		20	*88438* – 92516	1½ – 1½	Br I	HU72
4083.02	24484.99		6 B	86768 – *90851*	3½ –	Br I	HU72
4090.70	24439.02		140	81672 – *85762*	2½ – 3½	Br I	HU72
4097.72	24397.16		20	*85762* – 89860	3½ – 3½	Br I	HU72
4101.84	24372.65		150	81842 – *85943*	1½ – 1½	Br I	HU72
4143.10	24129.93		5	*85586* – 89729	1½ – ½	Br I	HU72
4148.25	24099.97		2	81672 – *85820*	2½ – 2½	Br I	TE63
4156.33	24053.12		8	81429 – *85586*	½ – 1½	Br I	HU72
4212.40	23732.96		40	*75814* – 80026	½ – ½	Br I	TE63
4235.37	23604.25		80	*78865* – 83101	½ – ½	Br I	HU72
4251.78	23513.15		206	*75009* – 79260	1½ – 2½	Br I	TE63
4271.58	23404.15		12	81672 – *85943*	2½ – 1½	Br I	TE63
4281.39	23350.53		20	*85586* – 89867	1½ – 1½	Br I	HU72
4333.88	23067.72		40	*85526* – 89860	2½ – 3½	Br I	HU72
4340.87	23030.57		10	*85526* – 89867	2½ – 1½	Br I	HU72
4353.75	22962.44		15	87191 – *91545*	4½ – 3½	Br I	HU72
4369.22	22881.14		30	81429 – *85799*	½ – ½	Br I	HU72
4372.18	22865.65		950	*74672* – 79044	2½ – 3½	Br I	TE63
4400.17	22720.19		60	*79178* – 83578	1½ – 1½	Br I	TE63
4411.07	22664.05		10	*85943* – 90354	1½ – 2½	Br I	HU72
4421.15	22612.38		50	*85526* – 89947	2½ – 2½	Br I	HU72
4424.44	22595.56		20	*78676* – 83101	1½ – ½	Br I	HU72
4445.72	22487.41		20	81081 – *85526*	3½ – 2½	Br I	HU72
4481.91	22305.83		30	*85762* – 90244	3½ – 4½	Br I	HU72
4513.89	22147.80		50	81429 – *85943*	½ – 1½	Br I	HU72
4542.25	22009.51		10	84305 – *88848*	2½ – 2½	Br I	HU72
4544.75	21997.41		40	*79178* – 83723	1½ – 2½	Br I	HU72

Br—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4585.57	21801.59		6	*78076* – 82661	½ – 1½	Br I	TE63
4588.59	21787.24		469	*74672* – 79260	2½ – 2½	Br I	TE63
4597.72	21743.98		14	82661 – *87259*	1½ – 1½	Br I	TE63
4609.87	21686.67		20	*79695* – 84305	1½ – 2½	Br I	HU72
4621.54	21631.91		359	*75009* – 79630	1½ – 1½	Br I	TE63
4627.70	21603.11		70 B	83723 – *88350*	2½ – 2½	Br I?	HU72
4628.02	21601.62		70 B	83723 – *88351*	2½ – 3½	Br I?	HU72
4648.24	21507.65		80	83723 – *88371*	2½ – 2½	Br I	HU72
4681.88	21353.11		5	81081 – *85762*	3½ – 3½	Br I	HU72
4686.89	21330.29		37	*76743* – 81429	1½ – ½	Br I	TE63
4696.70	21285.74		17	*87225* – 91921	3½ – 4½	Br I	TE63
4712.78	21213.11		14	*78865* – 83578	½ – 1½	Br I	TE63
4727.95	21145.04		20	86768 – *91496*	3½ – 4½	Br I	HU72
4728.86	21140.98		5	86768 – *91497*	3½ – 3½	Br I	HU72
4739.43	21093.83		43	81081 – *85820*	3½ – 2½	Br I	TE63
4773.39	20943.75		80	*87225* – 91998	3½ – 3½	Br I	HU72
4785.47	20890.89		35	83578 – *88363*	1½ – 1½	Br I	HU72
4837.46	20666.36		30	82661 – *87499*	1½ – ½	Br I	HU72
4847.24	20624.67		547	*78511* – 83358	2½ – 3½	Br I	TE63
4860.28	20569.33		15	83578 – *88438*	1½ – 1½	Br I	HU72
4899.19	20405.97		7	*79178* – 84077	1½ – 1½	Br I	TE63
4929.20	20281.73		500	*76743* – 81672	1½ – 2½	Br I	TE63
4937.32	20248.38		8	*87061* – 91998	2½ – 3½	Br I	TE63
4958.35	20162.50		138	*74672* – 79630	2½ – 1½	Br I	TE63
4980.32	20073.55		7	83358 – *88339*	3½ – 4½	Br I	TE63
4991.94	20026.82		30 B	83358 – *88350*	3½ – 2½	Br I?	HU72
4992.26	20025.54		30 B	83358 – *88351*	3½ – 3½	Br I?	HU72
5017.27	19925.72		138	*75009* – 80026	1½ – ½	Br I	TE63
5025.09	19894.71		68	*78076* – 83101	½ – ½	Br I	TE63
5033.34	19862.10		30	83358 – *88392*	3½ – 4½	Br I	HU72
5046.43	19810.58		452	*78676* – 83723	1½ – 2½	Br I	TE63
5066.11	19733.62		3450	*75521* – 80587	3½ – 4½	Br I	TE63
5098.94	19606.57		263	*76743* – 81842	1½ – 1½	Br I	TE63
5127.43	19497.62		313	*79178* – 84305	1½ – 2½	Br I	TE63
5175.37	19317.02		120	80587 – *85762*	4½ – 3½	Br I	TE63
5211.48	19183.17		266 B	*78511* – 83723	2½ – 2½	Br I?	TE63
5211.80	19181.99		266 B	*78865* – 84077	½ – 1½	Br I?	TE63
5249.27	19045.07		547	*79695* – 84945	1½ – 2½	Br I	TE63
5262.88	18995.82		30	83101 – *88363*	½ – 1½	Br I	HU72
5308.76	18831.65		10	83723 – *89031*	2½ – 1½	Br I	HU72
5323.56	18779.29		313	*79868* – 85191	½ – 1½	Br I	TE63
5384.05	18568.31		500	*75697* – 81081	2½ – 3½	Br I	TE63
5400.87	18510.48		180	*78676* – 84077	1½ – 1½	Br I	TE63
5489.17	18212.72		10	83358 – *88848*	3½ – 2½	Br I	TE63
5495.70	18191.08		60	*79695* – 85191	1½ – 1½	Br I	TE63
5502.50	18168.60		100	*78076* – 83578	½ – 1½	Br I	HU72
5559.60	17982.00		40	*75521* – 81081	3½ – 3½	Br I	TE63
5615.97	17801.50		330	*75814* – 81429	½ – ½	Br I	TE63
5766.83	17335.81		25	*79178* – 84945	1½ – 2½	Br I	TE63
5794.16	17254.05		105	*78511* – 84305	2½ – 2½	Br I	TE63
5975.23	16731.19		1800	*75697* – 81672	2½ – 2½	Br I	TE63
6001.52	16657.89		10	*78076* – 84077	½ – 1½	Br I	TE63
6013.26	16625.37		10	*79178* – 85191	1½ – 1½	Br I	TE63
6028.02	16584.66		250	*75814* – 81842	½ – 1½	Br I	TE63
6150.78	16253.66		90	*75521* – 81672	3½ – 2½	Br I	TE63
6257.00	15977.73		47	*79178* – 85435	1½ – 1½	Br I	TE63
6265.91	15955.01		8	79260 – *85526*	2½ – 2½	Br I	TE63
6268.51	15948.40		20	*78676* – 84945	1½ – 2½	Br I	TE63
6291.42	15890.32		2	85191 – *91483*	1½ – 2½	Br I	TE63
6325.39	15804.98		7	79260 – *85586*	2½ – 1½	Br I	TE63
6398.47	15624.47		24 B	*85762* – 92161	3½ – 2½	Br I?	TE63
6398.60	15624.15		24 B	*79178* – 85576	1½ – ½	Br I?	TE63
6408.78	15599.33		18	*74672* – 81081	2½ – 3½	Br I	TE63
6411.38	15593.01		37	*79868* – 86279	½ – ½	Br I	TE63
6420.84	15570.03		219	*75009* – 81429	1½ – ½	Br I	TE63
6433.56	15539.25		3	*78511* – 84945	2½ – 2½	Br I	TE63

Br—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6482.32	15422.36		28	79044 – *85526*	3½ – 2½	Br I	TE63
6508.76	15359.71		22	81842 – *88350*	1½ – 2½	Br I	TE63
6529.30	15311.39		63	81842 – *88371*	1½ – 2½	Br I	TE63
6551.98	15258.39		10	84945 – *91497*	2½ – 3½	Br I	TE63
6582.86	15186.82		188 B	81842 – *88424*	1½ – ½	Br I?	TE63
6583.46	15185.43		188 B	81842 – *88425*	1½ – 1½	Br I?	TE63
6583.52	15185.29		188 B	*79695* – 86279	1½ – ½	Br I?	TE63
6600.56	15146.09		30	84945 – *91545*	2½ – 3½	Br I	TE63
6641.40	15052.95		10	81842 – *88483*	1½ – 2½	Br I	TE63
6663.15	15003.82		35	*75009* – 81672	1½ – 2½	Br I	TE63
6668.43	14991.94		89	81672 – *88340*	2½ – 3½	Br I	TE63
6678.50	14969.33		85 B	81672 – *88350*	2½ – 2½	Br I?	TE63
6678.82	14968.61		85 B	81672 – *88351*	2½ – 3½	Br I?	TE63
6699.04	14923.43		12	81672 – *88371*	2½ – 2½	Br I	TE63
6711.21	14896.37		55	*78865* – 85576	½ – ½	Br I	TE63
6714.67	14888.70		1250	*75521* – 82236	3½ – 2½	Br I	TE63
6843.79	14607.80		21	68970 – *75814*	½ – ½	Br I	TE63
6847.57	14599.73		338	*75814* – 82661	½ – 1½	Br I	TE63
6900.28	14488.21		105	*78676* – 85576	1½ – ½	Br I	TE63
6923.73	14439.14		344	*78511* – 85435	2½ – 1½	Br I	TE63
6964.52	14354.57		1800	*75697* – 82661	2½ – 1½	Br I	TE63
6994.91	14292.20		68 B	81429 – *88424*	½ – ½	Br I?	TE63
6995.51	14290.98		68 B	81429 – *88425*	½ – 1½	Br I?	TE63
7101.08	14078.51		10	*79178* – 86279	1½ – ½	Br I	TE63
7227.04	13833.14		750	*75009* – 82236	1½ – 2½	Br I	TE63
7232.57	13822.56		9 B	84305 – *91538*	2½ – 3½	Br I?	TE63
7232.83	13822.07		9 B	*85762* – 92995	3½ – 2½	Br I?	TE63
7232.89	13821.95		9 B	80026 – *87259*	½ – 1½	Br I?	TE63
7239.96	13808.45		23 B	84305 – *91545*	2½ – 3½	Br I?	TE63
7240.10	13808.19		23 B	*85799* – 93039	½ – 1½	Br I?	TE63
7311.08	13674.13		300	81081 – *88392*	3½ – 4½	Br I	TE63
7359.33	13584.48		30	*78076* – 85435	½ – 1½	Br I	TE63
7413.69	13484.87		9	*78865* – 86279	½ – ½	Br I	TE63
7464.92	13392.33		20	84077 – *91542*	1½ – 2½	Br I	TE63
7488.74	13349.73		36	67183 – *74672*	1½ – 2½	Br I	TE63
7500.93	13328.04		10	*78076* – 85576	½ – ½	Br I	TE63
7563.85	13217.17		1700	*74672* – 82236	2½ – 2½	Br I	TE63
7652.44	13064.15		110	*75009* – 82661	1½ – 1½	Br I	TE63
7661.79	13048.21		38	*75697* – 83358	2½ – 3½	Br I	TE63
7751.55	12897.12		48	80587 – *88339*	4½ – 4½	Br I	TE63
7772.87	12861.74		30	68970 – *76743*	½ – 1½	Br I	TE63
7774.06	12859.77		30	83723 – *91497*	2½ – 3½	Br I	TE63
7804.57	12809.50		400	80587 – *88392*	4½ – 5½	Br I	TE63
7804.57	12809.50		1	80587 – *88392*	4½ – 5½	Br I	TE63
7837.34	12755.94		60	*75521* – 83358	3½ – 3½	Br I	TE63
7904.51	12647.55		10	83578 – *91483*	1½ – 2½	Br I	TE63
7989.25	12513.40		20	*74672* – 82661	2½ – 1½	Br I	TE63
8082.52	12368.99		170	*76743* – 84825	1½ – ½	Br I	TE63
8082.55	12368.95		1 W	*76743* – 84825	1½ – ½	Br I	TE63
8091.96	12354.56		40	*75009* – 83101	1½ – ½	Br I	TE63
8092.05	12354.43		1	*75009* – 83101	1½ – ½	Br I	TE63
8125.26	12303.93		275	66883 – *75009*	½ – 1½	Br I	TE63
8125.29	12303.89		35	66883 – *75009*	½ – 1½	Br I	TE63
8137.40	12285.57		2	83358 – *91496*	3½ – 4½	Br I	TE63
8256.63	12108.16		14 B	*78676* – 86933	1½ – 2½	Br I?	TE63
8256.68	12108.09		14 B	*78511* – 86768	2½ – 3½	Br I?	TE63
8265.93	12094.54		3	*78865* – 87131	½ – 1½	Br I	TE63
8270.30	12088.15		2			Br	TE63
8337.61	11990.57		15	80026 – *88363*	½ – 1½	Br I	TE63
8381.26	11928.11		8	83101 – *91482*	½ – 1½	Br I	TE63
8398.51	11903.61		8	80026 – *88424*	½ – ½	Br I	TE63
8399.09	11902.79		5	80026 – *88425*	½ – 1½	Br I	TE63
8412.41	11883.95		4	80026 – *88438*	½ – 1½	Br I	TE63
8421.75	11870.77		4	*78511* – 86933	2½ – 2½	Br I	TE63
8448.53	11833.14		1	*76743* – 85191	1½ – 1½	Br I	TE63
8458.35	11819.40		2			Br	TE63

Br—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8464.88	11810.29		1 B	83723 – *92187*	2½ –	Br I	TE63
8467.73	11806.31		1	81081 – *89548*	3½ – 2½	Br I	TE63
8513.49	11742.85		400	67183 – *75697*	1½ – 2½	Br I	TE63
8569.43	11666.20		20 D	*75009* – 83578	1½ – 1½	Br I	TE63
8588.02	11640.94		1	81081 – *89669*	3½ – 2½	Br I	TE63
8591.61	11636.08		1	*79178* – 87769	1½ – 1½	Br I	TE63
8595.12	11631.33		2	*78676* – 87271	1½ – ½	Br I	TE63
8620.08	11597.64		1	*78511* – 87131	2½ – 1½	Br I	TE63
8630.45	11583.71		10	67183 – *75814*	1½ – ½	Br I	TE63
8686.65	11508.77		30	80026 – *88712*	½ – ½	Br I	TE63
8692.28	11501.31		1	*76743* – 85435	1½ – 1½	Br I	TE63
8720.13	11464.58		35	79630 – *88350*	1½ – 2½	Br I	TE63
8733.32	11447.27		18	79630 – *88363*	1½ – 1½	Br I	TE63
8740.69	11437.61		9	79630 – *88371*	1½ – 2½	Br I	TE63
8794.24	11367.97		4 W	79630 – *88424*	1½ – ½	Br I	TE63
8794.79	11367.25		4 W	79630 – *88425*	1½ – 1½	Br I	TE63
8808.13	11350.04		65	79630 – *88438*	1½ – 1½	Br I	TE63
8826.85	11325.97		1			Br	TE63
8833.90	11316.93		10 W	*76743* – 85576	1½ – ½	Br I	TE63
8852.86	11292.69		2	79630 – *88483*	1½ – 2½	Br I	TE63
8888.43	11247.50		2	*78865* – 87754	½ – ½	Br I	TE63
8906.18	11225.08		250	*74672* – 83578	2½ – 1½	Br I	TE63
8928.41	11197.14		3	*78511* – 87440	2½ – 3½	Br I	TE63
8930.12	11194.99		100	66883 – *75814*	½ – ½	Br I	TE63
8956.74	11161.72		1 W	*79178* – 88135	1½ – 2½	Br I	TE63
9005.44	11101.36		1	80026 – *89031*	½ – 1½	Br I	TE63
9006.02	11100.65		1	82661 – *91667*	1½ – 1½	Br I	TE63
9009.31	11096.59		20	81842 – *90851*	1½ – 2½	Br I	TE63
9011.22	11094.24		100	*75814* – 84825	½ – ½	Br I?	TE63
9011.81	11093.51		250	*75814* – 84825	½ – ½	Br I?	TE63
9027.62	11074.08		40	81842 – *90869*	1½ – 2½	Br I	TE63
9049.25	11047.62		17	80587 – *89636*	4½ – 3½	Br I	TE63
9049.58	11047.21		10	84945 – *93994*	2½ – 3½	Br I?	TE63
9049.58	11047.21		10	81842 – *90891*	1½ – 1½	Br I?	TE63
9050.79	11045.74		800 D	*74672* – 83723	2½ – 2½	Br I	TE63
9055.66	11039.80		60	*78076* – 87131	½ – 1½	Br I	TE63
9068.43	11024.25		10	*75009* – 84077	1½ – 1½	Br I	TE63
9073.12	11018.55		1	84945 – *94018*	2½ – 2½	Br I	TE63
9077.51	11013.22		20	*78676* – 87754	1½ – ½	Br I	TE63
9078.26	11012.31		5	*78676* – 87754	1½ – 2½	Br I	TE63
9079.79	11010.45		600	79260 – *88340*	2½ – 3½	Br I	TE63
9082.29	11007.42		10	79630 – *88712*	1½ – ½	Br I	TE63
9089.84	10998.28		400	79260 – *88350*	2½ – 2½	Br I	TE63
9090.20	10997.85		600	79260 – *88351*	2½ – 3½	Br I	TE63
9095.76	10991.12		2	83723 – *92818*	2½ – 1½	Br I	TE63
9097.10	10989.51		1	*79178* – 88275	1½ – 1½	Br I	TE63
9103.07	10982.30		100	79260 – *88363*	2½ – 1½	Br I	TE63
9105.80	10979.00		300	68970 – *78076*	½ – ½	Br I	TE63
9110.38	10973.48		500	79260 – *88371*	2½ – 2½	Br I	TE63
9120.51	10961.30		3	83101 – *92221*	½ – 1½	Br I	TE63
9120.90	10960.83		2 W	80026 – *89147*	½ – ½	Br I	TE63
9131.68	10947.89		1	83101 – *92232*	½ – ½	Br I	TE63
9132.00	10947.50		1	83101 – *92233*	½ – 1½	Br I	TE63
9164.55	10908.62		60 D	79260 – *88425*	2½ – 1½	Br I	TE63
9174.50	10896.79		200	81672 – *90846*	2½ – 3½	Br I	TE63
9177.87	10892.79		100	79260 – *88438*	2½ – 1½	Br I	TE63
9179.02	10891.43		250 B	81672 – *90851*	2½ –	Br I	TE63
9195.74	10871.62		90	*78076* – 87271	½ – ½	Br I	TE63
9197.37	10869.70		100	81672 *90869*	2½ – 2½	Br I	TE63
9217.36	10846.12		10	79630 – *88848*	1½ – 2½	Br I	TE63
9219.28	10843.86		2 W	81672 – *90891*	2½ – 1½	Br I	TE63
9222.52	10840.05		500 D	79260 – *88483*	2½ – 2½	Br I	TE63
9243.33	10815.65		6	*78511* – 87754	2½ – 2½	Br I	TE63
9246.90	10811.47		1 W	82236 – *91483*	2½ – 2½	Br I	TE63
9248.12	10810.05		300	*75697* – 84945	2½ – 2½	Br I	TE63
9252.95	10804.40		3	82236 – *91489*	2½ – 2½	Br I	TE63

Br—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9258.36	10798.09		25	*78511* – 87769	2½ – 1½	Br I	TE63
9260.93	10795.10		10	82236 – *91497*	2½ – 3½	Br I?	TE63
9261.08	10794.92		5	82236 – *91497*	2½ – 3½	Br I?	TE63
9293.06	10757.77		6	82236 – *91529*	2½ – 1½	Br I	TE63
9294.66	10755.92		3000	79044 – *88339*	3½ – 4½	Br I	TE63
9296.21	10754.13		200	79044 – *88340*	3½ – 3½	Br I	TE63
9296.68	10753.58		150	*75009* – 84305	1½ – 2½	Br I	TE63
9302.20	10747.20		20	82236 – *91538*	2½ – 3½	Br I	TE63
9306.29	10742.48		100	79044 – *88350*	3½ – 2½	Br I?	TE63
9306.29	10742.48		100	82236 – *91542*	2½ – 2½	Br I?	TE63
9306.58	10742.14		1000	79044 – *88351*	3½ – 3½	Br I	TE63
9323.11	10723.10		15	79630 – *88953*	1½ – 1½	Br I	TE63
9326.81	10718.84		100	79044 – *88371*	3½ – 2½	Br I	TE63
9347.68	10694.91		12	79044 – *88392*	3½ – 4½	Br I	TE63
9377.59	10660.80		3	*75814* – 85191	½ – 1½	Br I	TE63
9396.96	10638.82		15	83358 – *92755*	3½ – 2½	Br I	TE63
9401.15	10634.08		1	79630 – *89031*	1½ – 1½	Br I	TE63
9405.25	10629.45		18	*74672* – 84077	2½ – 1½	Br I	TE63
9409.77	10624.34		1	*78865* – 88275	½ – 1½	Br I	TE63
9413.93	10619.65		1	84077 – *93491*	1½ – ½	Br I	TE63
9416.89	10616.31		1			Br	TE63
9423.68	10608.66		40	*75521* – 84945	3½ – 2½	Br I	TE63
9431.43	10599.94		1	82236 – *91667*	2½ – 1½	Br I	TE63
9438.94	10591.51		10 W	79044 – *88483*	3½ – 2½	Br I	TE63
9458.44	10569.67		2 D	*78676* – 88135	1½ – 2½	Br I	TE63
9460.95	10566.87		100	81429 – *90890*	½ – ½	Br I	TE63
9461.59	10566.15		250	81429 – *90891*	½ – 1½	Br I	TE63
9471.84	10554.72		1			Br	TE63
9494.45	10529.58		3	*75697* – 85191	2½ – 1½	Br I?	TE63
9494.62	10529.40		3	*75697* – 85191	2½ – 1½	Br I?	TE63
9508.82	10513.67		1	85191 – *94700*	1½ – 2½	Br I	TE63
9514.03	10507.91		12	80026 – *89540*	½ – 1½	Br I	TE63
9516.62	10505.05		8	79630 – *89147*	1½ – ½	Br I	TE63
9536.32	10483.35		8	*76743* – 86279	1½ – ½	Br I	TE63
9559.47	10457.96		30000	67183 – *76743*	1½ – 1½	Br I	TE63
9598.81	10415.10		8	*78676* – 88275	1½ – 1½	Br I?	TE63
9598.93	10414.97		8	*78676* – 88275	1½ – 1½	Br I?	TE63
9621.32	10390.74		175	*75814* – 85435	½ – 1½	Br I	TE63
9623.48	10388.40		1	*78511* – 88135	2½ – 2½	Br I	TE63
9627.42	10384.15		2	83101 – *92728*	½ – ½	Br I	TE63
9633.45	10377.65		1500	*74672* – 84305	2½ – 2½	Br I	TE63
9636.50	10374.37		12 W	75890 – *85526*	2½ – 2½	Br I	TE63
9640.29	10370.29		1	81842 – *91482*	1½ – 1½	Br I	TE63
9677.73	10330.17		100	75908 – *85586*	1½ – 1½	Br I?	TE63
9678.13	10329.74		80	75908 – *85586*	1½ – 1½	Br I?	TE63
9682.61	10324.96		3	84305 – *93988*	2½ – 2½	Br I	TE63
9687.18	10320.09		15	81842 – *91529*	1½ – 1½	Br I	TE63
9692.87	10314.03		8	79260 – *88953*	2½ – 1½	Br I	TE63
9693.94	10312.90		40	*78076* – 87769	½ – 1½	Br I	TE63
9695.80	10310.92		700	75890 – *85586*	2½ – 1½	Br I?	TE63
9696.08	10310.62		600	75890 – *85586*	2½ – 1½	Br I?	TE63
9700.44	10305.99		10	81842 – *91542*	1½ – 2½	Br I	TE63
9706.44	10299.62		1000	68970 – *78676*	½ – 1½	Br I	TE63
9712.07	10293.65		50	84305 – *94017*	2½ – 3½	Br I	TE63
9712.46	10293.23		1	84305 – *94018*	2½ – 2½	Br I	TE63
9738.33	10265.89		15 H	*75697* – 85435	2½ – 1½	Br I	TE63
9755.07	10248.27		3	84945 – *94700*	2½ – 3½	Br I	TE63
9759.79	10243.31		3	80026 – *89786*	½ – 1½	Br I	TE63
9765.10	10237.74		6000	64907 – *74672*	1½ – 2½	Br I	TE63
9765.68	10237.14		75	81081 – *90846*	3½ – 3½	Br I	TE63
9770.21	10232.39		15 B	81081 – *90851*	3½ –	Br I	TE63
9770.95	10231.61		8	79260 – *89031*	2½ – 1½	Br I	TE63
9777.05	10225.23		1	83723 – *93500*	2½ – 1½	Br I	TE63
9792.68	10208.91		300	81081 – *90873*	3½ – 4½	Br I	TE63
9803.53	10197.61		18	79044 – *88848*	3½ – 2½	Br I	TE63
9816.16	10184.49		200	*75009* – 84825	1½ – ½	Br I?	TE63

Lanthanum

La, Z = 57

La I Normal state of valence electrons $5d6s^2\ ^2D_{3/2}$ I.P. = 44981 cm^{-1}

La II Normal state of valence electrons $5d^2\ ^3F_2$ I.P. = 89204 cm^{-1}

La III Normal state of valence electrons $5d\ ^2D_{3/2}$ I.P. = 154675 cm^{-1}

La

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5591.911	17878.09	0.01		1603 – *7195*	2½ – 2½	La III	JO71
7092.182	14096.18	0.01		1603 – *8695*	2½ – 3½	La III	JO71
7195.141	13894.47	0.01		0 – *7195*	1½ – 2½	La III	JO71
9140.02	10937.898	0.02	12	*115602* – 124742	½ – 1½	La III	OD67
9640.25	10370.335	0.02	20	82814 – *92454*	2½ – 2½	La III	OD67
9720.43	10284.790	0.02	140	82814 – *92534*	2½ – 3½	La III	OD67

La References

OD67 Odabasi, H., J. Opt. Soc. Amer. **57**, 1459–1463 (1967).
Source: Sliding spark (La III)
Instrument: Wadsworth spectrograph
Detector: Photographic

JO71 Johansson, S., and Litzén, U., J. Opt. Soc. Amer. **61**, 1427–28 (1971).
Source: Pulsed hollow cathode (La III)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Fisher, R. H., Knoff, W. C., and Kinney, F. E., Astrophys. J. **130**, 683 (1959).

Lead

Pb, Z = 82

Pb I Normal state of valence electrons $6s^26p^2\ ^3P_0$ I.P. = 59819 cm^{-1}

Pb II Normal state of valence electrons $6s^26p\ ^2P^\circ_{1/2}$ I.P. = 121243 cm^{-1}

Pb

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2560.82	39039.4		B	52856 – *55417*	– 4	Pb I	AN68
2566.13	38958.6			52851 – *55417*	4 – 3	Pb I	AN68
2566.68	38950.1			52849 – *55416*	3 – 2	Pb I	AN68
2574.55	38831.1			52841 – *55416*	3 – 3	Pb I	AN68
6513.06	15349.6			*46328* – 52841	3 – 3	Pb I	AN68
6520.93	15331.0			*46328* – 52849	3 – 2	Pb I	AN68
6522.38	15327.6			*46328* – 52851	3 – 3	Pb I	AN68
6527.85	15314.8			*46328* – 52856	3 – 4	Pb I	AN68
6781.01	14743.0			*46060* – 52841	2 – 3	Pb I	AN68
6781.45	14742.1			*46068* – 52849	1 – 2	Pb I	AN68
6790.32	14722.8			*46060* – 52851	2 – 3	Pb I	AN68
7398.48	13512.6			*45443* – 52841	2 – 3	Pb I	AN68
7406.35	13498.2			*45443* – 52849	2 – 2	Pb I	AN68
7407.95	13495.3			*45443* – 52851	2 – 3	Pb I	AN68
7958.738	12561.370	0.01	1	*34959* – 42918	0 – 1	Pb I	AN68
8098.735	12344.229	0.01	1	44400 – *52499*	0 – 1	Pb I	AN68
8601.462	11622.749	0.01	1	*46328* – 54930	3 – 2	Pb I	AN68
8701.779	11488.757	0.01	2	44809 – *53511*	2 – 1	Pb I	AN68
8793.357	11369.108	0.01	1	*46068* – 54861	1 – 0	Pb I	AN68
8800.384	11360.030	0.01	2	44674 – *53475*	1 – 0	Pb I	AN68
8821.308	11333.084	0.01	3	*48188* – 57009	2 – 1	Pb I	AN68
8836.160	11314.035	0.01	2	44674 – *53511*	1 – 1	Pb I	AN68
8867.251	11274.365	0.01	1	*46060* – 54928	2 – 1	Pb I	AN68
8869.269	11271.800	0.01	1	*46060* – 54930	2 – 2	Pb I	AN68
8968.111	11147.567	0.01	1	*49439* – 58407	1 – 1	Pb I	AN68
9023.527	11079.107	0.01	3	*46328* – 55352	3 – 3	Pb I	AN68
9031.403	11069.446	0.01	1	*46328* – 55360	3 – 2	Pb I	AN68
9035.458	11064.478	0.01	2	*46328* – 55364	3 – 3	Pb I	AN68
9039.754	11059.219	0.01	6	*46328* – 55368	3 – 4	Pb I	AN68
9072.045	11019.855	0.01	4	*48188* – 57260	2 – 2	Pb I	AN68
9106.126	10978.611	0.01	1			Pb	AN68
9110.278	10973.608	0.01	2	44400 – *53511*	0 – 1	Pb I	AN68
9113.665	10969.530	0.01	40	*35287* – 44400	1 – 0	Pb I	AN68
9179.02	10891.43	0.01	1			Pb	AN68
9183.015	10886.688	0.01	15	42918 – *52101*	1 – 2	Pb I	AN68
9210.442	10854.269	0.01	1	*45443* – 54653	2 – 1	Pb I	AN68
9241.076	10818.287	0.01	1	*48188* – 57429	2 – 1	Pb I	AN68
9291.357	10759.743	0.01	7	*46060* – 55352	2 – 3	Pb I	AN68
9291.645	10759.410	0.01	5	*46068* – 55360	1 – 2	Pb I	AN68
9299.244	10750.617	0.01	1	*46060* – 55360	2 – 2	Pb I	AN68
9303.286	10745.946	0.01	2	*46060* – 55364	2 – 3	Pb I	AN68
9309.175	10739.148	0.01	1	*48188* – 57497	2 – 2	Pb I	AN68
9333.243	10711.455	0.01	1	*48188* – 57521	2 – 3	Pb I	AN68
9387.762	10649.249	0.01	50	*35287* – 44674	1 – 1	Pb I	AN68
9392.659	10643.697	0.01	1	42918 – *52311*	1 – 2	Pb I	AN68
9409.958	10624.129	0.01	2	*48188* – 57598	2 – 2	Pb I	AN68
9447.736	10581.647	0.01	1			Pb	AN68
9486.937	10537.922	0.01	1	*45443* – 54930	2 – 2	Pb I	AN68
9522.139	10498.965	0.01	100	*35287* – 44809	1 – 2	Pb I	AN68
9535.21	10484.57	0.02	1	*49439* – 58974	1 – 2	Pb I	AN68
9581.13	10434.32	0.14	5	42918 – *52499*	1 – 1	Pb I	AN68
9707.000	10299.022	0.01	2			Pb	AN68
9715.078	10290.458	0.01	200	*34959* – 44674	0 – 1	Pb I	AN68
9727.453	10277.367	0.01	2	*48188* – 57916	2 – 1	Pb I	AN68
9909.002	10089.068	0.01	1	*45443* – 55352	2 – 3	Pb I	AN68
9916.888	10081.045	0.01	1	*45443* – 55360	2 – 2	Pb I	AN68
9920.948	10076.920	0.01	2	*45443* – 55364	2 – 3	Pb I	AN68

Pb Reference

AN68 Wood, D. R., and Andrew, K. L., J. Opt. Soc. Amer. **58,** 818–829 (1968).

Source: Electrodeless discharge tube (2.45 GHz)

Instrument: a) 1 m Littrow spectrometer for wavelengths above 12000 Å
b) 9.2 m Paschen-Runge spectrograph for wavelengths below 12000 Å

Detector: a) PbS cooled with liquid nitrogen
b) Photographic

Uncertainty in σ: Not given for wavenumbers less than 7950 cm^{-1}

Lithium

Li, Z = 3

Li I Normal state of valence electrons $1s^2 2s\ ^2S_{1/2}$ I.P. = 43487 cm^{-1}

Li II Normal state of valence electrons $1s^2\ ^1S_0$ I.P. = 610079 cm^{-1}

Li

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2469.630	40480.860	0.01		*36628* – 39097		Li I	LZ70
3719.525	26877.82	0.02	8	27206 – *30925*		Li I	JO59
4086.415	24464.66	0.02	6	*30925* – 35012		Li I	JO59
5186.710	19274.78	0.02	4	31283 – *36469*		Li I	JO59
5345.251	18703.09	0.02	7	31283 – *36628*		Li I	JO59
5697.733	17546.05	0.02	7	*30925* – 36623		Li I	JO59
7373.838	13557.75	0.02	4	*30925* – 38299		Li I	JO59
7814.450	12793.31	0.02	5	31283 – *39097*		Li I	JO59
8169.255	12237.67	0.02	4	*30925* – 39094		Li I	JO59
9061.99	11032.09	0.02	1 L	*30925* – 39987		Li I	JO59
9108.24	10976.06	0.02	0 L	31283 – *40391*		Li I	JO59
9155.78	10919.07	0.02	3 LD	31283 – *40438*		Li I	JO59
9511.60	10510.60	0.02	3 LD	*30925* – 40437		Li I	JO59
9964.57	10032.81	0.02	2 LD	31283 – *41247*		Li I	JO59

Li References

JO59 Johansson, I., Ark. Fys. **15**, 169–179 (1959).
Source: Hollow cathode
Instrument: a) I m Pfund spectrometer
b) 21′ Wadsworth spectrograph
Detector: a) PbS
b) Photographic

LZ70 Litzén, U., Physica Scripta **1**, 253–255 (1970).
Source: Hollow cathode
Instrument: 1 m Pfund and 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Lutetium

Lu, Z = 71

Lu I Normal state of valence electrons $5d6s^2\ ^2D_{3/2}$ I.P. = 43762 cm^{-1}

Lu II Normal state of valence electrons $6s^2\ ^1S_0$ I.P. = 112110 cm^{-1}

Lu

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4136.3	24169.6	0.50	100	0 – *4136*	1½ – ½	Lu I	BO56
5482.6	18234.5	0.50	100	1993 – *7476*	2½ – 1½	Lu I	BO56
7476.2	13372.1	0.70	10	0 – *7476*	1½ – 1½	Lu I	BO56
9317.3	10729.8		10	24125 – *33443*	½ – ½	Lu I	KI54
9523.4	10497.6		6	*24308* – 33831	1½ – 1½	Lu I	KI54
9722.82	10282.26		10	*24108* – 33831	½ – 1½	Lu I	KI54
9984.82	10012.46		5 B	*20762* – 30746	½ –	Lu I?	KI54
9984.82	10012.46		5 B	*20762* – 30747	½ –	Lu I?	KI54

Lu References

KI54 Klinkenberg, P. F. A., Physica **XXI**, 53–62 (1954).
Used the wavelength list of Meggers and Scribner (1937).

BO56 Bovey, L. F. H., Steers, E. B. M., and Wise, H. S., Proc. Phys. Soc. **LXIXA**, 783 (1956).
Source: King furnace
Instrument: 1 m Fastie-Ebert spectrometer
Detector: PbS (Infra-red resonance lines of Lu observed)

Additional References

Meggers, W. F., and Scribner, B. F., J. Res. Nat. Bur. Stds. **19**, 31 (1937).

Magnesium

Mg, Z = 12

Mg I Normal state of valence electrons $2p^6 3s^2\ {}^1S_0$ I.P. = 61671 cm^{-1}

Ng II Normal state of valence electrons $2p^6 3s\ {}^2S_{1/2}$ I.P. = 121268 cm^{-1}

Mg

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3787.87	26392.9	0.01	5	*49346* – 53134	1 – 2	Mg I	RI65
4664.62	21432.11	0.01	5	92790 – *97455*	½ – ½	Mg II	RI65
4678.42	21368.91	0.01	7	92790 – *97468*	½ – 1½	Mg II	RI65
5368.33	18622.68	0.01	25 B	*103705* – 109074		Mg II	RI65
5382.17	18574.80	0.01	20 B	103689 – *109072*		Mg II	RI65
5642.53	17717.72	0.01	15 B	*103419* – 109062		Mg II	RI65
5843.396	17108.66	0.01	30	43503 – *49346*	0 – 1	Mg I	RI65
6341.094	15765.84	0.01	10	*47851* – 54192	2 – 3	Mg I	RI65
6347.880	15748.99	0.01	8	*47844* – 54192	1 – 2	Mg I	RI65
6351.217	15740.71	0.01	6	*47841* – 54192	0 – 1	Mg I	RI65
6643.716	15047.70	0.01	25	41197 – *47841*	1 – 0	Mg I	RI65
6647.012	15040.24	0.01	30	41197 – *47844*	1 – 1	Mg I	RI65
6653.758	15024.99	0.01	35	41197 – *47851*	1 – 2	Mg I	RI65
6719.668	14877.62	0.02	28 B	47957 – *54676*		Mg I	RI65
8273.373	12083.66	0.02	30	46403 – *54676*	2 – 3	Mg I	RI65
8452.069	11828.18	0.02	30	*35051* – 43503	1 – 0	Mg I	RI65
8603.39	11620.14	0.02	3 LB	103705 – *112309*		Mg II	RI55
8617.92	11600.56	0.02	3 LB	*103689* – 112307		Mg II	RI55
8881.44	11256.35	0.02	4 L	103420 – *112301*	1½ – 2½	Mg II	RI55
8881.78	11255.93	0.02	5 L	103419 – *112301*	2½ – 3½	Mg II	RI55
9060.693	11033.661	0.02	14	47957 – *57017*	2 – 1	Mg I	RI65
9061.973	11032.103	0.02	15	47957 – *57019*	3 – 2	Mg I	RI65
9117.056	10965.450	0.02	28	*47851* – 56968	2 – 3	Mg I	RI65
9123.834	10957.304	0.02	27	*47844* – 56968	1 – 2	Mg I	RI65
9127.152	10953.320	0.02	25	*47841* – 56968	0 – 1	Mg I	RI65
9128.43	10951.78	0.02	10 L	71491 – *80619*	1½ – ½	Mg II	RI55
9158.97	10915.27	0.02	7 L	71491 – *80650*	1½ – 1½	Mg II	RI55
9159.84	10914.23	0.02	11 L	71490 – *80650*	2½ – 1½	Mg II	RI55
9247.233	10811.085	0.02	35 B	*47957* – 57204		Mg I	RI65
9619.94	10392.23	0.02	6 L	*93799* – 103419	3½ – 2½	Mg II	RI55
9620.37	10391.76	0.02	5 L	*93799* – 103420	2½ – 1½	Mg II	RI55
9905.97	10092.16	0.02	14 LB	*93799* – 103705		Mg II	RI55

Mg References

RI55 Risberg, P., Ark. Fys. **9**, 483–494 (1955).
Source: Hollow cathode
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

RI65 Risberg, G., Ark. Fys. **28**, 381–395 (1965).
Source: Hollow cathode
Instrument: a) 1 m Pfund spectrometer for wavelengths above 12000 Å
b) 21′ Wadsworth spectrograph for wavelengths below 12000 Å
Detector: a) PbS
b) Photographic

Additional References

Fisher, R. A., and Eshbach, F. E., J. Opt. Soc. Amer. **43**, 1030 (1953).

Mercury

Hg, $Z = 80$

Hg I Normal state of valence electrons $5d^{10}6s^2\ {}^1S_0$ I.P. = 84184 cm^{-1}

Hg II Normal state of valence electrons $5d^{10}6s\ {}^2S_{1/2}$ I.P. = 151280 cm^{-1}

Hg

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2446.879	40857.246		50	*68886* – 71333	2 – 2	Hg I	HU65
2458.674	40661.242		400	74404 – *76863*	0 – 1	Hg I	HU65
2485.945	40215.185		200	73961 – *76447*	1 – 0	Hg I	HU65
2496.85	40039.50		700 B	*77287* – 79783	4 –	Hg I	HU65
2505.769	39897.029		900	73961 – *76467*	1 – 1	Hg I	HU65
2509.913	39831.157		300	*68886* – 71396	2 – 2	Hg I	HU65
2542.24	39324.70		1000 B	*77241* – 79783	3 –	Hg I	HU65
2544.48	39290.11		1500 B	*77239* – 79783	3 –	Hg I	HU65
2545.011	39281.849		5000	*68886* – 71431	2 – 3	Hg I	HU65
2546.77	39254.67		600 B	*77237* – 79783	2 –	Hg I	HU65
2618.8	38175.0		800	77129 – *79748*	3 – 4	Hg I	HU65
2635.8	37928.8		200	77107 – *79743*	2 – 2	Hg I	HU65
2637.1	37910.1		80 B	77107 – *79745*	2 – 3	Hg I?	HU65
2637.4	37905.8		80 B	77107 – *79745*	2 – 3	Hg I	HU65
2659.1	37596.5		300	77084 – *79743*	1 – 2	Hg I	HU65
2666.175	37496.65		100	*71295* – 73961	1 – 1	Hg I	HU65
2679.6	37308.8		160	77064 – *79743*	2 – 2	Hg I	HU65
2680.9	37290.7		200 B	77064 – *79745*	2 – 3	Hg I?	HU65
2681.2	37286.6		200 B	77064 – *79745*	2 – 3	Hg I?	HU65
2753.84	36303.07		7000	*71207* – 73961	2 – 1	Hg I	HU65
2797.522	35736.18		150	*76863* – 79660	1 – 2	Hg I	HU65
2838.7	35217.5		200 B	*76945* – 79783	4 –	Hg I	HU65
2862.27	34927.78		5000	73961 – *76823*	1 – 2	Hg I	HU65
2866.77	34872.98		30	*76823* – 79690	2 – 2	Hg I	HU65
2879.05	34724.16		250	*76823* – 79702	2 – 3	Hg I	HU65
3109.485	32150.87		6000	*71295* – 74404	1 – 0	Hg I	HU65
5074.71	19700.17		20	*68886* – 73961	2 – 1	Hg I	HU53
5514.10	18130.38		25	71431 – *76945*	3 – 4	Hg I	HU53
5733.64	17436.18		15	63928 – *69661*	0 – 1	Hg I	HU53
5768.96	17329.41		35	*71295* – 77064	1 – 2	Hg I	HU53
5807.91	17213.20		7	71431 – *77239*	3 – 3	Hg I	HU53
5810.29	17206.15		5	71431 – *77241*	3 – 3	Hg I	HU53
5812.81	17198.67		12	*71295* – 77107	1 – 2	Hg I	HU53
5840.64	17116.75		10	71396 – *77237*	2 – 2	Hg I	HU53
5842.96	17109.93		200	71396 – *77239*	2 – 3	Hg I	HU53
5855.68	17072.79		250	71431 – *77287*	3 – 4	Hg I	HU53
5900.88	16942.00		150	71336 – *77237*	1 – 2	Hg I	HU53
5903.92	16933.27		4	71333 – *77237*	2 – 2	Hg I	HU53
5908.50	16920.16		200	71333 – *77241*	2 – 3	Hg I	HU53
5922.03	16881.48		50	*71207* – 77129	2 – 3	Hg I	HU53
6535.882	15295.973		I	62350 – *68886*	1 – 2	Hg I	PE62
7166.22	13950.55		300	62350 – *69516*	1 – 0	Hg I	HU53
7311.42	13673.51		600	62350 – *69661*	1 – 1	Hg I	HU53
7367.07	13570.21		550	63928 – *71295*	0 – 1	Hg I	HU53
7402.32	13505.58		40	*69661* – 77064	1 – 2	Hg I	HU53
7422.77	13468.38		30	*69661* – 77084	1 – 1	Hg I	HU53
7445.89	13426.57		70	*69661* – 77107	1 – 2	Hg I	HU53
7567.98	13209.95		60	*69516* – 77084	0 – 1	Hg I	HU53
8857.006	11287.407		I	62350 – *71207*	1 – 2	Hg I	PE62
9859.431	10139.793		I	*54068* – 63928	1 – 0	Hg I	PE62

Hg References

HU53 Humphreys, C. J., J. Opt. Soc. Amer. **43**, 1027–1029 (1953).
Source: H-11 lamp
Instrument: 1 m Littrow spectrometer
Detector: PbS
Uncertainty in λ: Stated as being 0.1 Å

PE62 Peck, E. R., Khanna, B. N., and Anderholm, N. C., J. Opt. Soc. Amer. **52**, 536–538 (1962).
Interferometric measurements.

HU65 Humphreys, C. J., and Paul, E., Jr., NAVWEPS report 8833, 27 (1965).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1 m Littrow spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given

Neodymium

Nd, Z = 60

Nd I Normal state of valence electrons $4f^4 6s^2\ {}^5I_4$ I.P. = 44271 cm^{-1}

Nd II Normal state of valence electrons $4f^4({}^5I_4)6s(4, 1/2)_{7/2}$ I.P. = 86542 cm^{-1}

Nd

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2671.505	37421.891		12	11001 – *13672*	3 – 4	Nd I	MO70
2777.979	35987.589		10			Nd	MO70
2862.950	34919.495		12	12917 – *15780*	6 – 6	Nd I	MO70
2885.477	34646.877		20	8475 – *11360*	5 – 4	Nd I	MO70
2894.136	34543.217		20	9115 – *12009*	6 – 5	Nd I	MO70
2897.357	34504.815		14	9939 – *12837*	7 – 6	Nd I	MO70
2901.815	34451.806		10	10897 – *13799*	8 – 7	Nd I	MO70
2930.900	34109.921		10			Nd	MO70
2939.927	34005.187		10			Nd	MO70
2971.479	33644.110		11			Nd	MO70
2975.775	33595.540		12			Nd	MO70
3042.139	32861.786		25	12178 – *15220*	5 – 6	Nd I	MO70
3046.535	32815.236		25	13798 – *16845*	7 – 7	Nd I	MO70
3080.575	32452.631		15			Nd	MO70
3094.565	32305.919		10			Nd	MO70
3126.068	31980.355		20	16092 – *19218*	10 – 9	Nd I?	MO70
3126.068	31980.355		20	12736 – *15863*	3 – 4	Nd I?	MO70
3150.959	31727.726		15			Nd	MO70
3193.200	31308.018		50	14780 – *17973*	8 – 8	Nd I	MO70
3197.505	31265.866		14			Nd	MO70
3210.912	31135.317		25	12917 – *16128*	6 – 6	Nd I	MO70
3215.376	31092.091		10			Nd	MO70
3219.812	31049.255		30			Nd	MO70
3234.848	30904.934		10			Nd	MO70
3250.317	30757.850		20			Nd	MO70
3275.869	30517.937		12			Nd	MO70
3281.006	30470.156		10			Nd	MO70
3285.347	30429.895		22	14687 – *17973*	9 – 8	Nd I	MO70
3305.531	30244.086		12			Nd	MO70
3307.291	30227.991		24			Nd	MO70
3307.690	30224.345		20			Nd	MO70
3315.813	30150.302		60			Nd	MO70
3335.119	29975.771		20			Nd	MO70
3340.376	29928.596		10			Nd	MO70
3344.310	29893.390		30			Nd	MO70
3353.083	29815.177		10			Nd	MO70
3361.039	29744.601		15			Nd	MO70
3365.129	29708.449		10			Nd	MO70
3365.446	29705.650		30	12917 – *16282*	6 – 7	Nd I	MO70
3373.214	29637.243		25			Nd	MO70
3383.665	29545.703		100	15834 – *19218*	9 – 9	Nd I	MO70
3390.809	29483.454		25			Nd	MO70
3392.340	29470.148		25			Nd	MO70
3403.917	29369.918		10			Nd	MO70
3406.401	29348.501		15			Nd	MO70
3437.541	29082.638		100	11001 – *14438*	3 – 3	Nd I	MO70
3438.615	29073.555		10	13798 – *17237*	7 – 6	Nd I	MO70
3447.376	28999.668		40	12178 – *15625*	5 – 5	Nd I	MO70
3453.888	28944.992		30			Nd	MO70
3457.135	28917.807		30	12065 – *15522*	5 – 5	Nd I	MO70
3463.292	28866.397		50	13195 – *16658*	6 – 6	Nd I	MO70
3473.825	28778.871		25			Nd	MO70
3476.000	28760.864		25			Nd	MO70
3490.819	28638.770		15	13798 – *17289*	7 – 7	Nd I	MO70
3494.695	28607.006		50			Nd	MO70
3495.359	28601.572		15			Nd	MO70

Nd—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3509.896	28483.112		35	14327 – *17837*	7 – 7	Nd I	MO70
3511.927	28466.640		35	13333 – *16845*	8 – 7	Nd I	MO70
3539.661	28243.597		12			Nd	MO70
3540.112	28239.999		15	12178 – *15718*	5 – 4	Nd I	MO70
3540.563	28236.402		50			Nd	MO70
3559.931	28082.780		15	15533 – *19093*	8 – 8	Nd I	MO70
3561.870	28067.493		20	13195 – *16757*	6 – 5	Nd I	MO70
3605.865	27725.042		15	10376 – *13982*	5 – 4	Nd I	MO70
3641.464	27454.002		20	13798 – *17440*	7 – 8	Nd I	MO70
3723.604	26848.386		10	12056 – *15780*	7 – 6	Nd I	MO70
3741.058	26723.124		10	12917 – *16658*	6 – 6	Nd I	MO70
3858.190	25911.828		50	9814 – *13672*	4 – 4	Nd I	MO70
3862.050	25885.930		20	11918 – *15780*	7 – 6	Nd I	MO70
3886.760	25721.361		12			Nd	MO70
3902.960	25614.599		20	10774 – *14677*	6 – 5	Nd I	MO70
3918.835	25510.836		14	9814 – *13733*	4 – 3	Nd I?	MO70
3918.835	25510.836		14	8475 – *12394*	5 – 5	Nd I?	MO70
3929.805	25439.623		12	14780 – *18709*	8 – 9	Nd I	MO70
3935.190	25404.811		100	10376 – *14311*	5 – 5	Nd I	MO70
3943.015	25354.394		40	12902 – *16845*	8 – 7	Nd I	MO70
3960.550	25242.140		10			Nd	MO70
3982.700	25101.754		15			Nd	MO70
3993.385	25034.590		20	12065 – *16059*	5 – 4	Nd I	MO70
3998.620	25001.814		30	11486 – *15484*	4 – 3	Nd I	MO70
4019.700	24870.700		50	13953 – *17973*	9 – 8	Nd I	MO70
4022.175	24855.397		100	10774 – *14797*	6 – 5	Nd I	MO70
4038.620	24754.187		30	13798 – *17837*	7 – 7	Nd I	MO70
4079.130	24508.352		15	12178 – *16257*	5 – 5	Nd I	MO70
4082.875	24485.872		13			Nd	MO70
4099.990	24383.658		14	15834 – *19934*	9 – 10	Nd I	MO70
4111.625	24314.657		70	11109 – *15220*	6 – 6	Nd I	MO70
4113.880	24301.330		11	11486 – *15599*	4 – 4	Nd I	MO70
4136.555	24168.119		16	22705 – *26842*	7 – 6	Nd I	MO70
4139.890	24148.650		10	11486 – *15625*	4 – 5	Nd I	MO70
4144.040	24124.467		20	12065 – *16209*	5 – 4	Nd I	MO70
4144.94	24119.221	0.07	4 L	15073 – *19218*	10 – 9	Nd I	BL70
4168.070	23985.382		12	9814 – *13982*	4 – 4	Nd I	MO70
4201.14	23796.570	0.15	3 L			Nd	BL70
4206.84	23764.327	0.15	3 L			Nd	BL70
4210.01	23746.433	0.08	4 L	11918 – *16128*	7 – 6	Nd I	BL70
4226.03	23656.415	0.10	4 L	12056 – *16282*	7 – 7	Nd I	BL70
4234.28	23610.324	0.15	3 L	11001 – *15235*	3 – 4	Nd I	BL70
4234.93	23606.700	0.15	3 L			Nd	BL70
4313.84	23174.879	0.15	3 L	14780 – *19093*	8 – 8	Nd I	BL70
4341.36	23027.973	0.15	3 L			Nd	BL70
4364.49	22905.934	0.07	5 L	11918 – *16282*	7 – 7	Nd I	BL70
4380.98	22819.716	0.15	3 L	11001 – *15382*	3 – 2	Nd I	BL70
4387.21	22787.311	0.07	4 L	12902 – *17289*	8 – 7	Nd I	BL70
4405.95	22690.389	0.07	5 L	14687 – *19093*	9 – 8	Nd I	BL70
4413.76	22650.239	0.07	5 L	11109 – *15522*	6 – 5	Nd I	BL70
4425.12	22592.092	0.07	5 L	10376 – *14801*	5 – 4	Nd I	BL70
4431.40	22560.075	0.07	5 L	16092 – *20523*	10 – 9	Nd I	BL70
4479.79	22316.385	0.10	3 L	12178 – *16658*	5 – 6	Nd I	BL70
4497.33	22229.349	0.10	3 L	9814 – *14311*	4 – 5	Nd I	BL70
4503.92	22196.823	0.07	5 L	13333 – *17837*	8 – 7	Nd I	BL70
4516.79	22133.576	0.07	5 L	11109 – *15625*	6 – 5	Nd I	BL70
4537.89	22030.661	0.07	5 L	12902 – *17440*	8 – 8	Nd I	BL70
4539.68	22021.974	0.07	4 L			Nd	BL70
4595.43	21754.812	0.10	3 L	13195 – *17790*	6 – 5	Nd I	BL70
4601.61	21725.595	0.07	5 L	12065 – *16658*	7 – 6	Nd I	BL70
4624.14	21619.742	0.07	5 L	9814 – *14438*	4 – 3	Nd I	BL70
4630.97	21587.857	0.10	3 L			Nd	BL70
4688.96	21320.872	0.10	3 L	15834 – *20523*	9 – 9	Nd I	BL70
4705.03	21248.050	0.05	5 L			Nd	BL70
4707.98	21234.737	0.07	4 L	7524 – *12232*	3½ – 3½	Nd II	BL70
4731.91	21127.349	0.10	3 L			Nd	BL70

Nd—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4732.90	21122.929	0.10	3 L			Nd	BL70
4740.06	21091.023	0.07	5 L	12056 – *16796*	7 – 6	Nd I?	BL70
4740.06	21091.023	0.07	5 L	11918 – *16658*	7 – 6	Nd I?	BL70
4747.98	21055.841	0.05	6 L	10774 – *15522*	6 – 5	Nd I	BL70
4756.28	21019.097	0.05	6 L	13953 – *18709*	9 – 9	Nd I	BL70
4759.16	21006.378	0.05	5 L			Nd	BL70
4779.04	20918.994	0.10	3 L	12065 – *16844*	5 – 5	Nd I	BL70
4810.18	20783.570	0.10	3 L			Nd	BL70
4843.95	20638.675	0.05	5 L	10376 – *15220*	5 – 6	Nd I	BL70
4849.66	20614.375	0.10	3 L			Nd	BL70
4851.02	20608.596	0.05	5 L	10774 – *15625*	6 – 5	Nd I	BL70
4853.50	20598.066	0.07	4 L	12178 – *17032*	5 – 4	Nd I	BL70
4858.71	20575.979	0.05	6 L	10376 – *15235*	5 – 4	Nd I	BL70
4861.31	20564.973	0.05	6 L	15073 – *19934*	10 – 10	Nd I	BL70
4866.54	20542.873	0.05	5 L			Nd	BL70
4873.92	20511.767	0.10	3 L			Nd	BL70
4878.45	20492.721	0.05	6 L	11918 – *16796*	7 – 6	Nd I	BL70
4897.56	20412.759	0.10	3 L	11001 – *15898*	3 – 3	Nd I	BL70
4902.62	20391.691	0.05	5 L			Nd	BL70
4918.88	20324.284	0.10	3 L	11109 – *16028*	6 – 5	Nd I	BL70
4923.28	20306.119	0.15	3 L	13333 – *18256*	8 – 7	Nd I	BL70
4927.04	20290.623	0.10	3 L	11918 – *16845*	7 – 7	Nd I	BL70
4935.04	20257.731	0.05	5 L	12902 – *17837*	8 – 7	Nd I	BL70
4949.60	20198.140	0.10	3 L			Nd	BL70
4952.15	20187.739	0.10	3 L	11373 – *16325*	7½ – 8½	Nd II	BL70
4966.35	20130.017	0.10	3 L	12065 – *17032*	5 – 4	Nd I?	BL70
4966.35	20130.017	0.10	3 L	9877 – *14843*	4½ – 4½	Nd II?	BL70
5005.44	19972.812	0.10	3 L	10774 – *15780*	6 – 6	Nd I	BL70
5007.06	19966.350	0.07	4 L			Nd	BL70
5015.54	19932.591	0.10	3 L			Nd	BL70
5051.62	19790.228	0.10	3 L			Nd	BL70
5054.62	19778.482	0.10	3 L	13195 – *18249*	6 – 5	Nd I?	BL70
5054.62	19778.482	0.10	3 L	11109 – *16163*	6 – 5	Nd I?	BL70
5074.81	19699.793	0.10	3 L			Nd	BL70
5075.69	19696.378	0.10	3 L			Nd	BL70
5097.99	19610.220	0.10	3 L			Nd	BL70
5140.31	19448.770	0.10	3 L	13953 – *19093*	9 – 8	Nd I	BL70
5142.06	19442.151	0.10	3 L			Nd	BL70
5196.98	19236.693	0.07	5 L	9115 – *14311*	6 – 5	Nd I	BL70
5197.47	19234.879	0.07	5 L	8475 – *13672*	5 – 4	Nd I	BL70
5223.11	19140.456	0.10	3 L	10376 – *15599*	5 – 4	Nd I	BL70
5281.07	18930.388	0.05	7 L	9939 – *15220*	7 – 6	Nd I	BL70
5336.69	18733.092	0.07	5 L	7524 – *12861*	3½ – 3½	Nd II	BL70
5341.90	18714.821	0.05	5 L	10376 – *15718*	5 – 4	Nd I	BL70
5366.87	18627.749	0.05	5 L			Nd	BL70
5380.40	18580.905	0.10	4 L			Nd	BL70
5384.80	18565.723	0.05	7 L	10897 – *16282*	8 – 7	Nd I	BL70
5388.87	18551.701	0.05	5 L	10774 – *16163*	6 – 5	Nd I	BL70
5420.91	18442.052	0.10	3 L	9814 – *15235*	4 – 4	Nd I	BL70
5450.27	18342.707	0.10	4 L	15073 – *20523*	10 – 9	Nd I	BL70
5465.86	18290.389	0.10	3 L			Nd	BL70
5480.54	18241.396	0.05	7 L	11959 – *17440*	9 8	Nd I	BL70
5481.00	18239.865	0.10	4 L			Nd	BL70
5485.88	18223.640	0.10	3 L			Nd	BL70
5489.51	18211.590	0.10	3 L	10897 – *16387*	8 – 7	Nd I	BL70
5507.34	18152.629	0.07	6 L	8475 – *13982*	5 – 4	Nd I	BL70
5531.89	18072.069	0.10	3 L	8796 – *14328*	2½ – 3½	Nd II	BL70
5547.27	18021.964	0.10	3 L			Nd	BL70
5549.26	18015.501	0.10	3 L	11109 – *16658*	6 – 6	Nd I	BL70
5562.79	17971.683	0.05	5 L	9115 – *14677*	6 – 5	Nd I	BL70
5573.63	17936.730	0.05	6 L			Nd	BL70
5585.33	17899.157	0.10	3 L			Nd	BL70
5608.43	17825.434	0.05	7 L	13101 – *18709*	10 – 9	Nd I	BL70
5630.37	17755.973	0.05	7 L	14304 – *19934*	11 – 10	Nd I	BL70
5647.86	17700.987	0.07	6 L	11109 – *16757*	6 – 5	Nd I	BL70
5653.79	17682.422	0.07	5 L	4437 – *10091*	5½ – 4½	Nd II	BL70

Nd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5658.41	17667.984	0.07	6 L	9939 – *15598*	7 – 6	Nd I	BL70
5669.96	17631.993	0.07	6 L	9814 – *15484*	4 – 3	Nd I	BL70
5682.03	17594.539	0.15	3 L	9115 – *14797*	6 – 5	Nd I	BL70
5682.36	17593.517	0.15	3 L	10376 – *16059*	5 – 4	Nd I	BL70
5691.93	17563.937	0.10	3 L	12056 – *17748*	7 – 6	Nd I	BL70
5724.21	17464.890	0.10	3 L	12065 – *17790*	5 – 4	Nd I?	BL70
5724.21	17464.890	0.10	3 L	13017 – *18741*	4 – 4	Nd I?	BL70
5725.93	17459.644	0.10	3 L	1128 – *6853*	5 – 5	Nd I	BL70
5735.65	17430.055	0.07	5 L	11109 – *16844*	6 – 5	Nd I	BL70
5738.61	17421.065	0.10	3 L			Nd	BL70
5747.77	17393.301	0.10	3 L			Nd	BL70
5761.44	17352.033	0.10	3 L			Nd	BL70
5781.70	17291.228	0.10	3 L	9357 – *15139*	5½ – 5½	Nd II	BL70
5785.27	17280.558	0.08	4 L	9814 – *15599*	4 – 4	Nd I	BL70
5836.69	17128.320	0.07	6 L	8475 – *14311*	5 – 5	Nd I	BL70
5843.88	17107.246	0.07	5 L			Nd	BL70
5848.94	17092.447	0.08	4 L	10897 – *16746*	8 – 7	Nd I	BL70
5880.91	16999.528	0.15	3 L			Nd	BL70
5883.49	16992.074	0.10	3 L	10774 – *16658*	6 – 6	Nd I	BL70
5948.29	16806.964	0.10	3 L			Nd	BL70
5982.10	16711.973	0.10	3 L	10774 – *16757*	6 – 5	Nd I	BL70
6009.88	16634.724	0.10	3 L			Nd	BL70
6013.51	16624.682	0.10	3 L	11959 – *17973*	9 – 8	Nd I	BL70
6021.85	16601.657	0.10	3 L	10774 – *16796*	6 – 6	Nd I	BL70
6031.27	16575.728	0.10	3 L	13195 – *19226*	6 – 5	Nd I	BL70
6037.64	16558.240	0.10	3 L			Nd	BL70
6045.28	16537.314	0.07	5 L	2366 – *8411*	6 – 6	Nd I	BL70
6053.74	16514.203	0.10	3 L			Nd	BL70
6072.25	16463.863	0.10	3 L			Nd	BL70
6084.21	16431.499	0.08	4 L	9814 – *15898*	4 – 3	Nd I	BL70
6102.24	16382.950	0.08	4 L			Nd	BL70
6105.67	16373.746	0.07	5 L	9115 – *15220*	6 – 6	Nd I	BL70
6114.97	16348.844	0.10	3 L	12056 – *18171*	7 – 6	Nd I	BL70
6131.84	16303.865	0.05	5 L	6931 – *13063*	5½ – 4½	Nd II	BL70
6147.58	16262.121	0.05	5 L	7950 – *14097*	6½ – 5½	Nd II	BL70
6227.38	16053.732	0.07	5 L	6005 – *12232*	4½ – 3½	Nd II	BL70
6256.89	15978.016	0.07	5 L	9042 – *15299*	7½ – 6½	Nd II	BL70
6282.71	15912.351	0.07	5 L			Nd	BL70
6326.52	15802.161	0.05	5 L	8475 – *14801*	5 – 4	Nd I	BL70
6336.02	15778.468	0.10	3 L	3681 – *10017*	7 – 7	Nd I	BL70
6343.07	15760.931	0.07	5 L	9939 – *16282*	7 – 7	Nd I	BL70
6379.73	15670.363	0.10	3 L			Nd	BL70
6380.16	15669.307	0.10	3 L	10376 – *16757*	5 – 5	Nd I	BL70
6384.00	15659.882	0.10	3 L			Nd	BL70
6386.33	15654.169	0.08	4 L			Nd	BL70
6387.96	15650.174	0.10	3 L			Nd	BL70
6389.30	15646.892	0.10	3 L			Nd	BL70
6407.81	15601.693	0.08	4 L	9115 – *15522*	6 – 5	Nd I	BL70
6469.90	15451.967	0.10	3 L			Nd	BL70
6505.14	15368.260	0.05	5 L	10194 – *16700*	8½ – 7½	Nd II	BL70
6510.83	15354.829	0.05	7 L	9115 – *15625*	6 – 5	Nd I	BL70
6540.78	15284.520	0.05	6 L			Nd	BL70
6542.28	15281.016	0.05	5 L	10897 – *17440*	8 – 8	Nd I	BL70
6545.66	15273.125	0.10	3 L			Nd	BL70
6547.47	15268.903	0.10	3 L			Nd	BL70
6549.49	15264.193	0.10	3 L	8796 – *15345*	2½ – 3½	Nd II	BL70
6550.76	15261.234	0.08	4 L			Nd	BL70
6561.49	15236.277	0.10	3 L	12065 – *18627*	5 – 5	Nd I	BL70
6592.87	15163.757	0.08	4 L	8420 – *15013*	4½ – 4½	Nd II	BL70
6598.90	15149.901	0.10	3 L			Nd	BL70
6613.78	15115.816	0.08	4 L	9877 – *16490*	4½ – 5½	Nd II	BL70
6614.24	15114.765	0.10	3 L			Nd	BL70
6630.72	15077.198	0.08	4 L	*10160* – 16791	8 – 9	Nd I	BL70
6635.40	15066.564	0.10	3 L			Nd	BL70
6655.99	15019.957	0.15	3 L	5048 – *11704*	8 – 8	Nd I	BL70
6666.73	14995.760	0.10	3 L	12065 – *18732*	5 – 5	Nd I	BL70

Nd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6718.69	14879.787	0.05	5 L	9939 – *16658*	7 – 6	Nd I	BL70
6719.25	14878.547	0.08	4 L	8420 – *15139*	4½ – 5½	Nd II	BL70
6750.04	14810.680	0.08	4 L	11959 – *18709*	9 – 9	Nd I	BL70
6779.18	14747.016	0.08	4 L	11392 – *18171*	9½ – 8½	Nd II	BL70
6803.48	14694.344	0.10	3 L	7524 – *14328*	3½ – 3½	Nd II	BL70
6816.77	14665.696	0.05	6 L			Nd	BL70
6839.35	14617.278	0.05	6 L			Nd	BL70
6843.65	14608.093	0.05	5 L			Nd	BL70
6853.97	14586.098	0.05	6 L	0 – *6853*	4 – 5	Nd I	BL70
6856.11	14581.545	0.05	5 L	6005 – *12861*	4½ – 3½	Nd II	BL70
6872.71	14546.325	0.05	5 L	4437 – *11310*	5½ – 4½	Nd II	BL70
6897.96	14493.078	0.10	3 L	12334 – *19232*	6½ – 7½	Nd II	BL70
6908.18	14471.637	0.10	3 L			Nd	BL70
6927.46	14431.361	0.10	3 L			Nd	BL70
6939.44	14406.447	0.05	5 L	10897 – *17837*	8 – 7	Nd I	BL70
6955.13	14373.948	0.07	4 L	6931 – *13886*	5½ – 4½	Nd II	BL70
6977.69	14327.474	0.05	5 L	6637 – *13615*	7½ – 6½	Nd II	BL70
6994.33	14293.388	0.10	3 L	9198 – *16192*	3½ – 4½	Nd II	BL70
7003.59	14274.490	0.07	5 L	5487 – *12491*	6½ – 5½	Nd II	BL70
7015.64	14249.972	0.10	3 L	10774 – *17790*	6 – 5	Nd I	BL70
7025.24	14230.499	0.05	5 L	7868 – *14894*	8½ – 7½	Nd II	BL70
7035.93	14208.878	0.05	6 L			Nd	BL70
7047.76	14185.028	0.05	5 L	12178 – *19226*	5 – 5	Nd I	BL70
7058.34	14163.765	0.07	4 L	6005 – *13063*	4½ – 4½	Nd II	BL70
7062.60	14155.222	0.10	3 L	10774 – *17837*	6 – 7	Nd I?	BL70
7062.60	14155.222	0.10	3 L	11109 – *18171*	6 – 6	Nd I?	BL70
7094.07	14092.428	0.15	3 L			Nd	BL70
7134.16	14013.236	0.15	3 L	11959 – *19093*	9 – 8	Nd I	BL70
7153.82	13974.725	0.10	3 L			Nd	BL70
7159.35	13963.931	0.07	5 L	9166 – *16325*	9½ – 8½	Nd II	BL70
7170.01	13943.170	0.10	3 L			Nd	BL70
7213.98	13858.185	0.10	3 L			Nd	BL70
7283.65	13725.628	0.07	7 L	1128 – *8411*	5 – 6	Nd I	BL70
7315.91	13665.103	0.07	6 L			Nd	BL70
7349.55	13602.556	0.10	3 L	7950 – *15299*	6½ – 6½	Nd II	BL70
7367.06	13570.225	0.10	3 L	9198 – *16565*	3½ – 4½	Nd II	BL70
7371.85	13561.408	0.05	5 L	10516 – *17888*	10½ – 9½	Nd II	BL70
7454.09	13411.786	0.10	3 L	10666 – *18120*	3½ – 3½	Nd II	BL70
7467.31	13388.042	0.10	3 L	10887 – *18354*	2½ – 2½	Nd II	BL70
7492.55	13342.942	0.07	5 L			Nd	BL70
7497.28	13334.524	0.07	5 L	3681 – *11179*	7 – 6	Nd I	BL70
7527.92	13280.250	0.05	5 L	9042 – *16570*	7½ – 6½	Nd II	BL70
7539.83	13259.273	0.10	3 L			Nd	BL70
7545.06	13250.082	0.10	3 L	12736 – *20281*	3 – 3	Nd I	BL70
7545.86	13248.677	0.10	3 L			Nd	BL70
7637.93	13088.973	0.07	6 L	2366 – *10004*	6 – 5	Nd I	BL70
7644.61	13077.535	0.05	6 L			Nd	BL70
7651.10	13066.443	0.05	6 L	2366 – *10017*	6 – 7	Nd I	BL70
7732.43	12929.009	0.10	4 L			Nd	BL70
7734.54	12925.482	0.15	3 L	8475 – *16209*	5 – 4	Nd I	BL70
7734.99	12924.730	0.15	3 L			Nd	BL70
7763.62	12877.067	0.10	3 L			Nd	BL70
7772.85	12861.776	0.10	3 L			Nd	BL70
7788.91	12835.256	0.10	3 L			Nd	BL70
7790.70	12832.307	0.10	3 L			Nd	BL70
7792.23	12829.787	0.05	5 L			Nd	BL70
7816.64	12789.722	0.10	3 L	8420 – *16237*	4½ – 5½	Nd II	BL70
7837.75	12755.275	0.15	3 L	12459 – *20297*	8½ – 7½	Nd II	BL70
7866.05	12709.384	0.08	4 L			Nd	BL70
7876.91	12691.862	0.05	5 L			Nd	BL70
7878.58	12689.171	0.05	5 L	5048 – *12927*	8 – 7	Nd I	BL70
7889.41	12671.753	0.07	4 L			Nd	BL70
7893.76	12664.770	0.10	3 L			Nd	BL70
7911.69	12636.068	0.08	4 L	6931 – *14843*	5½ – 4½	Nd II	BL70
7922.06	12619.527	0.10	3 L			Nd	BL70
7947.91	12578.483	0.10	3 L			Nd	BL70

Nd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7955.66	12566.230	0.07	5 L	1128 – *9083*	5 – 4	Nd I	BL70
7966.55	12549.052	0.08	4 L			Nd	BL70
8010.28	12480.544	0.10	3 L			Nd	BL70
8022.90	12460.912	0.07	5 L	3681 – *11704*	7 – 8	Nd I	BL70
8042.26	12430.915	0.10	3 L			Nd	BL70
8053.69	12413.272	0.07	5 L	4437 – *12491*	5½ – 5½	Nd II	BL70
8059.12	12404.909	0.15	4 L	10376 – *18436*	5 – 4	Nd I	BL70
8081.37	12370.755	0.10	3 L	6931 – *15013*	5½ – 4½	Nd II	BL70
8084.72	12365.629	0.10	3 L			Nd	BL70
8127.50	12300.541	0.08	4 L	5487 – *13615*	6½ – 6½	Nd II	BL70
8158.91	12253.186	0.08	4 L			Nd	BL70
8167.11	12240.884	0.07	5 L			Nd	BL70
8174.93	12229.175	0.08	4 L			Nd	BL70
8175.42	12228.442	0.10	3 L			Nd	BL70
8238.25	12135.180	0.10	3 L			Nd	BL70
8256.73	12108.019	0.07	5 L	6637 – *14894*	7½ – 7½	Nd II	BL70
8267.43	12092.348	0.07	5 L			Nd	BL70
8286.94	12063.879	0.10	3 L	15834 – *24121*	9 – 8	Nd I?	BL70
8286.94	12063.879	0.10	3 L	7950 – *16237*	6½ – 5½	Nd II?	BL70
8311.81	12027.782	0.15	3 L			Nd	BL70
8312.24	12027.160	0.15	3 L			Nd	BL70
8322.31	12012.607	0.10	3 L			Nd	BL70
8329.60	12002.094	0.15	3 L			Nd	BL70
8332.51	11997.902	0.10	3 L			Nd	BL70
8394.82	11908.848	0.05	6 L	8420 – *16815*	4½ – 4½	Nd II	BL70
8403.26	11896.888	0.10	3 L	*12837* – 21240	6 – 7	Nd I	BL70
8403.75	11896.194	0.10	3 L			Nd	BL70
8419.04	11874.589	0.05	7 L			Nd	BL70
8429.76	11859.488	0.07	6 L			Nd	BL70
8446.03	11836.642	0.15	3 L	9908 – *18354*	3½ – 2½	Nd II?	BL70
8446.03	11836.642	0.15	3 L	9674 – *18120*	2½ – 3½	Nd II?	BL70
8451.86	11828.478	0.10	3 L			Nd	BL70
8456.65	11821.778	0.05	5 L	7868 – *16325*	8½ – 8½	Nd II	BL70
8465.59	11809.294	0.08	4 L			Nd	BL70
8497.73	11764.629	0.15	3 L			Nd	BL70
8571.64	11663.186	0.10	3 L	13298 – *21870*	6½ – 6½	Nd II	BL70
8593.18	11633.951	0.10	3 L			Nd	BL70
8602.93	11620.766	0.15	3 L			Nd	BL70
8613.27	11606.815	0.10	3 L			Nd	BL70
8641.51	11568.885	0.10	3 L			Nd	BL70
8690.80	11503.271	0.10	3 L	11486 – *20176*	4 – 5	Nd I	BL70
8691.54	11502.292	0.10	3 L			Nd	BL70
8694.68	11498.138	0.10	3 L			Nd	BL70
8761.49	11410.460	0.10	3 L			Nd	BL70
8781.72	11384.174	0.10	5 L			Nd	BL70
8798.35	11362.657	0.10	3 L			Nd	BL70
8812.44	11344.489	0.05	7 L	2366 – *11179*	6 – 6	Nd I	BL70
8851.70	11294.173	0.15	3 L			Nd	BL70
8876.48	11262.643	0.05	7 L	1128 – *10004*	5 – 5	Nd I	BL70
8887.82	11248.273	0.05	5 L	*12369* – 21257	3 – 4	Nd I	BL70
8951.82	11167.855	0.07	5 L			Nd	BL70
9009.93	11095.827	0.15	3 L			Nd	BL70
9017.97	11085.934	0.10	3 L			Nd	BL70
9045.63	11052.035	0.05	5 L	*12878* – 21924	4 – 5	Nd I	BL70
9050.05	11046.638	0.05	5 L	3681 – *12731*	7 – 7	Nd I	BL70
9053.35	11042.611	0.08	4 L			Nd	BL70
9083.75	11005.655	0.05	7 L	0 – *9083*	4 – 4	Nd I	BL70
9125.94	10954.775	0.05	5 L	*11360* – 20486	4 – 5	Nd I	BL70
9128.42	10951.799	0.10	3 L			Nd	BL70
9162.86	10910.635	0.07	5 L	*11108* – 20271	5 – 6	Nd I	BL70
9192.53	10875.419	0.15	3 L			Nd	BL70
9232.83	10827.949	0.07	5 L	*13641* – 22874	5 – 5	Nd I	BL70
9245.44	10813.181	0.05	7 L	3681 – *12927*	7 – 7	Nd I	BL70
9256.93	10799.759	0.10	3 L			Nd	BL70
9369.61	10669.880	0.10	3 L			Nd	BL70
9377.96	10660.380	0.05	5 L	*11108* – 20486	5 – 5	Nd I	BL70

Nd—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9378.99	10659.209	0.05	5 L	*12009* – 21388	5 – 6	Nd I	BL70
9389.29	10647.516	0.10	3 L	*12731* – 22121	7 – 6	Nd I	BL70
9420.33	10612.432	0.08	4 L			Nd	BL70
9427.49	10604.372	0.05	5 L	*11812* – 21240	6 – 7	Nd I	BL70
9446.14	10583.435	0.10	3 L	2366 – *11812*	6 – 6	Nd I	BL70
9467.05	10560.059	0.10	3 L	*13641* – 23108	5 – 6	Nd I	BL70
9470.69	10556.001	0.10	3 L			Nd	BL70
9471.60	10554.986	0.05	5 L			Nd	BL70
9513.25	10508.775	0.10	3 L	13017 – *22530*	4 – 5	Nd I	BL70
9514.82	10507.042	0.10	3 L			Nd	BL70
9533.44	10486.520	0.15	3 L	*13641* – 23175	5 – 5	Nd I	BL70
9544.49	10474.379	0.05	7 L	1128 – *10672*	5 – 4	Nd I	BL70
9575.43	10440.535	0.05	5 L	*11812* – 21388	6 – 6	Nd I	BL70
9586.93	10428.010	0.10	3 L			Nd	BL70
9595.13	10419.099	0.07	6 L	3681 – *13276*	7 – 6	Nd I	BL70
9626.49	10385.156	0.08	4 L			Nd	BL70
9627.31	10384.272	0.10	3 L			Nd	BL70
9673.51	10334.677	0.08	4 L	5048 – *14722*	8 – 7	Nd I	BL70
9683.57	10323.941	0.05	7 L	5048 – *14732*	8 – 8	Nd I	BL70
9744.29	10259.609	0.08	4 L			Nd	BL70
9750.83	10252.727	0.08	4 L			Nd	BL70
9771.96	10230.558	0.15	3 L			Nd	BL70
9790.66	10211.017	0.05	7 L	1128 – *10918*	5 – 5	Nd I	BL70
9927.37	10070.401	0.08	5 L	0 – *9927*	4 – 3	Nd I	BL70

Nd References

BL70 Blaise, J., Chevillard, J., Vergès, J., and Wyart, J. F., Spectrochim. Acta **25B**, 333–381 (1970).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS

MO70 Morillon, C., Spectrochim. Acta **25B**, 513–538 (1970).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Girard grid spectrometer
Detector: PbS and InSb

Neon

Ne, Z = 10

Ne I Normal state of valence electrons $2p^6\ ^1S_0$ I.P. = 173930 cm^{-1}

Ne II Normal state of valence electrons $2p^5\ ^2P^o_{3/2}$ I.P. = 330389 cm^{-1}

Ne

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2649.264	37736.035		30	*161636* – 164285	1 – 0	Ne I	HU73
2689.459	37172.062		15	164285 – *166975*	0 – 1	Ne I	HU73
2741.106	36471.678		20	164285 – *167026*	0 – 1	Ne I	HU73
2761.708	36199.603		18	*161524* – 164285	1 – 0	Ne I	HU73
2789.824	35834.784		120	163038 – *165828*	2 – 2	Ne I	HU73
2815.554	35507.304		20	163012 – *165828*	1 – 2	Ne I	HU73
2874.431	34780.010		80	163038 – *165912*	2 – 1	Ne I	HU73
2898.612	34489.860		40	163707 – *166606*	1 – 0	Ne I	HU73
2900.161	34471.442		100	163012 – *165912*	1 – 1	Ne I	HU73
2929.062	34131.310		600	162899 – *165828*	2 – 2	Ne I	HU73
2947.909	33913.099		2200	163708 – *166656*	2 – 1	Ne I	HU73
2948.787	33902.998		1300 B	163707 – *166656*	1 – 1	Ne I?	HU73
2949.065	33899.801		1300 B	163657 – *166606*	1 – 0	Ne I?	HU73
2983.252	33511.327		30	*159534* – 162517	1 – 1	Ne I	HU73
2997.472	33352.352		450	162830 – *165828*	3 – 2	Ne I	HU73
2999.240	33332.683		80	163657 – *166656*	1 – 1	Ne I	HU73
3013.669	33173.094		250	162899 – *165912*	2 – 1	Ne I	HU73
3137.878	31859.980		40	*159379* – 162517	0 – 1	Ne I	HU73
3255.207	30711.639		20	163401 – *166656*	0 – 1	Ne I	HU73
3267.620	30594.965		20	163707 – *166975*	1 – 1	Ne I	HU73
3303.842	30259.534		10	163707 – *167011*	1 – 2	Ne I	HU73
3310.303	30200.474		150 B	162517 – *165828*	1 – 2	Ne I?	HU73
3310.401	30199.579		150 B	163657 – *166967*	1 – 0	Ne I?	HU73
3364.493	29714.054		15	*159534* – 162899	1 – 2	Ne I	HU73
3394.910	29447.826		50	162517 – *165912*	1 – 1	Ne I	HU73
3478.001	28744.305		40	*159534* – 163012	1 – 1	Ne I	HU73
3503.731	28533.216		85	*159534* – 163038	1 – 2	Ne I	HU73
3521.877	28386.207		125	164285 – *167807*	0 – 1	Ne I	HU73
3574.040	27971.914		40	163401 – *166975*	0 – 1	Ne I	HU73
3625.687	27573.461		100	163401 – *167026*	0 – 1	Ne I	HU73
3866.682	25854.914		35	*159534* – 163401	1 – 0	Ne I	HU73
3916.756	25524.366		650	*158601* – 162517	2 – 1	Ne I	HU73
3936.990	25393.188		50	163038 – *166975*	2 – 1	Ne I	HU73
3955.048	25277.246		10	163012 – *166967*	1 – 0	Ne I	HU73
3962.720	25228.308		70 B	163012 – *166975*	1 – 1	Ne I?	HU73
3962.779	25227.934		70 B	163038 – *167001*	2 – 3	Ne I?	HU73
3973.212	25161.689		250	163038 – *167011*	2 – 2	Ne I	HU73
3988.637	25064.383		5	163038 – *167026*	2 – 1	Ne I	HU73
3998.942	24999.792		30	163012 – *167011*	1 – 2	Ne I	HU73
4009.258	24935.468		5	163038 – *167047*	2 – 2	Ne I	HU73
4010.318	24928.877		500	163038 – *167048*	2 – 3	Ne I	HU73
4014.367	24903.732		180	163012 – *167026*	1 – 1	Ne I	HU73
4034.988	24776.460		350	163012 – *167047*	1 – 2	Ne I	HU73
4076.228	24525.791		10	162899 – *166975*	2 – 1	Ne I	HU73
4086.369	24464.927		25	163708 – *167794*	2 – 2	Ne I	HU73
4087.247	24459.670		700 B	163707 – *167794*	1 – 2	Ne I?	HU73
4087.298	24459.366		700 B	163708 – *167795*	2 – 3	Ne I?	HU73
4088.345	24453.102		14	163708 – *167796*	2 – 2	Ne I	HU73
4089.223	24447.850		400	163707 – *167796*	1 – 2	Ne I	HU73
4100.038	24383.362		90	163707 – *167807*	1 – 1	Ne I	HU73
4102.017	24371.599		800	162899 – *167001*	2 – 3	Ne I	HU73
4103.120	24365.048		1500	*158795* – 162899	1 – 2	Ne I	HU73
4122.648	24249.638		600	*159534* – 163657	1 – 1	Ne I	HU73
4127.875	24218.930		40	162899 – *167026*	2 – 1	Ne I	HU73
4137.700	24161.420		500	163657 – *167794*	1 – 2	Ne I	HU73
4138.636	24155.956		15 B	162517 – *166656*	1 – 1	Ne I?	HU73

Ne—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4139.676	24149.887		15 B	163657 – *167796*	1 – 2	Ne I?	HU73
4148.496	24098.544		200	162899 – *167047*	2 – 2	Ne I	HU73
4149.556	24092.388		50 B	162899 – *167048*	2 – 3	Ne I?	HU73
4150.492	24086.960		50 B	163657 – *167807*	1 – 1	Ne I?	HU73
4169.331	23978.122		1000	162830 – *167000*	3 – 4	Ne I	HU73
4170.427	23971.820		10	162830 – *167001*	3 – 3	Ne I	HU73
4173.101	23956.458		600	*159534* – 163707	1 – 1	Ne I	HU73
4173.979	23951.417		1800	*159534* – 163708	1 – 2	Ne I	HU73
4216.628	23709.160		1100 B	*158795* – 163012	1 – 1	Ne I?	HU73
4216.906	23707.601		1100 B	162830 – *167047*	3 – 2	Ne I?	HU73
4217.966	23701.643		300	162830 – *167048*	3 – 3	Ne I	HU73
4229.588	23636.515		3500	*158601* – 162830	2 – 3	Ne I	HU73
4242.359	23565.362		850	*158795* – 163038	1 – 2	Ne I	HU73
4277.274	23372.999		1050	*159379* – 163657	0 – 1	Ne I	HU73
4297.997	23260.302		1000	*158601* – 162899	2 – 2	Ne I	HU73
4327.727	23100.514		600	*159379* – 163707	0 – 1	Ne I	HU73
4406.458	22687.775		50	163401 – *167807*	0 – 1	Ne I	HU73
4411.506	22661.813		400	*158601* 163012	2 1	Ne I	HU73
4437.236	22530.404		2250	*158601* – 163038	2 – 2	Ne I	HU73
4449.797	22466.802		130	162517 – *166967*	1 – 0	Ne I	HU73
4457.469	22428.133		350	162517 – *166975*	1 – 1	Ne I	HU73
4493.691	22247.348		300	162517 – *167011*	1 – 2	Ne I	HU73
4605.309	21708.145		750	*158795* – 163401	1 – 0	Ne I	HU73
4751.262	21041.295		1200	*159534* – 164285	1 – 0	Ne I	HU73
4861.275	20565.121		20	*158795* – 163657	1 – 1	Ne I	HU73
4912.607	20350.238		120	*158795* – 163708	1 – 2	Ne I	HU73
5106.605	19577.136		170	*158601* – 163707	2 – 1	Ne I	HU73
5107.484	19573.769		50	*158601* – 163708	2 – 2	Ne I	HU73
5279.072	18937.551		15	162517 – *167796*	1 – 2	Ne I	HU73
5351.206	18682.274		20	*161701* – 167052	3 – 2	Ne I	HU73
5367.617	18625.16		40 B	*161701* – 167069	3 –	Ne I	JO63
5369.418	18618.91		30 B	*161699* – 167069	2 –	Ne I	JO63
5375.541	18597.70		180 B	*161701* – 167076	3 –	Ne I	JO63
5377.322	18591.54		120	*161699* – 167076	2 – 3	Ne I	JO63
5411.011	18475.79		80	*162435* – 167846	1 – 2	Ne I	JO63
5416.040	18458.64		20 B	*161636* – 167052	1 –	Ne I	JO63
5426.695	18422.39		140 B	*162419* – 167846	2 –	Ne I	JO63
5432.457	18402.85		100	*161636* – 167069	1 – 2	Ne I	JO63
5436.270	18389.95		190 B	*162410* – 167846	3 –	Ne I	JO63
5437.777	18384.85		130	*162408* – 167846	2 – 3	Ne I	JO63
5445.397	18359.12		30 B	*161607* – 167052	2 –	Ne I	JO63
5461.800	18303.98		130 B	*161607* – 167069	2 –	Ne I	JO63
5468.181	18282.62		200	*161592* – 167060	3 – 4	Ne I	JO63
5469.961	18276.68		250 B	*161590* – 167060	4 –	Ne I	JO63
5476.944	18253.373		6 B	*161592* – 167069	3 – 3	Ne I?	HU73
5476.957	18253.330		6 B	*161592* – 167069	3 – 2	Ne I?	HU73
5478.718	18247.463		10	*161590* – 167069	4 – 3	Ne I	HU73
5484.859	18227.03		20 B	*161592* – 167076	3 –	Ne I	JO63
5486.642	18221.11		30 B	*161590* – 167076	4 –	Ne I	JO63
5489.890	18210.330		5	*158795* – 164285	1 – 0	Ne I	HU73
5528.482	18083.21		120 B	*161524* – 167052	1 –	Ne I	JO63
5543.008	18035.82		40	*161509* – 167052	0 – 1	Ne I	JO63
5544.903	18029.657		15	*161524* – 167069	1 – 2	Ne I	HU73
5812.846	17198.578		4	*161636* – 167449	1 – 1	Ne I	HU73
5817.669	17184.321		150 B	163708 – *169526*	2 – 2	Ne I?	HU73
5818.286	17182.499		150 B	163708 – *169526*	2 – 3	Ne I?	HU73
5818.547	17181.727		150 B	163707 – *169526*	1 – 2	Ne I?	HU73
5825.260	17161.930		400	152970 – *158795*	0 – 1	Ne I	HU73
5831.148	17144.601		10	163657 – *169488*	1 – 1	Ne I	HU73
5929.002	16861.640		20	163038 – *168967*	2 – 1	Ne I	HU73
5938.65	16834.25		15	*162419* – 168358	2 – 1	Ne I	HU73
5954.615	16789.110		40 B	*161636* – 167591	1 – 2	Ne I?	HU73
5954.732	16788.771		40 B	163012 – *168967*	1 – 1	Ne I?	HU73
6010.122	16634.054		25	164285 – *170296*	0 – 1	Ne I	HU73
6019.031	16609.433		60 B	163708 – *169727*	2 – 1	Ne I?	HU73
6019.909	16607.009		60 B	163707 – *169727*	1 – 1	Ne I?	HU73

Ne—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6048.658	16528.079		20	163657 – *169705*	1 – 0	Ne I	HU73
6068.240	16474.742		40	162899 – *168967*	2 – 1	Ne I	HU73
6070.362	16468.982		12	163657 – *169727*	1 – 1	Ne I	HU73
6093.948	16405.242		80	162830 – *168924*	3 – 2	Ne I	HU73
6115.387	16347.729		20 B	*161524* – 167639	1 – 1	Ne I?	HU73
6115.689	16346.923		20 B	163401 – *169516*	0 – 1	Ne I?	HU73
6210.072	16098.476		15	*161636* – 167846	1 – 2	Ne I	HU73
6239.416	16022.763		50 B	*161607* – 167846	2 – 3	Ne I?	HU73
6239.428	16022.732		50 B	*161607* – 167846	2 – 2	Ne I?	HU73
6406.779	15604.203		30	162517 – *168924*	1 – 2	Ne I	HU73
6449.481	15500.887		20 B	162517 – *168967*	1 – 1	Ne I?	HU73
6450.064	15499.487		20 B	163038 – *169488*	2 – 1	Ne I?	HU73
6463.933	15466.232		10	163038 – *169502*	2 – 3	Ne I	HU73
6470.211	15451.225		40 B	163038 – *169508*	2 – 2	Ne I?	HU73
6470.351	15450.890		40 B	163012 – *169482*	1 – 0	Ne I?	HU73
6487.917	15409.057		100 B	163038 – *169526*	2 – 2	Ne I?	HU73
6488.534	15407.592		100 B	163038 – *169526*	2 – 3	Ne I?	HU73
6504.369	15370.081		30	163012 – *169516*	1 – 1	Ne I	HU73
6513.647	15348.188		50	163012 – *169526*	1 – 2	Ne I	HU73
6563.887	15230.714		800	152970 – *159534*	0 – 1	Ne I	HU73
6580.360	15192.585		70 B	163708 – *170288*	2 – 2	Ne I?	HU73
6580.720	15191.754		70 B	163708 – *170289*	2 – 2	Ne I?	HU73
6581.078	15190.928		70 B	163708 – *170289*	2 – 3	Ne I?	HU73
6581.238	15190.558		70 B	163707 – *170288*	1 – 2	Ne I?	HU73
6581.598	15189.727		70 B	163707 – *170289*	1 – 2	Ne I?	HU73
6588.283	15174.314		4	163707 – *170296*	1 – 1	Ne I	HU73
6603.171	15140.101		50	162899 – *169502*	2 – 3	Ne I	HU73
6627.155	15085.308		20 B	162899 – *169526*	2 – 2	Ne I?	HU73
6627.772	15083.904		20 B	162899 – *169526*	2 – 3	Ne I?	HU73
6631.692	15074.990		40 B	163657 – *170288*	1 – 2	Ne I?	HU73
6632.052	15074.171		40 B	163657 – *170289*	1 – 2	Ne I?	HU73
6670.933	14986.312		100 B	162830 – *169501*	3 – 4	Ne I?	HU73
6671.581	14984.856		100 B	162830 – *169502*	3 – 3	Ne I?	HU73
6695.565	14931.179		20 B	162830 – *169526*	3 – 2	Ne I?	HU73
6696.182	14929.803		20 B	162830 – *169526*	3 – 3	Ne I?	HU73
6894.703	14499.925		4	163401 – *170296*	0 – 1	Ne I	HU73
6965.100	14353.371		4	162517 – *169482*	1 – 0	Ne I	HU73
6970.543	14342.163		18	162517 – *169488*	1 – 1	Ne I	HU73
6990.690	14300.830		20	162517 – *169508*	1 – 2	Ne I	HU73
7562.663	13219.241		700	151038 – *158601*	1 – 2	Ne I	HU73
7742.607	12912.014		1100	150858 – *158601*	2 – 2	Ne I	HU73
7829.003	12769.525		250	150772 – *158601*	1 – 2	Ne I	HU73
7837.501	12755.68	0.10	3	*161701* – 169538	3 – 3	Ne I	LI68
7839.325	12752.71	0.10	2	*161699* – 169538	2 – 2	Ne I	LI68
7841.585	12749.04	0.10	16	*161701* – 169543	3 – 4	Ne I	LI68
7843.368	12746.14	0.10	11	*161699* – 169543	2 – 3	Ne I	LI68
7878.562	12689.201		1000	150917 – *158795*	0 – 1	Ne I	HU73
7882.064	12683.56	0.10	8	*162435* – 170317	1 – 2	Ne I	LI68
7893.870	12664.594		25 B	*161636* – 169530	1 – 2	Ne I?	HU73
7893.874	12664.587		25 B	*161636* – 169530	1 – 1	Ne I?	HU73
7897.740	12658.39	0.10	14	*162419* – 170317	2 – 3	Ne I	LI68
7902.338	12651.02	0.10	7	*161636* – 169538	1 – 2	Ne I	LI68
7907.510	12642.75	0.10	22	*162410* – 170317	3 – 4	Ne I	LI68
7908.985	12640.39	0.10	16	*162408* – 170317	2 – 3	Ne I	LI68
7923.226	12617.670		20 B	*161607* – 169530	2 – 2	Ne I?	HU73
7923.230	12617.663		20 B	*161607* – 169530	2 – 1	Ne I?	HU73
7931.688	12604.21	0.10	16	*161607* – 169538	2 – 2	Ne I	LI68
7937.484	12595.004		300	150858 – *158795*	2 – 1	Ne I	HU73
7942.244	12587.46	0.10	26	*161592* – 169534	3 – 4	Ne I	LI68
7944.028	12584.63	0.10	30	*161590* – 169534	4 – 5	Ne I	LI68
7948.603	12577.386		5	*161590* – 169538	4 – 3	Ne I	HU73
7950.909	12573.738		10 B	*161592* – 169543	3 – 3	Ne I?	HU73
7950.916	12573.727		10 B	*161592* – 169543	3 – 4	Ne I?	HU73
7952.683	12570.934		10 B	*161590* – 169543	4 – 3	Ne I?	HU73
7952.690	12570.923		10 B	*161590* – 169543	4 – 4	Ne I?	HU73
8006.313	12486.73	0.10	13	*161524* – 169530	1 – 2	Ne I	LI68

Ne—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8020.860	12464.08	0.10	4	*161509* – 169530	0 – 1	Ne I	LI68
8023.881	12459.389		800	150772 – *158795*	1 – 1	Ne I	HU73
8285.254	12066.334		3000 I	150315 – *158601*	2 – 2	Ne I	HU73
8341.541	11984.912		1000	151038 – *159379*	1 – 0	Ne I	HU73
8479.523	11789.889		500	150121 – *158601*	1 – 2	Ne I	HU73
8480.131	11789.043		1500	150315 – *158795*	2 – 1	Ne I	HU73
8496.167	11766.792		2000 I	151038 – *159534*	1 – 1	Ne I	HU73
8553.441	11688.002		300	152970 – *161524*	0 – 1	Ne I	HU73
8607.882	11614.081		1200 I	150772 – *159379*	1 – 0	Ne I	HU73
8617.189	11601.537		500	150917 – *159534*	0 – 1	Ne I	HU73
8665.885	11536.345		950	152970 – *161636*	0 – 1	Ne I	HU73
8674.400	11525.019		1500	150121 – *158795*	1 – 1	Ne I	HU73
8676.112	11522.746		3000	150858 – *159534*	2 – 1	Ne I	HU73
8762.508	11409.134		1100 I	150772 – *159534*	1 – 1	Ne I	HU73
8776.894	11390.434		1600 I	149824 – *158601*	2 – 2	Ne I	HU73
8795.241	11366.673		10	*158795* – 167591	1 – 2	Ne I	HU73
8820.890	11333.621		20	*159534* – 168355	1 – 1	Ne I	HU73
8824.010	11329.613		10	*159534* – 168358	1 – 1	Ne I	HU73
8843.569	11304.557		20	*158795* – 167639	1 – 1	Ne I	HU73
8844.12	11303.85		50	*159534* – 168378	1 – 2	Ne I	HU73
8848.349	11298.450		2	*158601* – 167449	2 – 1	Ne I	HU73
8852.648	11292.964		5	*158795* – 167648	1 – 2	Ne I	HU73
8944.073	11177.528		3500 I	149657 – *158601*	3 – 2	Ne I	HU73
8957.945	11160.219		15	*158601* – 167559	2 – 3	Ne I	HU73
8971.771	11143.020		3000 I	149824 – *158795*	2 – 1	Ne I	HU73
9119.69	10962.28	0.02	2 L	282375 – *291495*	1½ – 2½	Ne II	PE71
9121.23	10960.43	0.02	0 L	282680 – *291801*	½ – 1½	Ne II	PE71
9129.40	10950.62	0.02	1 L	283322 – *292451*	1½ – 1½	Ne II	PE71
9203.74	10862.17	0.02	3 L	281998 – *291202*	2½ – 3½	Ne II	PE71
9224.37	10837.88	0.02	3 L	283322 – *292546*	1½ – ½	Ne II	PE71
9287.48	10764.23	0.02	2 L	282680 – *291968*	½ – ½	Ne II	PE71
9426.54	10605.44	0.02	3 L	282375 – *291801*	1½ – 1½	Ne II	PE71
9561.53	10455.71	0.02	1 L	308101 – *317663*	1½ – 1½	Ne II	PE71
9561.87	10455.34	0.02	8 L	308101 – *317663*	2½ – 1½	Ne II	PE71
9680.15	10327.59	0.02	9 LB	308101 – *317781*	2½ – 2½	Ne II?	PE71
9680.15	10327.59	0.02	9 LB	308101 – *317781*	1½ – 1½	Ne II?	PE71
9680.54	10327.17	0.02	1 L	308101 – *317781*	2½ – 1½	Ne II	PE71
9726.70	10278.16	0.02	7 L	308101 – *317828*	1½ – ½	Ne II	PE71
9853.33	10146.07	0.02	4 L	*302989* – 312843	1½ – 2½	Ne II	PE68
9854.21	10145.17	0.02	1 LH	*302988* – 312843	½ – 1½	Ne II	PE68
9879.70	10118.99	0.02	5 L	*303600* – 313480	2½ – 3½	Ne II	PE68
9880.31	10118.36	0.02	5 L	*303599* – 313480	3½ – 4½	Ne II	PE68
9898.14	10100.14	0.02	7 LB	*302935* – 312833		Ne II	PE68
9919.85	10078.04	0.02	4 L	*303824* – 313744	2½ – 3½	Ne II	PE68
9920.35	10077.53	0.02	5 L	*303824* – 313744	3½ – 4½	Ne II	PE68
9921.17	10076.69	0.02	3 L	*302903* – 312824	2½ – 3½	Ne II	PE68
9922.27	10075.57	0.02	2 L	*302902* – 312824	1½ – 2½	Ne II	PE68
9933.44	10064.25	0.02	5 L	*303528* – 313461	3½ – 4½	Ne II	PE68
9934.25	10063.42	0.02	4 L	*303527* – 313461	4½ – 5½	Ne II	PE68
9948.05	10049.47	0.02	4 L	*303509* – 313457	2½ – 3½	Ne II	PE68
9949.06	10048.45	0.02	3 L	*303508* – 313457	1½ – 2½	Ne II	PE68
9967.54	10029.82	0.02	3 LH	*302844* – 312811	2½ – 3½	Ne II	PE68
9968.12	10029.24	0.02	3 L	*302843* – 312811	3½ – 4½	Ne II	PE68
9979.50	10017.79	0.02	4 L	*302831* – 312810	3½ – 4½	Ne II	PE68
9981.65	10015.63	0.02	4 L	*302829* – 312810	4½ – 5½	Ne II	PE68

Ne References

JO63 Johansson, I., Ark. Fys. **25,** 381–387 (1963)
Source: Electrodeless discharge tube (18 MHz)
Instrument: 1 m Pfund spectrometer
Detector: PbS
Uncertainty in σ: Given as $\sim$0.005 cm^{-1}

PE68 Persson, W., and Minnhagen, L., Ark. Fys. **37,** 273–300 (1968).
Source: Hollow cathode
Instrument: 3.4 m Jarrell Ash Ebert spectrograph
Detector: Photographic

LI68 Litzèn, U., Ark. Fys. **38,** 317–324 (1968).
Source: Electrodeless discharge tube (18 MHz)
Instrument: 1 m Pfund spectrometer
Detector: PbS cooled with liquid nitrogen

PE71 Persson, W., Physica Scripta **3,** 133–155 (1971).
Source: Hollow cathode
Instrument: 3.5 m RVS Ebert spectrograph and 3.4 m Jarrell-Ash Ebert spectrograph
Detector: Photographic

HU73 Humphreys, C. J., J. Phys. Chem. Ref. Data 2, 519–529 (1973).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1 m Littrow spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Not given—observed wavenumbers calculated from established energy levels (Kaufman and Minnhagen (1972))

Additional References

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Humphreys, C. J., and Kostkowski, H. J., J. Res. Nat. Bur. Stds. **49,** 73 (1952).
Hepner, G., Compt. rend. **248,** 8 (1959).
Humphreys, C. J., and Paul, E., Jr., NAVWEPS report 5996, 23 (1960).
Humphreys, C. J., Paul, E., Jr., Cowan, R. D., and Andrew, K. L., J. Opt. Soc. Amer. **57,** 855 (1967).
Morillon, C., Spectrochim. Acta **28B,** 527 (1972).

Nitrogen

N, Z = 7

N I Normal state of valence electrons $2s^2 2p^3\ {}^4S^\circ_{3/2}$ I.P. = 117214 cm^{-1}

N II Normal state of valence electrons $2s^2 2p^2\ {}^3P_0$ I.P. = 238750 cm^{-1}

N

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5331.59	18751.01	0.02	2 B	105017 – *110349*	3½ –	N I	ER61
5354.72	18670.00	0.02	4 B	105143 – *110498*	2½ –	N I	ER61
5358.12	18658.16	0.02	32	105143 – *110501*	2½ – 3½	N I	ER61
5366.17	18630.19	0.02	13 B	105119 – *110485*	1½ –	N I	ER61
5378.57	18587.24	0.02	13	105119 – *110498*	1½ – 2½	N I	ER61
5384.50	18566.75	0.02	4 B	105017 – *110402*	3½ –	N I	ER61
5477.48	18251.58	0.02	11 B	105008 – *110485*	2½ –	N I	ER61
5480.80	18240.54	0.02	13 B	105017 – *110498*	3½ –	N I	ER61
5484.07	18229.66	0.02	60 B	105017 – *110501*	3½ –	N I	ER61
5489.82	18210.56	0.02	32 UB	105008 – *110498*	2½ –	N I?	ER61
5489.82	18210.56	0.02	32 UB	104996 – *110485*	1½ –	N I?	ER61
5493.27	18199.13	0.02	8	105008 – *110501*	2½ – 3½	N I	ER61
5501.59	18171.60	0.02	13	104984 – *110485*	½ – 1½	N I	ER61
5502.15	18169.74	0.02	13	104996 – *110498*	1½ – 2½	N I	ER61
5518.39	18116.27	0.02	6	104886 – *110404*	½ – 1½	N I	ER61
5520.73	18108.61	0.02	12 B	104881 – *110402*	3½ –	N I	ER61
5524.05	18097.71	0.02	10 B	104825 – *110349*	2½ –	N I	ER61
5538.79	18049.56	0.02	33 UB	104810 – *110349*	2½ –	N I	ER61
5544.81	18029.95	0.02	30 B	104859 – *110404*	1½ –	N I	ER61
5560.25	17979.89	0.02	51 B	104825 – *110385*	2½ –	N I	ER61
5573.69	17936.55	0.02	17	104886 – *110459*	½ –	N I	ER61
5577.06	17925.70	0.02	8	104825 – *110402*	2½ – 3½	N I	ER61
5579.44	17918.06	0.02	7 B	104825 – *110404*	2½ –	N I	ER61
5591.86	17878.26	0.02	100	104881 – *110473*	3½ – 4½	N I?	ER61
5591.86	17878.26	0.02	100	104810 – *110402*	2½ – 3½	N I?	ER61
5600.06	17852.09	0.02	10 B	104859 – *110459*	1½ –	N I	ER61
5620.46	17787.27	0.02	8 UB	104881 – *110501*	3½ –	N I	ER61
5666.11	17643.98	0.02	42 B	104683 – *110349*	2½ –	N I	ER61
5668.41	17636.83	0.02	8 B	104716 – *110385*	3½ –	N I	ER61
5685.16	17584.86	0.02	100 UB	104716 – *110402*	3½ –	N I?	ER61
5685.16	17584.86	0.02	100 UB	104664 – *110349*	1½ – 2½	N I?	ER61
5702.30	17531.99	0.02	18 B	104683 – *110385*	2½ –	N I	ER61
5707.32	17516.58	0.02	125 UB	104765 – *110473*	4½ –	N I	ER61
5719.13	17480.41	0.02	27	104683 – *110402*	2½ – 3½	N I	ER61
5721.17	17474.16	0.02	32	104664 – *110385*	1½ – 2½	N I	ER61
5733.62	17436.22	0.02	24	104615 – *110349*	1½ – 2½	N I	ER61
5735.92	17429.23	0.02	16 UB	104765 – *110501*	4½ –	N I	ER61
5750.47	17385.13	0.02	12	104654 – *110404*	½ – 1½	N I	ER61
5756.29	17367.55	0.02	23	104716 – *110473*	3½ – 4½	N I	ER61
5769.81	17326.86	0.02	16	104615 – *110385*	1½ – 2½	N I	ER61
5781.50	17291.81	0.02	6 B	104716 – *110498*	3½ –	N I	ER61
5784.77	17282.04	0.02	4 B	104716 – *110501*	3½ –	N I	ER61
5789.08	17269.17	0.02	11 B	104615 – *110404*	1½ –	N I	ER61
5805.77	17219.55	0.02	10	104654 – *110459*	½ –	N I	ER61
6338.98	15771.10	0.02	22	*97805* – 104144	1½ – ½	N I	ER61
6374.65	15682.86	0.02	54	*97770* – 104144	½ – ½	N I	ER61
6415.80	15582.27	0.02	200	*97805* – 104221	1½ – 1½	N I	ER61
6451.46	15496.13	0.02	34	*97770* – 104221	½ – 1½	N I	ER61
6600.31	15146.66	0.02	75	88170 – *94770*	½ – ½	N I	ER61
6619.70	15102.29	0.02	26	88151 – *94770*	1½ – ½	N I	ER61
6622.92	15094.96	0.02	75	88170 – *94793*	½ – 1½	N I	ER61
6642.31	15050.88	0.02	80	88151 – *94793*	1½ – 1½	N I	ER61
6679.72	14966.60	0.02	180	88151 – *94830*	1½ – 2½	N I	ER61
6686.21	14952.07	0.02	15	88107 – *94793*	2½ – 1½	N I	ER61
6723.62	14868.87	0.02	100	88107 – *94830*	2½ – 2½	N I	ER61
6774.56	14757.07	0.02	300	88107 – *94881*	2½ – 3½	N I	ER61

N—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6809.64	14681.04	0.02	55	*97805* – 104615	1½ – 1½	N I	ER61
6845.27	14604.64	0.02	27	*97770* – 104615	½ – 1½	N I	ER61
6848.18	14598.42	0.02	17	*97805* – 104654	1½ – ½	N I	ER61
6871.66	14548.55	0.02	20	*96750* – 103622	1½ – ½	N I	ER61
6883.84	14522.81	0.02	36	*97770* – 104654	½ – ½	N I	ER61
6916.31	14454.62	0.02	29	*96750* – 103667	1½ – 1½	N I	ER61
6984.64	14313.21	0.02	80	*96750* – 103735	1½ – 2½	N I	ER61
7304.73	13686.03	0.02	14	88170 – *95475*	½ – ½	N I	ER61
7314.04	13668.60	0.02	65	*97805* – 105119	1½ – 1½	N I	ER61
7323.13	13651.63	0.02	60	88170 – *95493*	½ – 1½	N I	ER61
7324.14	13649.74	0.02	58	88151 – *95475*	1½ – ½	N I	ER61
7337.88	13624.18	0.02	350	*97805* – 105143	1½ – 2½	N I	ER61
7342.53	13615.56	0.02	35	88151 – *95493*	1½ – 1½	N I	ER61
7349.71	13602.27	0.02	190	*97770* – 105119	½ – 1½	N I	ER61
7357.12	13588.55	0.02	115	*96787* – 104144	1½ – ½	N I	ER61
7357.57	13587.73	0.02	200	*96864* – 104221	2½ – 1½	N I	ER61
7361.04	13581.33	0.02	1200	86220 – *93581*	1½ – ½	N I	ER61
7380.99	13544.61	0.02	65	88151 – *95532*	1½ – 2½	N I	ER61
7386.43	13534.64	0.02	60	88107 – *95493*	2½ – 1½	N I	ER61
7424.89	13464.53	0.02	185	88107 – *95532*	2½ – 2½	N I	ER61
7433.95	13448.12	0.02	21	*96787* – 104221	1½ – 1½	N I	ER61
7444.20	13429.61	0.02	670	86137 – *93581*	½ – ½	N I	ER61
7751.43	12897.32	0.02	51	*96864* – 104615	2½ – 1½	N I	ER61
7823.49	12778.5	0.02	5 M	105143 – *112967*	2½ – 3½	N I	ER61
7827.78	12771.51	0.02	15	*96787* – 104615	1½ – 1½	N I	ER61
7852.89	12730.68	0.02	35	*96864* – 104716	2½ – 3½	N I	ER61
7866.35	12708.89	0.02	30	*96787* – 104654	1½ – ½	N I	ER61
7895.39	12662.16	0.02	27	*96787* – 104683	1½ – 2½	N I	ER61
7946.32	12581.00	0.02	27	*96864* – 104810	2½ – 2½	N I	ER61
7947.73	12578.8	0.02	3	105017 – *112965*	3½ – 3½	N I	ER61
7949.49	12575.99	0.02	8	105017 – *112967*	3½ – 4½	N I	ER61
7956.84	12564.4	0.02	4 M	105008 – *112965*	2½ – 3½	N I	ER61
7961.09	12557.66	0.02	14 U	*96864* – 104825	2½ – 2½	N I	ER61
8017.30	12469.62	0.02	1350	*96864* – 104881	2½ – 3½	N I	ER61
8020.80	12464.2	0.02	5 M	104859 – *112880*	1½ – 2½	N I	ER61
8022.68	12461.25	0.02	680	*96787* – 104810	1½ – 2½	N I	ER61
8037.42	12438.40	0.02	195	*96787* – 104825	1½ – 2½	N I	ER61
8043.62	12428.81	0.02	6	104825 – *112868*	2½ – 3½	N I	ER61
8059.53	12404.27	0.02	98	*96750* – 104810	1½ – 2½	N I	ER61
8067.56	12391.9	0.02	5	104810 – *112877*	2½ – 3½	N I	ER61
8072.18	12384.83	0.02	12	104881 – *112953*	3½ – 4½	N I?	ER61
8072.18	12384.83	0.02	12	*96787* – 104859	1½ – 1½	N I?	ER61
8074.26	12381.65	0.02	375	*96750* – 104825	1½ – 2½	N I	ER61
8108.90	12328.76	0.02	350	*96750* – 104859	1½ – 1½	N I	ER61
8128.82	12298.55	0.02	120	*95493* – 103622	1½ – ½	N I	ER61
8135.15	12288.97	0.02	260	*95532* – 103667	2½ – 1½	N I?	ER61
8135.15	12288.97	0.02	260	*96750* – 104886	1½ – ½	N I?	ER61
8147.20	12270.80	0.02	20 M	*95475* – 103622	½ – ½	N I	ER61
8153.53	12261.28	0.02	27 M	*96864* – 105017	2½ – 3½	N I	ER61
8160.96	12250.11	0.02	11 M	104716 – *112877*	3½ – 4½	N I	ER61
8173.50	12231.32	0.02	75 M	*95493* – 103667	1½ – 1½	N I	ER61
8187.66	12210.17	0.02	12 M	104765 – *112953*	4½ – 5½	N I	ER61
8191.84	12203.93	0.02	150	*95475* – 103667	½ – 1½	N I	ER61
8203.34	12186.82	0.02	480	*95532* – 103735	2½ – 2½	N I	ER61
8233.51	12142.16	0.02	12	*96750* – 104984	1½ – ½	N I	ER61
8241.79	12129.97	0.02	170	*95493* – 103735	1½ – 2½	N I	ER61
8245.440	12124.60	0.02	35	*96750* – 104996	1½ – 1½	N I	ER61
8255.86	12109.30	0.02	25 M	*96864* – 105119	2½ – 1½	N I	ER61
8257.71	12106.59	0.02	45	*96750* – 105008	1½ – 2½	N I	ER61
8279.64	12074.51	0.02	230	*96864* – 105143	2½ – 2½	N I	ER61
8332.19	11998.36	0.02	110	*96787* – 105119	1½ – 1½	N I	ER61
8580.27	11651.45	0.02	2 V	88170 – *96750*	½ – 1½	N I	EI58
8599.67	11625.173	0.02	3 V	88151 – *96750*	1½ – 1½	N I	EI58
8643.58	11566.114	0.02	4 V	88107 – *96750*	2½ – 1½	N I	EI58
8829.02	11323.184	0.02	3 V	*94793* – 103622	1½ – ½	N I	EI58
8836.27	11313.900	0.02	4 V	*94830* – 103667	2½ – 1½	N I	EI58

N—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8851.65	11294.242	0.02	2 V	*94770* – 103622	½ – ½	N I	EI58
8853.65	11291.679	0.02	5 V	*94881* – 103735	3½ – 2½	N I	EI58
8873.67	11266.210	0.02	3 V	*94793* – 103667	1½ – 1½	N I	EI58
8896.30	11237.556	0.02	2 V	*94770* – 103667	½ – 1½	N I	EI58
8904.60	11227.076	0.02	3 V	*94830* – 103735	2½ – 2½	N I	EI58
8941.98	11180.142	0.02	1 V	*94793* – 103735	1½ – 2½	N I	EI58
9184.78	10884.60	0.02	2 V	*95532* – 104716	2½ – 3½	N I	EI58
9189.34	10879.19	0.02	1 V	*95493* – 104683	1½ – 2½	N I	EI58
9278.21	10774.993	0.02	3 V	*95532* – 104810	2½ – 2½	N I	EI58
9292.96	10757.888	0.02	7 V	*95532* – 104825	2½ – 2½	N I	EI58
9316.67	10730.510	0.02	4 V	*95493* – 104810	1½ – 2½	N I	EI58
9327.58	10717.954	0.02	6 V	*95532* – 104859	2½ – 1½	N I	EI58
9331.42	10713.550	0.02	8 V	*95493* – 104825	1½ – 2½	N I	EI58
9349.20	10693.167	0.02	3 V	*95532* – 104881	2½ – 3½	N I	EI58
9384.43	10653.034	0.02	8 V	*95475* – 104859	½ – 1½	N I	EI58
9392.41	10643.981	0.02	6 V	*95493* – 104886	1½ – ½	N I	EI58
9410.80	10623.177	0.02	5 V	*95475* – 104886	½ – ½	N I	EI58
9434.09	10596.958	0.02	6 V	*110715* – 120149	3½ – 4½	N I	EI58
9438.59	10591.905	0.02	5 V	*110710* – 120149	2½ – 3½	N I	EI58
9464.12	10563.328	0.02	5 V	*95532* – 104996	2½ – 1½	N I	EI58
9476.40	10549.638	0.02	8 V	*95532* – 105008	2½ – 2½	N I	EI58
9478.99	10546.76	0.04	4 L	205350 – *214829*	2 – 1	N II	ER58
9485.45	10539.573	0.02	10 V	*95532* – 105017	2½ – 3½	N I	EI58
9490.67	10533.775	0.02	5 V	*95493* – 104984	1½ – ½	N I	EI58
9502.57	10520.583	0.02	8 V	*95493* – 104996	1½ – 1½	N I	EI58
9509.07	10513.399	0.02	7 V	*95475* – 104984	½ – ½	N I	EI58
9514.85	10507.004	0.02	8 V	*95493* – 105008	1½ – 2½	N I	EI58
9520.96	10500.271	0.02	6 V	*95475* – 104996	½ – 1½	N I	EI58
9534.340	10485.530		8	104765 – *114300*	4½ – 5½	N I	ER71
9801.25	10199.98	0.02	2 V	*94881* – 104683	3½ – 2½	N I	EI58
9833.25	10166.79	0.02	3 V	*94830* – 104664	2½ – 1½	N I	EI58
9835.13	10164.845	0.02	7 V	*94881* – 104716	3½ – 3½	N I	EI58
9852.18	10147.255	0.02	8 V	*94830* – 104683	2½ – 2½	N I	EI58
9870.64	10128.280	0.02	7 V	*94793* – 104664	1½ – 1½	N I	EI58
9872.60	10126.27	0.04	5 LBH	211294 – *221167*	4 –	N II	ER58
9880.19	10118.49	0.04	4 LH	211287 – *221167*	3 – 4	N II	ER58
9883.95	10114.644	0.02	13 V	*94881* – 104765	3½ – 4½	N I	EI58
9886.06	10112.483	0.02	12 V	*94830* – 104716	2½ – 3½	N I	EI58
9889.57	10108.893	0.02	11 V	*94793* – 104683	1½ – 2½	N I	EI58
9893.25	10105.130	0.02	10 V	*94770* – 104664	½ – 1½	N I	EI58
9927.64	10070.12	0.04	6 LH	211415 – *221342*	2 – 3	N II	ER58
9932.55	10065.15	0.04	7 LBH	211410 – *221342*	3 –	N II	ER58
9943.31	10054.259	0.02	4 V	*94881* – 104825	3½ – 2½	N I	EI58
9961.95	10035.45	0.04	7 LH	211402 – *221363*	4 – 5	N II	ER58
9974.05	10023.27	0.04	8 LBH	211389 – *221363*	5 –	N II	ER58
9979.47	10017.822	0.02	5 V	*94830* – 104810	2½ – 2½	N I	EI58
9994.21	10003.055	0.02	5 V	*94830* – 104825	2½ – 2½	N I	EI58
9999.51	9997.750	0.02	4 V	*94881* – 104881	3½ – 3½	N I	EI58

N References

ER58 Eriksson, K. B. S., Ark. Fys. 13, 303–329 (1958).
Source: Pulsed electrodeless discharge
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

EI58 Eriksson, K. B. S., Ark. Fys. 13, 429–439 (1958).
Source: Pulsed electrodeless discharge (9 MHz)
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

ER61 Eriksson, K. B. S., and Johansson, I., Ark. Fys. 19, 235–248 (1961).
Source: Hollow cathode and electrodeless discharge (18 MHz)
Instrument: 1 m Pfund spectrometer
Detector: PbS

ER71 Eriksson, K. B. S., and Petterson, J. E., Physica Scripta 3, 211–217 (1971).
Source: Pulsed electrodeless discharge (18 MHz)
Instrument: a) 21′ Jarrell-Ash Wadsworth spectrograph
b) 3 m and 5.5 m Czerny-Turner spectrograph
Detector: a) and b) Photographic
Uncertainty in λ: Given as ± .003 Å for unaffected lines of favourable intensity

Additional References

Friksson, K. B. S., Ark. Fys. 33, 357 (1966).

Oxygen

O, Z = 8

O I Normal state of valence electrons $2s^22p^4\ ^3P_2$ I.P. = 109837 cm^{-1}

O II Normal state of valence electrons $2s^22p^3\ ^4S°_{3/2}$ I.P. = 283244 cm^{-1}

O

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3819.607	26173.56	0.02	13 LB	102968 – *106787*		O I	IS68
5479.867	18243.63	0.01	22 LB	*97488* – 102968		O I	EI63
5484.198	18229.23	0.02	13 LB	99681 – *105165*	– 1	O I	IS68
5539.811	18046.23	0.03	12 L	*124240* – 129779	5 – 6	O I	ER68
5541.051	18042.19	0.03	12 L	*124258* – 129799	4 – 5	O I	ER68
5541.269	18041.48	0.03	12 L	*124238* – 129779	4 – 5	O I	ER68
5547.501	18021.21	0.01	23 LB	*97420* – 102968		O I	EI63
5564.333	17966.70	0.03	12 L	*124213* – 129777	4 – 5	O I	ER68
6166.564	16212.06	0.03	14 L	116631 – *122797*	2 – 2	O I	ER68
7593.757	13165.11	0.02	24 L	88631 – *96225*	0 – 1	O I	EI63
7593.905	13164.85	0.02	26 L	88631 – *96225*	2 – 1	O I	EI63
7594.461	13163.89	0.02	25 L	88630 – *96225*	1 – 1	O I	EI63
7644.976	13076.91	0.01	14 LB	*96225* – 103870	1 –	O I	IS68
7695.668	12990.77	0.03	12 L	116631 – *124326*	2 – 3	O I	ER68
7953.248	12570.04	0.02	20 LB	*97488* – 105441		O I	EI63
8020.897	12464.02	0.02	21 LB	*97420* – 105441		O I	EI63
8801.421	11358.692	0.03	18 L	113996 – *122797*	3 – 2	O I	ER68
8845.275	11302.376	0.01	23 L	86631 – *95476*	3 – 2	O I	EI63
8848.950	11297.682	0.01	22 L	86627 – *95476*	2 – 2	O I	EI63
8850.970	11295.104	0.01	21 L	86625 – *95476*	1 – 2	O I	EI63
8857.075	11287.318	0.01	21 L	88631 – *97488*	0 – 1	O I	EI63
8857.308	11287.022	0.01	21 LB	88631 – *97488*	2 –	O I	EI63
8857.392	11286.914	0.01	24 L	88631 – *97488*	2 – 3	O I	EI63
8857.840	11286.344	0.01	23 LB	88630 – *97488*	1 –	O I	EI63
9296.725	10753.530	0.01	17 LB	*97488* – 106785		O I	EI63
9364.291	10675.940	0.01	16 LB	*97420* – 106785		O I	EI63
9364.480	10675.725	0.01	17 LB	*97420* – 106785		O I	EI63
9593.216	10421.177	0.03	12 LD	113204 – *122797*	1 – 2	O I	ER68
9686.982	10320.304	0.01	9 LB	*96225* – 105912	1 –	O I	IS68
9832.804	10167.252	0.01	10 L	*76794* – 86627	1 – 2	O I	EI63
9998.457	9998.802	0.03	8 L	113298 – *123296*	1 – 2	O I	ER68

O References

EI63 Eriksson, K. B. S., and Isberg, H. B. S., Ark. Fys. **24,** 549–558 (1963).
Source: Pulsed electrodeless discharge (18 MHz)
Instrument: a) 1 m Pfund spectrometer for wavelengths above 12000 Å
b) 3 m Czerny-Turner spectrograph for wavelengths below 12000 Å
Detector: a) PbS
b) Photographic

IS68 Isberg, B., Ark. Fys. **35,** 495–498 (1968).
Source: Pulsed electrodeless discharge (18 MHz)
Instrument: a) 1 m Pfund spectrometer for wavelengths above 12000 Å
b) 3 m Czerny Turner spectrograph for wavelengths below 12000 Å
Detector: a) PbS cooled with liquid nitrogen
b) Photographic

ER68 Eriksson, K. B. S., and Isberg, H. B. S., Ark. Fys. **37,** 221–230 (1968).
Source: Pulsed electrodeless discharge (18 MHz)
Instrument: a) 1 m Pfund spectrometer for wavelengths above 12000 Å
b) 3 m Czerny-Turner spectrograph for wavelengths below 12000 Å
Detector: a) PbS cooled with liquid nitrogen
b) Photographic

Phosphorus

P, Z = 15

P I Normal state of valence electrons $3s^2 3p^3\ {}^4S^\circ_{3/2}$ I.P. = 84580 cm^{-1}

P II Normal state of valence electrons $3s^2 3p^2\ {}^3P_0$ I.P. = 159100 cm^{-1}

P

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9245.57	10813.03		0	56339 – *65585*	2½ – 2½	P I	MA59
9359.48	10681.43		1	56090 – *65450*	1½ – 1½	P I	MA59
9434.14	10596.92		1	55939 – *65373*	½ – ½	P I	MA59
9447.85	10581.52		8	56339 – *65787*	2½ – 3½	P I	MA59
9494.57	10529.45		6	56090 – *65585*	1½ – 2½	P I	MA59
9510.81	10511.48		3	55939 – *65450*	½ – 1½	P I	MA59
9561.36	10455.90		1			P	MA59
9568.15	10448.48		0	*68088* – 77656	1½ – ½	P I	MA59
9582.67	10432.64		2	68260 – *77843*	½ – 1½	P I	MA59
9796.71	10204.72		2	58174 – *67971*	1½ – ½	P I	MA59
9828.22	10172.01		0			P	MA59
9852.72	10146.71		0			P	MA59
9874.46	10124.36		0			P	MA59
9913.77	10084.22		25	58174 – *68088*	1½ – 1½	P I	MA59

P Reference

MA59 Martin, W. C., J. Opt. Soc. Amer. **49**, 1071–1085 (1959).
Source: Hollow cathode
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Potassium

K, Z = 19

K I Normal state of valence electrons $3p^6 4s\ ^2S_{1/2}$ I.P. = 35010 cm^{-1}

K II Normal state of valence electrons $3p^6\ ^1S_0$ I.P. = 255076 cm^{-1}

K

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2489.462	40158.370	0.01		*28127* – 30617		K I	LZ70
2676.938	37345.93	0.01	5	*24720* – 27397	1½ – 2½	K I	JO72
2678.008	37331.11	0.01	1	*24720* – 27398	1½ – 1½	K I	JO72
2696.765	37071.37	0.01	3	*24701* – 27398	½ – 1½	K I	JO72
2730.554	36612.62	0.01	7	*24720* – 27450	1½ – ½	K I	JO72
2749.309	36362.86	0.01	4	*24701* – 27450	½ – ½	K I	JO72
3164.396	31592.99	0.01	22	21536 – *24701*	1½ – ½	K I	JO72
3183.153	31406.82	0.01	7	21536 – *24720*	1½ – 1½	K I	JO72
3185.461	31384.07	0.01	33	21534 – *24720*	2½ – 1½	K I	JO72
3674.827	27204.74	0.01	36	21026 – *24701*	½ – ½	K I	JO72
3693.585	27066.58	0.01	59	21026 – *24720*	½ – 1½	K I	JO72
6590.85	15168.40	0.01		21536 – *28127*	1½ – 2½	K I	JO61
6593.16	15163.08	0.01		21534 – *28127*	2½ – 3½	K I	JO61
7462.26	13397.09	0.01		21536 – *28999*	1½ – ½	K I	JO61
7472.99	13377.86	0.01		21534 – *29007*	2½ – 1½	K I	JO61
7983.670	12522.141	0.01	98	*13042* – 21026	1½ – ½	K I	JO72
8041.380	12432.274	0.01	56	*12985* – 21026	½ – ½	K I	JO72
8491.805	11772.838	0.01	17 V	*13042* – 21534	1½ – 2½	K I	JO72
8494.114	11769.637	0.01	16 V	*13042* – 21536	1½ – 1½	K I	JO72
8551.819	11690.219	0.01	17 V	*12985* – 21536	½ – 1½	K I	JO72
9069.73	11022.67	0.03	16 V	21536 – *30606*	1½ – 2½	K I	RI56
9072.03	11019.87	0.03	17 V	21534 – *30606*	2½ – 3½	K I	RI56
9532.90	10487.11	0.03	8 V	21536 – *31069*	1½ – ½	K I	RI56
9537.41	10482.15	0.03	5 V	21536 – *31074*	1½ – 1½	K I	RI56
9539.71	10479.63	0.03	9 V	21534 – *31074*	2½ – 1½	K I	RI56

K References

R156 Risberg, P., Ark. Fys. **10**, 583–605 (1956).
Source: Hollow cathode
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

JO61 Johansson, I., Ark. Fys. **20**, 135–146 (1961).
Source: Hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

LZ70 Litzén, U., Physica Scripta **1**, 253–255 (1970).
Source: Hollow cathode
Instrument: 1 m Pfund and 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

JO72 Johansson, I., and Svendenius, N., Physica Scripta **5**, 129–131 (1972).
Source: Hollow cathode
Instrument: a) 1 m Pfund and 1.5 m Czerny-Turner spectrometer
b) 3 m Czerny-Turner spectrograph for wavelengths below 12500 Å
Detector: a) PbS cooled with liquid nitrogen
b) Photographic

Additional References

Fisher, R. A., Knoff, W. C., and Kinney, F. E., Astrophys. J. **130**, 683 (1959).

Praseodymium

Pr, $Z = 59$

Pr I Normal state of valence electrons $4f^3 6s^2\ {}^4I^\circ_{9/2}$ I.P. = 43730 cm^{-1}

Pr II Normal state of valence electrons $4f^3({}^4I^\circ_{9/2})6s(9/2, 1/2)^\circ_4$ I.P. = 85090 cm^{-1}

Pr III Normal state of valence electrons $4f^3\ {}^4I^\circ_{9/2}$ I.P. = 174408 cm^{-1}

Pr

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9328.78	10716.583		500 V	*15705* – 25033	4½ – 4½	Pr III	SU74
9682.96	10324.591		500 V	*16763* – 26446	4½ – 3½	Pr III	SU74
9704.58	10301.585		500 V	*15705* – 25409	4½ – 3½	Pr III	SU74
9764.26	10238.626		500 V	*13887* – 23651	3½ – 3½	Pr III	SU74
9839.50	10160.334		500 V	*10032* – 19872	4½ – 3½	Pr III	SU74
9966.27	10031.098		500 V	*15443* – 25409	3½ – 3½	Pr III	SU74

Pr Reference

SU74 Sugar, J., J. Res. Nat. Bur. Stds. **78A**, 555–593 (1974).
Source: Sliding spark (Pr III)
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in λ: Stated as being 0.003 Å

Rhenium

Re, Z = 75

Re I Normal state of valence electrons $5d^5 6s^2\ {}^6S_{5/2}$ I.P. = 63530 cm^{-1}

Re II Normal state of valence electrons $5d^5 6s\ {}^7S_3$ I.P. = 134000 cm^{-1}

Re

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8606.6	11615.8		1	26661 – *35267*	2½ – 2½	Re I	KL57
8728.85	11453.12		3	32435 – *41163*	2½ – 3½	Re I	KL57
8782.08	11383.70		8	27141 – *35923*	3½ – 4½	Re I	KL57
8839.33	11309.97		4	28542 – *37381*	3½ – 2½	Re I	KL57
8972.67	11141.90		1	33281 – *42254*	2½ – 1½	Re I	KL57
9035.02	11065.02		2	50359 – *59394*	3½ – 4½	Re I?	KL57
9035.02	11065.02		2	44703 – *53738*	2½ – 3½	Re I?	KL57
9136.40	10942.23		3	26131 – *35267*	2½ – 2½	Re I	KL57
9143.74	10933.44		2	30526 – *39670*	1½ – 2½	Re I	KL57
9155.59	10919.30		1	28542 – *37697*	3½ – 2½	Re I	KL57
9163.8	10909.5		1	24425 – *33589*	2½ – 1½	Re I	KL57
9203.67	10862.25		10	19757 – *28961*	½ – 1½	Re I	KL57
9236.01	10824.22		10	27827 – *37063*	1½ – 1½	Re I	KL57
9396.40	10639.45		100	19457 – *28854*	2½ – 2½	Re I	KL57
9408.68	10625.57		8	32435 – *41843*	2½ – 3½	Re I	KL57
9414.99	10618.45		40	14216 – *23631*	3½ – 4½	Re I	KL57
9432.00	10599.31		8	19457 – *28889*	2½ – 3½	Re I	KL57
9436.95	10593.74		2	23154 – *32591*	2½ – 1½	Re I	KL57
9470.21	10556.54		20	31982 – *41453*	3½ – 4½	Re I	KL57
9553.73	10464.25		10	27827 – *37381*	1½ – 2½	Re I	KL57
9660.16	10349.0		4	*41313* – 50973	2½ – 2½	Re I	KL57
9667.4	10341.3		1	28030 – *37697*	2½ – 2½	Re I	KL57
9675.50	10332.55		10	*41313* – 50988	2½ – 3½	Re I	KL57
9717.80	10287.58		4	*41313* – 51030	2½ – 1½	Re I	KL57
9722.63	10282.46		5	*41313* – 51035	2½ – 2½	Re I	KL57
9760.39	10242.68		1	31186 – *40946*	2½ – 3½	Re I	KL57
9764.60	10238.26		4	31399 – *41163*	4½ – 3½	Re I	KL57
9795.16	10206.32		20	30131 – *39926*	½ – 1½	Re I	KL57
9799.44	10201.86		2	*48569* – 58368	5½ – 4½	Re I	KL57
9809.35	10191.57		1	*41163* – 50973	3½ – 2½	Re I	KL57
9824.66	10175.68		20	*41163* – 50988	3½ – 3½	Re I	KL57
9830.29	10169.85		100	*41163* – 50994	3½ – 4½	Re I	KL57
9852.59	10146.84		1	31460 – *41313*	1½ – 2½	Re I	KL57
9860.94	10138.24		2	31982 – *41843*	3½ – 3½	Re I	KL57
9870.15	10128.78		15	29800 – *39670*	2½ – 2½	Re I	KL57
9871.68	10127.21		1	*41163* – 51035	3½ – 2½	Re I	KL57
9933.66	10064.02		2	30559 – *40493*	5½ – 6½	Re I	KL57
9970.38	10026.96		5	27827 – *37797*	1½ – ½	Re I	KL57
9978.09	10019.21		7	31186 – *41163*	2½ – 3½	Re I	KL57

Re Reference

KI57 Klinkenberg, P. F. A., Meggers, W. F., Velasco, R., and Catalán, M. A., J. Res. Nat. Bur. Std. **59**, 319–348 (1957).

Additional References

Klinkenberg, P. F. A., Physica **13**, 581 (1947).
Klinkenberg, P. F. A., Physica **14**, 269 (1948).

Rubidium

Rb, $Z = 37$

Rb I Normal state of valence electrons $4p^6 5s\ ^2S_{1/2}$ I.P. = 33691 cm^{-1}

Rb II Normal state of valence electrons $4p^6\ ^1S_0$ I.P. = 220105 cm^{-1}

Rb

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2504.093	39923.730	0.01		*26792* – 29296		Rb I	LZ70
3582.562	27905.37	0.01		20132 – *23715*	½ – ½	Rb I	JO61
3660.086	27314.31	0.01		20132 – *23792*	½ – 1½	Rb I	JO61
4359.440	22932.47	0.01		19355 – *23715*	1½ – ½	Rb I	JO61
4437.385	22529.65	0.01		19355 – *23792*	2½ – 1½	Rb I	JO61
6538.656	15289.48	0.01		*12816* – 19355	1½ – 2½	Rb I	JO61
6539.107	15288.43	0.01		*12816* – 19355	1½ – 1½	Rb I	JO61
6776.699	14752.41	0.01		*12578* – 19355	½ – 1½	Rb I	JO61
7315.960	13665.01	0.01		*12816* – 20132	1½ – ½	Rb I	JO61
7436.469	13443.57	0.01		19355 – *26792*	1½ – 2½	Rb I	JO61
7436.889	13442.81	0.01		19355 – *26792*	2½ – 3½	Rb I	JO61
7553.563	13235.17	0.01		*12578* – 20132	½ – ½	Rb I	JO61

Rb References

JO61 Johansson, I., Ark. Fys. **20**, 135–146 (1961).
Source: Hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

LZ70 Litzén, U., Physica Scripta **1**, 253–255 (1970).
Source: Hollow cathode
Instrument: 1 m Pfund and 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Ruthenium

Ru, Z = 44

Ru I Normal state of valence electrons $4d^7 5s\ ^5F_5$ I.P. = 59410 cm^{-1}

Ru II Normal state of valence electrons $4d^7\ ^4F_{9/2}$ I.P. = 135200 cm^{-1}

Ru

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8705.45	11483.91		3	21643 – *30348*	4 – 4	Ru I	KE59
8826.92	11325.88		6	22518 – *31345*	5 – 4	Ru I	KE59
8848.18	11298.66		3	23004 – *31852*	4 – 3	Ru I	KE59
8926.39	11199.67		8	22419 – *31345*	3 – 4	Ru I	KE59
9243.65	10815.28		3 H	27516 – *36760*	3 – 3	Ru I?	KE59
9243.65	10815.28		3 H	*38243* – 47486	4 – 4	Ru I?	KE59
9387.25	10649.83		6	23004 – *32391*	4 – 3	Ru I	KE59
9404.72	10630.05		4	*40768* – 50172	3 – 2	Ru I?	KE59
9404.72	10630.05		4	27560 – *36965*	1 – 2	Ru I?	KE59
9509.81	10512.58		40	22343 – *31852*	2 – 3	Ru I	KE59
9702.72	10303.56		8	21643 – *31345*	4 – 4	Ru I	KE59
9716.09	10289.39		2	*39773* – 49489	1 – 2	Ru I	KE59
9718.67	10286.65		3	23453 – *33172*	2 – 2	Ru I	KE59
9773.53	10228.91		8	29677 – *39450*	6 – 5	Ru I	KE59
9786.16	10215.71		1 H	27560 – *37346*	1 – 1	Ru I	KE59
9915.03	10082.93		30	22292 – *32207*	1 – 2	Ru I	KE59
9972.34	10024.99		15 H	*31852* – 41825	3 – 4	Ru I?	KE59
9972.34	10024.99		15 H	22419 – *32391*	3 – 3	Ru I?	KE59

Ru Reference

KE59 Kessler, K. G., J. Res. Nat. Bur. Stds. **63A**, 213–251 (1959).
Source: D.C. arc
Instrument: 22′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Additional References

Kessler, K. G., and Meggers, W. F., J. Res. Nat. Bur. Stds. **55**, 97 (1955).

Samarium

Sm, Z = 62

Sm I Normal state of valence electrons $4f^6 6s^2\ ^7F_0$ I.P. = 45417 cm^{-1}

Sm II Normal state of valence electrons $4f^6 6s\ ^8F_{1/2}$ I.P. = 89285 cm^{-1}

Sm

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2453.753	40742.801		20			Sm	MO70
2515.660	39740.175		11			Sm	MO70
2562.249	39017.585		15	*26146* – 28708	1 – 1	Sm I	MO70
2571.716	38873.941		12	15082 – *17654*	6 – 6	Sm I	MO70
2573.570	38845.937		15	13542 – *16116*	3 – 2	Sm I	MO70
2594.159	38537.629		20	16354 – *18948*	4 – 3	Sm I	MO70
2600.619	38441.900		30	13050 – *15650*	2 – 1	Sm I	MO70
2648.564	37746.015		15	14856 – *17504*	5 – 4	Sm I	MO70
2656.473	37633.648		10	14202 – *16859*	5 – 5	Sm I	MO70
2687.771	37195.419		15	14202 – *16890*	5 – 4	Sm I	MO70
2720.672	36745.616		18	12846 – *15567*	3 – 2	Sm I	MO70
2726.478	36667.367		12	12313 – *15039*	2 – 2	Sm I	MO70
2752.763	36317.245		15	13458 – *16211*	4 – 3	Sm I	MO70
2954.668	33835.533		30	11044 – *13999*	2 – 1	Sm I	MO70
2974.105	33614.403		100	11406 – *14380*	3 – 2	Sm I	MO70
2995.353	33375.955		50	10801 – *13796*	1 – 0	Sm I	MO70
3023.465	33065.627		10	14563 – *17587*	4 – 5	Sm I	MO70
3023.640	33063.713		10			Sm	MO70
3038.407	32903.020		200	11877 – *14915*	4 – 3	Sm I	MO70
3053.510	32740.278		25			Sm	MO70
3062.326	32646.023		12	13050 – *16112*	2 – 1	Sm I	MO70
3066.335	32603.341		14	13050 – *16116*	2 – 2	Sm I	MO70
3108.975	32156.182		10			Sm	MO70
3115.090	32093.058		16			Sm	MO70
3131.849	31921.323		10			Sm	MO70
3133.817	31901.277		240	12445 – *15579*	5 – 4	Sm I	MO70
3167.156	31565.469		14			Sm	MO70
3175.407	31483.449		10			Sm	MO70
3194.248	31297.747		65	12313 – *15507*	2 – 3	Sm I	MO70
3198.505	31256.091		130	10801 – *13999*	1 – 1	Sm I	MO70
3205.493	31187.953		15	13542 – *16748*	3 – 3	Sm I	MO70
3215.469	31091.192		15	15082 – *18298*	6 – 6	Sm I	MO70
3221.736	31030.713		12			Sm	MO70
3249.003	30770.290		150	13095 – *16344*	6 – 5	Sm I	MO70
3284.893	30434.100		25	12846 – *16131*	3 – 4	Sm I	MO70
3336.648	29962.034		80	29066 – *32402*	2 – 1	Sm I	MO70
3351.358	29830.523		10			Sm	MO70
3365.416	29705.915		14	29037 – *32402*	2 – 1	Sm I	MO70
3379.809	29579.412		120			Sm	MO70
3385.528	29529.445		15			Sm	MO70
3401.815	29388.065		11			Sm	MO70
3433.109	29120.183		20	14154 – *17587*	4 – 5	Sm I	MO70
3510.185	28480.767		100	*26146* – 29656	1 – 1	Sm I	MO70
3527.873	28337.970		200			Sm	MO70
3809.357	26243.998		12			Sm	MO70
3871.254	25824.386		20			Sm	MO70
3923.004	25483.725		20			Sm	MO70
4046.404	24706.568		15			Sm	MO70
4095.500	24410.390		30	14202 – *18298*	5 – 6	Sm I?	MO70
4095.500	24410.390		30	14193 – *18288*	2½ – 3½	Sm II?	MO70
4098.039	24395.259	0.06	7 L	13095 – *17193*	6 – 6	Sm I	BL69
4107.816	24337.204		12			Sm	MO70
4129.032	24212.153		13	13458 – *17587*	4 – 5	Sm I	MO70
4147.564	24103.961	0.12	4 L	14202 – *18350*	5 – 5	Sm I	BL69
4153.081	24071.949		10			Sm	MO70
4171.350	23966.522		40	15082 – *19254*	6 – 6	Sm I	MO70

Sm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4172.726	23958.619		60	11406 – *15579*	3 – 4	Sm I	MO70
4173.883	23951.978		60	14115 – *18288*	4½ – 3½	Sm II	MO70
4254.106	23500.289	0.15	3 L	11877 – *16131*	4 – 4	Sm I	BL69
4267.206	23428.145	0.12	4 L			Sm	BL69
4270.470	23410.238	0.15	3 L			Sm	BL69
4282.655	23343.632	0.15	3 L	14026 – *18309*	1 – 0	Sm I	BL69
4284.242	23334.984	0.15	3 L	*26962* – 31246	1 – 2	Sm I	BL69
4303.981	23227.965	0.06	7 L	13814 – *18118*	7 – 7	Sm I	BL69
4315.230	23167.414	0.15	3 L			Sm	BL69
4333.732	23068.506	0.15	3 L	11877 – *16211*	4 – 3	Sm I	BL69
4357.153	22944.506	0.12	4 L			Sm	BL69
4377.699	22836.819	0.15	3 L	12313 – *16690*	2 – 1	Sm I	BL69
4387.737	22784.574	0.15	3 L	13687 – *18075*	2 – 2	Sm I	BL69
4413.945	22649.290	0.06	7 L	12445 – *16859*	5 – 5	Sm I?	BL69
4413.945	22649.290	0.06	7 L	14591 – *19005*	8 – 7	Sm I?	BL69
4445.238	22489.846	0.10	5 L	12445 – *16890*	5 – 4	Sm I	BL69
4467.335	22378.603	0.10	5 L	11877 – *16344*	4 – 5	Sm I	BL69
4483.437	22298.232	0.08	6 L	13814 – *18298*	7 – 6	Sm I	BL69
4491.706	22257.182	0.08	6 L	13095 – *17587*	6 – 5	Sm I	BL69
4511.778	22158.164	0.12	4 L	13777 – *18288*	3½ – 3½	Sm II	BL69
4528.620	22075.757	0.15	3 L			Sm	BL69
4539.926	22020.781	0.12	4 L			Sm	BL69
4547.098	21986.049	0.06	7 L	14591 – *19138*	8 – 8	Sm I	BL69
4629.520	21594.618	0.15	3 L	15082 – *19712*	6 – 6	Sm I?	BL69
4629.520	21594.618	0.15	3 L	19627 – *24257*	3½ – 4½	Sm II?	BL69
4631.090	21587.297	0.15	3 L			Sm	BL69
4686.811	21330.648	0.12	4 L			Sm	BL69
4710.360	21224.007	0.15	3 L			Sm	BL69
4719.709	21181.966	0.15	3 L	13050 – *17769*	2 – 1	Sm I	BL69
4748.373	21054.099	0.10	5 L	12445 – *17193*	5 – 6	Sm I	BL69
4763.934	20985.327	0.15	3 L			Sm	BL69
4804.732	20807.136	0.15	3 L	11406 – *16211*	3 – 3	Sm I	BL69
4949.605	20198.119	0.15	3 L	20648 – *25597*	5½ – 4½	Sm II	BL69
5013.157	19942.067	0.10	5 L	11877 – *16890*	4 – 4	Sm I	BL69
5023.105	19902.572	0.12	4 L	13095 – *18118*	6 – 7	Sm I	BL69
5051.365	19791.226	0.12	4 L	14202 – *19254*	5 – 6	Sm I	BL69
5083.619	19665.657	0.15	3 L			Sm	BL69
5096.856	19614.583	0.15	3 L			Sm	BL69
5112.609	19554.147	0.15	3 L	12846 – *17959*	3 – 4	Sm I	BL69
5129.050	19491.467	0.08	6 L	15082 – *20211*	6 – 7	Sm I	BL69
5142.070	19442.113	0.10	5 L	12445 – *17587*	5 – 5	Sm I	BL69
5178.223	19306.374	0.10	5 L			Sm	BL69
5190.761	19259.740	0.12	4 L	13814 – *19005*	7 – 7	Sm I	BL69
5202.569	19216.027	0.10	5 L	13095 – *18298*	6 – 6	Sm I	BL69
5300.968	18859.330	0.06	7 L	12987 – *18288*	3½ – 3½	Sm II	BL69
5328.020	18763.575	0.15	3 L			Sm	BL69
5360.576	18649.620	0.15	3 L			Sm	BL69
5366.109	18630.390	0.12	4 L	11877 – *17243*	4 – 3	Sm I	BL69
5407.062	18489.284	0.10	5 L			Sm	BL69
5483.536	18231.430	0.15	3 L			Sm	BL69
5513.919	18130.970	0.15	3 L	12445 – *17959*	5 – 4	Sm I	BL69
5514.376	18129.467	0.12	4 L			Sm	BL69
5536.725	18056.288	0.15	3 L			Sm	BL69
5551.401	18008.553	0.15	3 L			Sm	BL69
5610.569	17818.638	0.15	3 L	20179 – *25790*	4½ – 3½	Sm II	BL69
5645.876	17707.208	0.15	3 L	11044 – *16690*	2 – 1	Sm I	BL69
5659.351	17665.046	0.15	3 L			Sm	BL69
5708.992	17511.445	0.12	4 L			Sm	BL69
5716.637	17488.026	0.12	4 L			Sm	BL69
5722.088	17471.366	0.06	7 L	12566 – *18288*	2½ – 3½	Sm II	BL69
5783.754	17285.088	0.12	4 L	11406 – *17190*	3 – 2	Sm I	BL69
5837.101	17127.114	0.15	3 L	11406 – *17243*	3 – 3	Sm I	BL69
5866.863	17040.230	0.12	4 L	20179 – *26046*	4½ – 4½	Sm II	BL69
5879.723	17002.960	0.15	3 L			Sm	BL69
5882.113	16996.051	0.15	3 L	18807 – *24689*	3½ – 3½	Sm II	BL69
5889.674	16974.232	0.15	3 L	10801 – *16690*	1 – 1	Sm I	BL69

Sm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5892.557	16965.927	0.15	3 L	*25615* – 31508	5 – 4	Sm I	BL69
5893.409	16963.474	0.15	3 L	19035 – *24928*	2½ – 2½	Sm II	BL69
5916.037	16898.592	0.15	3 L			Sm	BL69
5923.766	16876.543	0.15	3 L			Sm	BL69
5935.681	16842.666	0.15	3 L	13050 – *18985*	2 – 1	Sm I	BL69
6066.504	16479.457	0.15	3 L	17270 – *23337*	8 – 7	Sm I	BL69
6134.670	16296.344	0.15	3 L	13542 – *19677*	3 – 2	Sm I	BL69
6143.071	16274.058	0.15	3 L	19035 – *25178*	2½ – 1½	Sm II	BL69
6145.294	16268.170	0.12	4 L	11044 – *17190*	2 – 2	Sm I	BL69
6172.849	16195.551	0.12	4 L	20648 – *26820*	5½ – 4½	Sm II	BL69
6180.243	16176.175	0.10	5 L	20648 – *26828*	5½ – 5½	Sm II	BL69
6192.300	16144.678	0.15	3 L	15617 – *21809*	6 – 5	Sm I	BL69
6194.740	16138.319	0.15	3 L	*23996* – 30191	4 – 4	Sm I	BL69
6197.388	16131.423	0.15	3 L	19400 – *25597*	4½ – 4½	Sm II	BL69
6207.400	16105.405	0.15	3 L	18478 – *24685*	1½ – 1½	Sm II	BL69
6232.605	16040.273	0.12	4 L	20648 – *26880*	5½ – 5½	Sm II	BL69
6268.674	15947.980	0.15	3 L	19035 – *25304*	2½ – 3½	Sm II	BL69
6277.694	15925.066	0.15	3 L	16354 *22632*	4 3	Sm I	BL69
6279.042	15921.647	0.12	4 L	*24967* – 31246	3 – 2	Sm I	BL69
6288.670	15897.270	0.15	3 L	15524 – *21813*	3 – 2	Sm I	BL69
6305.122	15855.790	0.15	3 L	14154 – *20459*	4 – 3	Sm I	BL69
6331.614	15789.447	0.12	4 L	11877 – *18209*	4 – 3	Sm I	BL69
6410.181	15595.922	0.15	3 L	14783 – *21193*	2 – 1	Sm I	BL69
6418.457	15575.813	0.15	3 L	19627 – *26046*	3½ – 4½	Sm II	BL69
6445.196	15511.194	0.15	3 L	17568 – *24013*	1½ – 1½	Sm II	BL69
6458.746	15478.652	0.15	3 L	19627 – *26086*	3½ – 3½	Sm II	BL69
6463.487	15467.299	0.15	3 L	17270 – *23734*	8 – 7	Sm I	BL69
6490.268	15403.476	0.06	7 L	11798 – *18288*	2½ – 3½	Sm II	BL69
6496.389	15388.962	0.10	5 L	18807 – *25304*	3½ – 3½	Sm II	BL69
6531.662	15305.857	0.12	4 L	18050 – *24582*	2½ – 2½	Sm II?	BL69
6531.662	15305.857	0.12	4 L	13458 – *19990*	4 – 4	Sm I?	BL69
6531.662	15305.857	0.12	4 L	19627 – *26159*	3½ – 3½	Sm II?	BL69
6541.013	15283.976	0.10	5 L	*24967* – 31508	3 – 4	Sm I	BL69
6597.541	15153.022	0.08	6 L			Sm	BL69
6629.055	15080.985	0.15	3 L	11659 – *18288*	2½ – 3½	Sm II	BL69
6646.081	15042.351	0.10	5 L	19400 – *26046*	4½ – 4½	Sm II	BL69
6648.770	15036.267	0.12	4 L			Sm	BL69
6653.470	15025.645	0.12	4 L	17568 – *24221*	1½ – ½	Sm II	BL69
6661.711	15007.057	0.15	3 L	20648 – *27309*	5½ – 4½	Sm II	BL69
6701.117	14918.808	0.15	3 L	20179 – *26880*	4½ – 5½	Sm II	BL69
6707.678	14904.216	0.06	7 L			Sm	BL69
6724.871	14866.111	0.12	4 L	13458 – *20183*	4 – 5	Sm I?	BL69
6724.871	14866.111	0.12	4 L	11044 – *17769*	2 – 1	Sm I?	BL69
6746.264	14818.969	0.15	3 L	12445 – *19191*	5 – 4	Sm I	BL69
6748.849	14813.293	0.06	7 L	16428 – *23177*	2½ – 1½	Sm II	BL69
6836.937	14622.436	0.06	7 L	17005 – *23842*	3½ – 2½	Sm II	BL69
6908.741	14470.462	0.06	7 L			Sm	BL69
6968.620	14346.122	0.15	3 L	10801 – *17769*	1 – 1	Sm I	BL69
7009.748	14261.950	0.12	4 L	10801 – *17810*	1 – 0	Sm I	BL69
7010.170	14261.091	0.15	3 L	11406 – *18416*	3 – 2	Sm I	BL69
7047.909	14184.728	0.12	4 L	20648 – *27695*	5½ – 6½	Sm II	BL69
7052.992	14174.505	0.06	7 L			Sm	BL69
7105.197	14070.359	0.12	4 L	19400 – *26505*	4½ – 5½	Sm II	BL69
7130.209	14021.001	0.12	4 L	20179 – *27309*	4½ – 4½	Sm II	BL69
7155.486	13971.472	0.15	3 L	19035 – *26190*	2½ – 2½	Sm II	BL69
7189.078	13906.188	0.12	4 L	17005 – *24194*	3½ – 2½	Sm II	BL69
7272.282	13747.083	0.12	4 L			Sm	BL69
7280.060	13732.396	0.12	4 L	17568 – *24848*	1½ – 2½	Sm II	BL69
7328.610	13641.423	0.15	3 L	10960 – *18288*	4½ – 3½	Sm II	BL69
7333.192	13632.899	0.15	3 L			Sm	BL69
7395.580	13517.894	0.15	3 L			Sm	BL69
7413.502	13485.214	0.10	5 L	16428 – *23842*	2½ – 2½	Sm II	BL69
7441.701	13434.114	0.08	6 L			Sm	BL69
7503.435	13323.586	0.15	3 L	20648 – *28151*	5½ – 5½	Sm II	BL69
7533.600	13270.237	0.08	6 L	16428 – *23962*	2½ – 1½	Sm II	BL69
7550.250	13240.974	0.15	3 L	18807 – *26357*	3½ – 2½	Sm II	BL69

Sm—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7577.310	13193.687	0.08	6 L	17005 – *24582*	3½ – 2½	Sm II	BL69
7582.300	13185.004	0.06	7 L	16077 – *23659*	1½ – ½	Sm II	BL69
7584.890	13180.502	0.06	7 L	16428 – *24013*	2½ – 1½	Sm II	BL69
7615.470	13127.576	0.06	7 L	10801 – *18416*	1 – 2	Sm I	BL69
7617.863	13123.452	0.08	6 L			Sm	BL69
7651.724	13065.377	0.15	3 L			Sm	BL69
7681.866	13014.111	0.15	3 L	19627 – *27309*	3½ – 4½	Sm II	BL69
7684.574	13009.525	0.08	6 L	17005 – *24689*	3½ – 3½	Sm II	BL69
7749.380	12900.730	0.15	3 L	15897 – *23646*	5½ – 4½	Sm II?	BL69
7749.380	12900.730	0.15	3 L	*25453* – 33202	5 – 6	Sm I?	BL69
7784.950	12841.785	0.15	3 L	13458 – *21243*	4 – 4	Sm I	BL69
7787.630	12837.366	0.15	3 L			Sm	BL69
7797.080	12821.807	0.15	3 L			Sm	BL69
7816.580	12789.820	0.06	7 L			Sm	BL69
7843.160	12746.476	0.15	3 L	*21813* – 29656	2 – 1	Sm I?	BL69
7843.160	12746.476	0.15	3 L	17005 – *24848*	3½ – 2½	Sm II?	BL69
7884.560	12679.547	0.12	4 L	16077 – *23962*	1½ – 1½	Sm II	BL69
7892.110	12667.418	0.06	7 L	15955 – *23847*	2 – 2	Sm I?	BL69
7892.110	12667.418	0.06	7 L	20648 – *28540*	5½ – 5½	Sm II?	BL69
7899.580	12655.439	0.15	3 L	11877 – *19776*	4 – 3	Sm I	BL69
7923.610	12617.059	0.15	3 L	14920 – *22844*	3 – 2	Sm I?	BL69
7923.610	12617.059	0.15	3 L	17005 – *24928*	3½ – 2½	Sm II?	BL69
7929.430	12607.798	0.15	3 L	16428 – *24358*	2½ – 3½	Sm II?	BL69
7929.430	12607.798	0.15	3 L	18050 – *25980*	2½ – 2½	Sm II?	BL69
7930.900	12605.461	0.12	4 L			Sm	BL69
7938.280	12593.742	0.12	4 L			Sm	BL69
7971.930	12540.583	0.15	3 L	20179 – *28151*	4½ – 5½	Sm II	BL69
7972.600	12539.529	0.12	4 L	14920 – *22893*	3 – 4	Sm I?	BL69
7972.600	12539.529	0.12	4 L	16615 – *24588*	6½ – 5½	Sm II?	BL69
7990.660	12511.188	0.15	3 L			Sm	BL69
8000.830	12495.285	0.10	5 L	16428 – *24429*	2½ – 1½	Sm II	BL69
8013.170	12476.042	0.12	4 L	13687 – *21700*	2 – 3	Sm I?	BL69
8013.170	12476.042	0.12	4 L	18807 – *26820*	3½ – 4½	Sm II?	BL69
8024.720	12458.086	0.15	3 L			Sm	BL69
8059.430	12404.432	0.06	7 L	16162 – *24221*	½ – ½	Sm II	BL69
8103.550	12336.895	0.15	3 L			Sm	BL69
8108.220	12329.790	0.10	5 L	10180 – *18288*	3½ – 3½	Sm II	BL69
8118.850	12313.646	0.15	3 L			Sm	BL69
8144.080	12275.499	0.10	5 L	16077 – *24221*	1½ – ½	Sm II	BL69
8145.390	12273.525	0.15	3 L			Sm	BL69
8153.880	12260.745	0.12	4 L	16428 – *24582*	2½ – 2½	Sm II	BL69
8200.890	12190.463	0.15	3 L	13095 – *21296*	6 – 6	Sm I?	BL69
8200.890	12190.463	0.15	3 L	16615 – *24816*	6½ – 5½	Sm II?	BL69
8265.420	12095.289	0.08	6 L			Sm	BL69
8265.910	12094.572	0.12	4 L	20179 – *28445*	4½ – 3½	Sm II?	BL69
8265.910	12094.572	0.12	4 L	20648 – *28913*	5½ – 4½	Sm II?	BL69
8267.500	12092.246	0.15	3 L	12445 – *20712*	5 – 4	Sm I	BL69
8273.160	12083.973	0.12	4 L	17391 – *25664*	7½ – 6½	Sm II	BL69
8298.810	12046.624	0.06	7 L	17005 – *25304*	3½ – 3½	Sm II	BL69
8299.950	12044.969	0.06	7 L	18807 – *27107*	3½ – 3½	Sm II	BL69
8305.630	12036.732	0.15	3 L			Sm	BL69
8313.480	12025.366	0.15	3 L			Sm	BL69
8327.580	12005.005	0.08	6 L			Sm	BL69
8345.960	11978.567	0.15	3 L	13814 – *22160*	7 – 6	Sm I	BL69
8354.470	11966.365	0.15	3 L			Sm	BL69
8360.610	11957.577	0.12	4 L	20179 – *28540*	4½ – 5½	Sm II	BL69
8380.630	11929.013	0.15	3 L			Sm	BL69
8395.320	11908.139	0.15	3 L			Sm	BL69
8397.160	11905.530	0.15	3 L			Sm	BL69
8419.800	11873.517	0.06	7 L	16428 – *24848*	2½ – 2½	Sm II	BL69
8444.380	11838.956	0.15	3 L	19627 – *28072*	3½ – 3½	Sm II	BL69
8476.990	11793.412	0.15	3 L	18807 – *27284*	3½ – 2½	Sm II	BL69
8484.210	11783.376	0.15	3 L			Sm	BL69
8502.040	11758.665	0.15	3 L	18807 – *27309*	3½ – 4½	Sm II	BL69
8515.540	11740.023	0.12	4 L			Sm	BL69
8542.070	11703.561	0.15	3 L			Sm	BL69

Sm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8548.080	11695.332	0.12	4 L	17391 – *25939*	7½ – 6½	Sm II?	BL69
8548.080	11695.332	0.12	4 L	18050 – *26599*	2½ – 1½	Sm II?	BL69
8558.660	11680.875	0.12	4 L			Sm	BL69
8560.410	11678.487	0.15	3 L			Sm	BL69
8628.390	11586.476	0.15	3 L	19627 – *28256*	3½ – 3½	Sm II	BL69
8645.710	11563.265	0.15	3 L	17568 – *26214*	1½ – 2½	Sm II	BL69
8653.330	11553.082	0.15	3 L	14667 – *23321*	3½ – 2½	Sm II	BL69
8656.520	11548.825	0.15	3 L	18807 – *27464*	3½ – 3½	Sm II	BL69
8731.930	11449.087	0.15	3 L	18478 – *27210*	1½ – ½	Sm II?	BL69
8731.930	11449.087	0.15	3 L	11044 – *19776*	2 – 3	Sm I?	BL69
8749.760	11425.757	0.12	4 L	16428 – *25178*	2½ – 1½	Sm II	BL69
8751.130	11423.968	0.12	4 L	19400 – *28151*	4½ – 5½	Sm II	BL69
8783.740	11381.556	0.15	3 L			Sm	BL69
8789.480	11374.123	0.15	3 L	14920 – *23709*	3 – 3	Sm I?	BL69
8789.480	11374.123	0.15	3 L	17568 – *26357*	1½ – 2½	Sm II?	BL69
8794.370	11367.799	0.15	3 L	19035 – *27829*	2½ – 1½	Sm II	BL69
8880.490	11257.557	0.12	4 L	12313 – *21193*	2 – 1	Sm I	BL69
8943.040	11178.819	0.12	4 L	20648 – *29591*	5½ – 4½	Sm II	BL69
8975.050	11138.949	0.10	5 L	*20091* – 29066	1 – 2	Sm I?	BL69
8975.050	11138.949	0.10	5 L	17005 – *25980*	3½ – 2½	Sm II?	BL69
8982.470	11129.747	0.10	5 L	14612 – *23594*	3 – 4	Sm I	BL69
8984.050	11127.790	0.06	7 L	14193 – *23177*	2½ – 1½	Sm II	BL69
9039.760	11059.212	0.10	5 L			Sm	BL69
9100.780	10985.061	0.15	3 L	16077 – *25178*	1½ – 1½	Sm II	BL69
9115.200	10967.683	0.15	3 L	15242 – *24358*	4½ – 3½	Sm II	BL69
9124.050	10957.044	0.12	4 L	16428 – *25552*	2½ – 1½	Sm II	BL69
9140.230	10937.648	0.12	4 L	14856 – *23996*	5 – 4	Sm I	BL69
9174.320	10897.006	0.06	7 L	14667 – *23842*	3½ – 2½	Sm II	BL69
9182.060	10887.820	0.15	3 L			Sm	BL69
9185.620	10883.601	0.15	3 L	17005 – *26190*	3½ – 2½	Sm II	BL69
9208.760	10856.252	0.12	4 L	17005 – *26214*	3½ – 2½	Sm II	BL69
9233.760	10826.859	0.15	3 L	18050 – *27284*	2½ – 2½	Sm II	BL69
9261.430	10794.512	0.08	6 L			Sm	BL69
9264.630	10790.783	0.15	3 L	14365 – *23629*	2 – 1	Sm I?	BL69
9264.630	10790.783	0.15	3 L	18807 – *28072*	3½ – 3½	Sm II?	BL69
9275.240	10778.440	0.15	3 L			Sm	BL69
9283.760	10768.548	0.15	3 L	16077 – *25361*	1½ – 1½	Sm II	BL69
9311.780	10736.144	0.12	4 L			Sm	BL69
9325.370	10720.498	0.12	4 L	19400 – *28725*	4½ – 4½	Sm II	BL69
9326.580	10719.108	0.10	5 L			Sm	BL69
9330.110	10715.052	0.15	3 L	20179 – *29509*	4½ – 3½	Sm II	BL69
9439.050	10591.385	0.15	3 L	15897 – *25336*	5½ – 4½	Sm II	BL69
9446.900	10582.584	0.06	7 L	15242 – *24689*	4½ – 3½	Sm II	BL69
9454.500	10574.077	0.15	3 L			Sm	BL69
9458.160	10569.985	0.15	3 L			Sm	BL69
9513.690	10508.289	0.06	7 L	19400 – *28913*	4½ – 4½	Sm II	BL69
9518.690	10502.770	0.12	4 L			Sm	BL69
9533.710	10486.223	0.12	4 L	18478 – *28011*	1½ – 1½	Sm II	BL69
9551.540	10466.648	0.06	7 L	16428 – *25980*	2½ – 2½	Sm II	BL69
9565.220	10451.679	0.12	4 L	*20091* – 29656	1 – 1	Sm I	BL69
9567.250	10449.461	0.15	3 L			Sm	BL69
9580.280	10435.249	0.15	3 L	18050 – *27631*	2½ – 2½	Sm II	BL69
9611.680	10401.158	0.12	4 L	14856 – *24467*	5 – 5	Sm I	BL69
9622.270	10389.711	0.12	4 L			Sm	BL69
9625.490	10386.235	0.12	4 L	20179 – *29804*	4½ – 4½	Sm II?	BL69
9625.490	10386.235	0.12	4 L	*21296* – 30921	6 – 5	Sm I?	BL69
9636.640	10374.218	0.12	4 L	19035 – *28672*	2½ – 2½	Sm II	BL69
9637.690	10373.088	0.15	3 L	14115 – *23752*	4½ – 4½	Sm II?	BL69
9637.690	10373.088	0.15	3 L	18807 – *28445*	3½ – 3½	Sm II?	BL69
9641.710	10368.763	0.15	3 L	17568 – *27210*	1½ – ½	Sm II	BL69
9645.290	10364.914	0.15	3 L	12846 – *22491*	3 – 2	Sm I	BL69
9648.790	10361.155	0.15	3 L	14193 – *23842*	2½ – 2½	Sm II	BL69
9661.140	10347.910	0.15	3 L			Sm	BL69
9664.680	10344.120	0.15	3 L	18478 – *28142*	1½ – ½	Sm II	BL69
9683.200	10324.335	0.08	6 L			Sm	BL69
9689.980	10317.111	0.12	4 L	14667 – *24358*	3½ – 3½	Sm II?	BL69

Sm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9689.980	10317.111	0.12	4 L	*22643* – 32333	6 – 5	Sm I?	BL69
9700.110	10306.337	0.06	7 L	15897 – *25597*	5½ – 4½	Sm II	BL69
9711.270	10294.493	0.15	3 L	16354 – *26065*	4 – 5	Sm I	BL69
9713.590	10292.034	0.12	4 L			Sm	BL69
9716.260	10289.206	0.08	6 L	17568 – *27284*	1½ – 2½	Sm II	BL69
9740.000	10264.128	0.15	3 L			Sm	BL69
9757.150	10246.086	0.10	5 L			Sm	BL69
9768.830	10233.836	0.12	4 L	14193 – *23962*	2½ – 1½	Sm II	BL69
9771.520	10231.018	0.15	3 L			Sm	BL69
9779.040	10223.151	0.15	3 L			Sm	BL69
9797.830	10203.545	0.12	4 L	16615 – *26413*	6½ – 5½	Sm II?	BL69
9797.830	10203.545	0.12	4 L	20648 – *30445*	5½ – 6½	Sm II?	BL69
9820.100	10180.406	0.12	4 L	14193 – *24013*	2½ – 1½	Sm II	BL69
9835.650	10164.310	0.06	7 L	15617 – *25453*	6 – 5	Sm I	BL69
9864.300	10134.789	0.08	6 L	18807 – *28672*	3½ – 2½	Sm II	BL69
9865.940	10133.104	0.08	6 L			Sm	BL69
9868.500	10130.475	0.15	3 L			Sm	BL69
9871.520	10127.376	0.15	3 L			Sm	BL69
9876.890	10121.870	0.12	4 L			Sm	BL69
9881.660	10116.984	0.08	6 L	19627 – *29509*	3½ – 3½	Sm II	BL69
9890.020	10108.432	0.08	6 L	16615 – *26505*	6½ – 5½	Sm II	BL69
9914.760	10083.209	0.06	7 L	14667 – *24582*	3½ – 2½	Sm II	BL69

Sm References

BL69 Blaise, J., Morillon, C., Schweighofer, M. G., and Vergès, J., Spectrochim. Acta **24B,** 405–445 (1969).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS

MO70 Morillon, C., Spectrochim. Acta **25B,** 513–538 (1970).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Girard grid spectrometer
Detector: PbS and InSb

Selenium

Se, Z = 34

Se I Normal state of valence electrons $4s^24p^4\ ^3P_2$ I.P. = 78658 cm^{-1}

Se II Normal state of valence elctrons $4s^24p^3\ ^4S^\circ_{3/2}$ I.P. = 170900 cm^{-1}

Se

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3519.15	28408.20		1			Se	MO74
3782.42	26430.89		1			Se	MO74
3860.077	25899.15		4			Se	MO74
3866.768	25854.34		1			Se	MO74
3915.161	25534.77		1			Se	MO74
3978.629	25127.43		2600	59391 – *63369*	3 – 4	Se I	MO74
3981.838	25107.18		50	59391 – *63373*	3 – 2	Se I	MO74
3996.110	25017.51		650	59391 – *63387*	3 – 3	Se I	MO74
4085.326	24471.17		500	59287 – *63373*	2 – 2	Se I	MO74
4094.948	24413.67		260	59287 – *63382*	2 – 1	Se I	MO74
4099.597	24385.99		1400	59287 – *63387*	2 – 3	Se I	MO74
4116.677	24284.81		5			Se	MO74
4130.347	24204.44		340	59242 – *63373*	1 – 2	Se I	MO74
4138.076	24159.23		295	59242 – *63380*	1 – 0	Se I	MO74
4139.969	24148.18		700	59242 – *63382*	1 – 1	Se I	MO74
4191.438	23851.65		40	59287 – *63479*	2 – 2	Se I	MO74
4205.763	23770.41		1	69614 – *73819*	2 – 2	Se I	MO74
4220.414	23687.89		5	69599 – *73819*	1 – 2	Se I	MO74
4226.91	23651.49		1	69314 – *73541*	3 – 2	Se I	MO74
4231.082	23628.17		115			Se	MO74
4231.842	23623.93		1			Se	MO74
4233.161	23616.56		45	69314 – *73547*	3 – 3	Se I?	MO74
4233.161	23616.56		45	69314 – *73547*	3 – 4	Se I?	MO74
4234.231	23610.60		2	69629 – *73863*	0 – 1	Se I	MO74
4236.459	23598.18		22	59242 – *63479*	1 – 2	Se I	MO74
4246.405	23542.91		10	69614 – *73860*	2 – 3	Se I	MO74
4263.714	23447.33		11	69277 – *73541*	2 – 2	Se I	MO74
4265.970	23434.93		2	69277 – *73543*	2 – 1	Se I	MO74
4269.944	23413.12		20	69277 – *73547*	2 – 3	Se I	MO74
4274.376	23388.85		220	*65339* – 69614	3 – 2	Se I	MO74
4278.094	23368.52		8	69263 – *73541*	1 – 2	Se I	MO74
4280.350	23356.20		10	69263 – *73543*	1 – 1	Se I	MO74
4280.492	23355.43		3	69263 – *73543*	1 – 0	Se I	MO74
4299.910	23249.96		37	*65299* – 69599	1 – 1	Se I	MO74
4314.564	23170.99		2	*65299* – 69614	1 – 2	Se I	MO74
4321.526	23133.66		110	*65277* – 69599	2 – 1	Se I	MO74
4329.975	23088.52		51	*65299* – 69629	1 – 0	Se I	MO74
4335.177	23060.82		7			Se	MO74
4335.328	23060.01		1			Se	MO74
4336.175	23055.51		43	*65277* – 69614	2 – 2	Se I	MO74
4389.35	22776.20		1			Se	MO74
4390.260	22771.48		2			Se	MO74
4392.988	22757.34		12			Se	MO74
4393.706	22753.62		45			Se	MO74
4394.387	22750.09		2			Se	MO74
4419.711	22619.74		8			Se	MO74
4434.071	22546.49		7	*71154* – 75588	3 – 4	Se I	MO74
4449.474	22468.43		2			Se	MO74
4454.323	22443.98		5			Se	MO74
4469.388	22368.32		2			Se	MO74
4482.836	22301.22		2	*71106* – 75588	1 – 2	Se I	MO74
4492.692	22252.30		6	*71096* – 75588	2 – 3	Se I	MO74
4559.70	21925.28		1	*70388* – 74948	1 – 1	Se I	MO74
4560.30	21922.40		1	*70391* – 74951	3 – 2	Se I	MO74
4562.90	21909.91		1	*70388* – 74951	2 – 2	Se I	MO74
4569.373	21878.87		2	*70390* – 74960	4 – 3	Se I	MO74

Se—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4572.747	21862.73		2			Se	MO74
4572.878	21862.10		1			Se	MO74
4583.944	21809.32		5			Se	MO74
4600.551	21730.60		570	60677 – *65277*	2 – 2	Se I	MO74
4603.566	21716.36		730	60695 – *65299*	0 – 1	Se I	MO74
4622.166	21628.98		39	60677 – *65299*	2 – 1	Se I	MO74
4626.824	21607.20		6			Se	MO74
4646.675	21514.89		11			Se	MO74
4655.637	21473.48		1721	60622 – *65277*	1 – 2	Se I	MO74
4662.350	21442.56		4603	60677 – *65339*	2 – 3	Se I	MO74
4677.252	21374.24		556	60622 – *65299*	1 – 1	Se I	MO74
4691.872	21307.64		5			Se	MO74
4703.999	21252.71		9	69614 – *74318*	2 – 1	Se I	MO74
4717.430	21192.20		2			Se	MO74
4718.649	21186.72		6	69599 – *74318*	1 – 1	Se I	MO74
4794.20	20852.85		1			Se	MO74
4804.307	20808.98		2			Se	MO74
4810.281	20783.13		7			Se	MO74
4810.428	20782.50		2			Se	MO74
4847.151	20625.05		6	69314 – *74161*	3 – 2	Se I	MO74
4865.365	20547.83		2			Se	MO74
4883.943	20469.67		5	69277 – *74161*	2 – 2	Se I	MO74
4895.470	20421.47		15	69314 – *74209*	3 – 2	Se I	MO74
4898.30	20409.67		1	69263 – *74161*	1 – 2	Se I	MO74
4932.259	20269.15		10	69277 – *74209*	2 – 2	Se I	MO74
4946.639	20210.23		7	69263 – *74209*	1 – 2	Se I	MO74
5047.833	19805.07		6			Se	MO74
5102.919	19591.28		2			Se	MO74
5166.978	19348.39		5			Se	MO74
5182.045	19292.13		2			Se	MO74
5195.638	19241.66		6	*70391* – 75587	3 – 4	Se I	MO74
5196.343	19239.05		6	*70390* – 75587	4 – 5	Se I?	MO74
5196.343	19239.05		6	*70390* – 75587	4 – 4	Se I?	MO74
5198.286	19231.86		3	*70388* – 75587	2 – 3	Se I	MO74
5198.927	19229.49		3	*70388* – 75587	1 – 2	Se I?	MO74
5198.927	19229.49		3	*70388* – 75587	1 – 1	Se I?	MO74
5232.723	19105.29		2	*66623* – 71855	1 – 1	Se I	MO74
5270.318	18969.01		2			Se	MO74
5285.385	18914.93		7			Se	MO74
5285.58	18914.24		2			Se	MO74
5312.149	18819.63		21	60677 – *65989*	2 – 2	Se I	MO74
5340.474	18719.82		2			Se	MO74
5367.235	18626.48		5	60622 – *65989*	1 – 2	Se I	MO74
5419.599	18446.51		2			Se	MO74
5456.660	18321.23		2			Se	MO74
5586.997	17893.82		2			Se	MO74
5642.080	17719.12		6			Se	MO74
5657.140	17671.93		2			Se	MO74
5697.790	17545.87		6	69614 – *75311*	2 – 3	Se I	MO74
5713.242	17498.42		2	69599 – *75312*	1 – 2	Se I	MO74
5760.489	17354.90		6			Se	MO74
5760.64	17354.44		2			Se	MO74
5783.979	17284.42		5	*63479* – 69263	2 – 1	Se I	MO74
5798.360	17241.55		11	*63479* – 69277	2 – 2	Se I	MO74
5803.950	17224.94		3	*66623* – 72427	1 – 2	Se I	MO74
5805.65	17219.90		2			Se	MO74
5815.574	17190.51		3			Se	MO74
5876.35	17012.72		1	69277 – *75153*	2 – 1	Se I	MO74
5879.489	17003.64		2			Se	MO74
5879.592	17003.34		2			Se	MO74
5880.470	17000.80		69	*63382* – 69263	1 – 1	Se I	MO74
5881.267	16998.50		2	69314 – *75195*	3 – 3	Se I	MO74
5881.397	16998.12		14	69314 – *75195*	3 – 4	Se I	MO74
5882.361	16995.33		32	*63380* – 69263	0 – 1	Se I	MO74
5890.092	16973.03		32	*63373* – 69263	2 – 1	Se I	MO74
5890.201	16972.71		133	*63387* – 69277	3 – 2	Se I	MO74

Se—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5890.725	16971.20		2	69263 – *75153*	1 – 1	Se I	MO74
5894.850	16959.33		23	*63382* – 69277	1 – 2	Se I	MO74
5904.472	16931.69		79	*63373* – 69277	2 – 2	Se I	MO74
5918.052	16892.84		7	69277 – *75195*	2 – 3	Se I	MO74
5919.325	16889.20		5	69277 – *75196*	2 – 2	Se I	MO74
5926.989	16867.37		69	*63387* – 69314	3 – 3	Se I	MO74
5927.278	16866.54		421	60695 – *66623*	0 – 1	Se I	MO74
5933.708	16848.27		2	69263 – *75196*	1 – 2	Se I	MO74
5941.263	16826.84		10	*63373* – 69314	2 – 3	Se I	MO74
5944.470	16817.76		275	*63369* – 69314	4 – 3	Se I	MO74
5945.878	16813.78		2557	60677 – *66623*	2 – 1	Se I	MO74
5990.119	16689.60		8	59287 – *65277*	2 – 2	Se I	MO74
5998.039	16667.56		7			Se	MO74
6000.964	16659.44		1295	60622 – *66623*	1 – 1	Se I	MO74
6035.139	16565.10		19	59242 – *65277*	1 – 2	Se I	MO74
6051.918	16519.17		85	59287 – *65339*	2 – 3	Se I	MO74
6053.125	16515.88		2			Se	MO74
6056.753	16505.99		5	59242 – *65299*	1 – 1	Se I	MO74
6062.098	16491.43		3			Se	MO74
6117.183	16342.93		6			Se	MO74
6132.242	16302.80		2			Se	MO74
6134.853	16295.86		2	*63479* – 69614	2 – 2	Se I	MO74
6191.00	16148.07		2			Se	MO74
6220.525	16071.42		2			Se	MO74
6226.70	16055.48		1	*63387* – 69614	3 – 2	Se I	MO74
6235.591	16032.59		6			Se	MO74
6235.75	16032.18		2			Se	MO74
6259.632	15971.02		2	69314 – *75574*	3 – 2	Se I	MO74
6280.75	15917.32		2			Se	MO74
6290.674	15892.21		2			Se	MO74
6296.423	15877.70		2	69277 – *75574*	2 – 2	Se I	MO74
6299.649	15869.56		3			Se	MO74
6369.798	15694.80		2			Se	MO74
6397.562	15626.68		14	*65339* – 71737	3 – 4	Se I	MO74
6400.143	15620.38		135	*65339* – 71739	3 – 3	Se I	MO74
6400.957	15618.40		1550	*65339* – 71740	3 – 2	Se I?	MO74
6400.957	15618.40		1550	*65339* – 71740	3 – 4	Se I?	MO74
6437.911	15528.75		11	*65299* – 71737	1 – 2	Se I	MO74
6441.137	15520.97		703	*65299* – 71740	1 – 2	Se I	MO74
6461.942	15471.00		1031	*65277* – 71739	2 – 3	Se I	MO74
6462.753	15469.06		129	*65277* – 71740	2 – 2	Se I	MO74
6473.162	15444.18		2			Se	MO74
6473.27	15443.92		2			Se	MO74
6537.202	15292.89		4			Se	MO74
6556.434	15248.03		13	*65299* – 71855	1 – 1	Se I	MO74
6592.285	15165.10		9			Se	MO74
6598.230	15151.44		2480	59391 – *65989*	3 – 2	Se I	MO74
6701.717	14917.47		1687	59287 – *65989*	2 – 2	Se I	MO74
6710.697	14897.51		8			Se	MO74
6740.190	14832.32		6			Se	MO74
6746.738	14817.93		1001	59242 – *65989*	1 – 2	Se I	MO74
6765.785	14776.21		2			Se	MO74
6933.172	14419.47		2			Se	MO74
6948.244	14388.19		6			Se	MO74
7003.329	14275.02		3			Se	MO74
7012.302	14256.76		3			Se	MO74
7041.25	14198.14		2	*65989* – 73030	2 – 3	Se I	MO74
7053.40	14173.69		2	*65989* – 73042	2 – 1	Se I	MO74
7062.868	14154.68		3	*65989* – 73052	2 – 2	Se I	MO74
7067.387	14145.63		7			Se	MO74
7081.200	14118.04		2			Se	MO74
7082.456	14115.54		2			Se	MO74
7086.00	14108.48		2			Se	MO74
7087.484	14105.52		2	*65339* – 72427	3 – 2	Se I	MO74
7093.575	14093.41		5	*65989* – 73083	2 – 1	Se I	MO74
7104.842	14071.06		7	*65989* – 73094	2 – 2	Se I	MO74

Se—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7111.564	14057.76		17	*65989* – 73101	2 – 3	Se I	MO74
7149.279	13983.60		28	*65277* – 72427	2 – 2	Se I	MO74
7170.730	13941.77		2			Se	MO74
7185.795	13912.54		6			Se	MO74
7240.882	13806.70		3			Se	MO74
7249.851	13789.62		3			Se	MO74
7304.938	13685.63		7			Se	MO74
7318.620	13660.04		16	*65299* – 72618	1 – 2	Se I	MO74
7320.006	13657.46		3			Se	MO74
7335.446	13628.71		26	59287 – *66623*	2 – 1	Se I	MO74
7366.512	13571.23		6	*62247* – 69614	3 – 2	Se I	MO74
7376.780	13552.34		5	*65339* – 72716	3 – 3	Se I	MO74
7380.466	13545.58		5	59242 – *66623*	1 – 1	Se I	MO74
7410.697	13490.32		2	*66623* – 74033	1 – 0	Se I	MO74
7423.909	13466.31		2			Se	MO74
7438.580	13439.75		5	*65277* – 72716	2 – 3	Se I	MO74
7460.239	13400.73		10	*66623* – 74083	1 – 1	Se I	MO74
7468.753	13385.46		20	*66623* – 74092	1 – 2	Se I	MO74
7487.403	13352.11		2			Se	MO74
7542.489	13254.60		7			Se	MO74
7557.565	13228.16		2			Se	MO74
7566.533	13212.48		10	*65299* – 72866	1 – 1	Se I	MO74
7588.149	13174.84		4	*65277* – 72866	2 – 1	Se I	MO74
7645.837	13075.44		2			Se	MO74
7660.896	13049.73		6			Se	MO74
7691.086	12998.51		19	*65339* – 73030	3 – 3	Se I	MO74
7712.670	12962.13		14	*65339* – 73052	3 – 2	Se I	MO74
7742.394	12912.37		5	*65299* – 73041	1 – 0	Se I	MO74
7754.641	12891.98		6	*65339* – 73094	3 – 2	Se I	MO74
7764.983	12874.81		9	*65277* – 73042	2 – 1	Se I	MO74
7770.972	12864.88		2	*61828* – 69599	2 – 1	Se I	MO74
7779.898	12850.12		2			Se	MO74
7780.022	12849.92		3			Se	MO74
7785.621	12840.68		9	*61828* – 69614	2 – 2	Se I	MO74
7805.173	12808.51		2	*65277* – 73083	2 – 1	Se I	MO74
7883.381	12681.44		2			Se	MO74
7898.448	12657.25		6			Se	MO74
7914.242	12631.99		28	*65339* – 73253	3 – 4	Se I	MO74
7918.202	12625.68		8	*61681* – 69599	1 – 1	Se I	MO74
7948.25	12577.94		2	*61681* – 69629	1 – 0	Se I	MO74
7962.506	12555.43		3			Se	MO74
7986.004	12518.48		29	*65277* – 73263	2 – 3	Se I	MO74
8017.444	12469.39		2			Se	MO74
8017.590	12469.16		8			Se	MO74
8096.706	12347.32		3			Se	MO74
8120.934	12310.49		2			Se	MO74
8126.90	12301.45		2			Se	MO74
8135.997	12287.69		5			Se	MO74
8151.787	12263.89		3			Se	MO74
8200.061	12191.70		4			Se	MO74
8200.186	12191.51		2			Se	MO74
8245.866	12123.97		23	*50996* – 59242	1 – 1	Se I	MO74
8257.950	12106.23		34	*63479* – 71737	2 – 3	Se I	MO74
8258.211	12105.85		11	*63479* – 71737	2 – 2	Se I	MO74
8260.624	12102.31		14	*63479* – 71739	2 – 3	Se I	MO74
8261.433	12101.13		3	*63479* – 71740	2 – 2	Se I	MO74
8290.887	12058.14		97	*50996* – 59287	1 – 2	Se I	MO74
8349.791	11973.07		130	*63387* – 71737	3 – 3	Se I	MO74
8349.886	11972.93		426	*63387* – 71737	3 – 4	Se I	MO74
8353.280	11968.07		8	*63387* – 71740	3 – 2	Se I?	MO74
8353.280	11968.07		8	*63387* – 71740	3 – 4	Se I?	MO74
8354.698	11966.04		101	*63382* – 71737	1 – 2	Se I	MO74
8354.756	11965.96		50	*63382* – 71737	1 – 1	Se I	MO74
8356.648	11963.25		96	*63380* – 71737	0 – 1	Se I	MO74
8357.926	11961.42		6	*63382* – 71740	1 – 2	Se I	MO74
8364.062	11952.64		292	*63373* – 71737	2 – 3	Se I	MO74

Se—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8364.321	11952.27		112	*63373* – 71737	2 – 2	Se I	MO74
8367.367	11947.92		101	*63369* – 71737	4 – 4	Se I	MO74
8368.105	11946.87		752	*63369* – 71738	4 – 5	Se I	MO74
8376.732	11934.56		152	*63479* – 71855	2 – 1	Se I	MO74
8437.608	11848.46		5			Se	MO74
8473.221	11798.66		3	*63382* – 71855	1 – 1	Se I	MO74
8475.10	11796.04		2	*63380* – 71855	0 – 1	Se I	MO74
8482.844	11785.27		33	*63373* – 71855	2 – 1	Se I	MO74
8492.692	11771.61		8			Se	MO74
8596.032	11630.09		2			Se	MO74
8611.099	11609.74		5			Se	MO74
8666.181	11535.95		2			Se	MO74
8675.131	11524.05		4			Se	MO74
8833.586	11317.33		2			Se	MO74
8894.949	11239.26		57	*65339* – 74234	3 – 4	Se I	MO74
8912.706	11216.87		3			Se	MO74
8934.950	11188.94		28	*65299* – 74234	1 – 2	Se I	MO74
8956.685	11161.79		43	*65277* – 74234	2 – 3	Se I	MO74
8967.793	11147.96		8			Se	MO74
9054.074	11041.73		2	*63373* – 72427	2 – 2	Se I	MO74
9071.134	11020.96		2			Se	MO74
9150.259	10925.66		2			Se	MO74
9205.346	10860.28		8			Se	MO74
9237.263	10822.75		68	*63479* – 72716	2 – 3	Se I	MO74
9343.375	10699.84		23	*63373* – 72716	2 – 3	Se I	MO74
9386.831	10650.30		150	*63479* – 72866	2 – 1	Se I	MO74
9387.808	10649.20		4			Se	MO74
9442.758	10587.23		2			Se	MO74
9442.897	10587.07		8			Se	MO74
9457.964	10570.20		2			Se	MO74
9489.701	10534.85		2	*62247* – 71737	3 – 4	Se I	MO74
9492.944	10531.25		18	*63373* – 72866	2 – 1	Se I	MO74
9493.094	10531.09		14	*62247* – 71740	3 – 2	Se I?	MO74
9493.094	10531.09		14	*62247* – 71740	3 – 4	Se I?	MO74
9551.568	10466.62		21	*63479* – 73030	2 – 3	Se I	MO74
9563.663	10453.38		4	*63479* – 73042	2 – 1	Se I	MO74
9625.371	10386.36		4114	*50996* – 60622	1 – 1	Se I	MO74
9657.679	10351.62		9	*63373* – 73030	2 – 3	Se I	MO74
9680.457	10327.26		7935	*50996* – 60677	1 – 2	Se I	MO74
9699.058	10307.45		1423	*50996* – 60695	1 – 0	Se I	MO74
9731.178	10273.43		3	*63369* – 73101	4 – 3	Se I	MO74
9735.524	10268.85		3			Se	MO74
9784.688	10217.25		400	*63479* – 73263	2 – 3	Se I	MO74
9862.911	10136.22		5			Se	MO74
9866.567	10132.46		9	*63387* – 73253	3 – 4	Se I	MO74
9890.801	10107.63		39	*63373* – 73263	2 – 3	Se I	MO74
9911.395	10086.63		6	*61828* – 71739	2 – 3	Se I	MO74
9917.996	10079.92		8			Se	MO74
9936.602	10061.04		2			Se	MO74

Se Reference

MO74 Morillon, C., and Vergès, J., Physica Scripta **10**, 227–235 (1974).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

George, S., Fredrickson, J. E., and Tucker, A. W., J. Opt. Soc. Amer. **63**, 596 (1973).

Silicon

Si, $Z = 14$

Si I Normal state of valence electrons $3s^23p^2\ ^3P_0$ I.P. = 65747 cm^{-1}

Si II Normal state of valence electrons $3s^23p\ ^2P^\circ_{1/2}$ I.P. = 131838 cm^{-1}

Si

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3866.76	25854.38	0.01	6	*45321* – 49188	3 – 2	Si I	LI65
4531.30	22062.71	0.01	12	*54257* – 58788	3 – 4	Si I	LI65
4569.27	21879.35	0.01	8	*54205* – 58774	2 – 3	Si I	LI65
4581.77	21819.69	0.01	5	*54205* – 58786	2 – 3	Si I	LI65
4590.16	21779.77	0.01	9	*54185* – 58775	1 – 2	Si I	LI65
4681.63	21354.24	0.01	21	50189 – *54871*	2 – 1	Si I	LI65
4779.47	20917.13	0.01	12	*54257* – 59037	3 – 4	Si I	LI65
4805.43	20804.13	0.01	4	49399 – *54205*	1 – 2	Si I	LI65
4829.94	20698.56	0.01	4	*54205* – 59034	2 – 3	Si I	LI65
4852.37	20602.86	0.01	4	*54257* – 59109	3 – 3	Si I	LI65
4904.85	20382.43	0.01	1	*54205* – 59109	2 – 3	Si I	LI65
4905.82	20378.38	0.01	2	*54205* – 59110	2 – 2	Si I	LI65
4914.14	20343.87	0.01	4	49399 – *54313*	1 – 1	Si I	LI65
4924.32	20301.83	0.01	1	*53387* – 58311	1 – 0	Si I	LI65
4925.65	20296.36	0.01	2	*54185* – 59110	1 – 2	Si I	LI65
4996.64	20007.97	0.01	3	49188 – *54185*	2 – 1	Si I	LI65
5016.47	19928.88	0.02	31	49188 – *54205*	2 – 2	Si I	LI65
5068.97	19722.50	0.02	110	49188 – *54257*	2 – 3	Si I	LI65
5124.67	19508.13	0.02	14	49060 – *54185*	1 – 1	Si I	LI65
5125.20	19506.12	0.02	5	49188 – *54313*	2 – 1	Si I	LI65
5128.55	19493.38	0.02	13	49399 – *54528*	1 – 2	Si I	LI65
5144.49	19432.97	0.02	48	49060 – *54205*	1 – 2	Si I	LI65
5156.97	19385.94	0.02	15	49028 – *54185*	0 – 1	Si I	LI65
5184.42	19283.29	0.02	8	49060 – *54245*	1 – 0	Si I	LI65
5253.21	19030.79	0.02	5	49060 – *54313*	1 – 1	Si I	LI65
5285.51	18914.48	0.02	8	49028 – *54313*	0 – 1	Si I	LI65
5339.59	18722.90	0.02	26	49188 – *54528*	2 – 2	Si I	LI65
5388.07	18554.45	0.02	2	*53387* – 58775	1 – 2	Si I	LI65
5426.60	18422.72	0.02	7	*53362* – 58788	3 – 4	Si I	LI65
5467.62	18284.51	0.02	3	49060 – *54528*	1 – 2	Si I	LI65
5674.79	17617.00	0.02	3	*53362* – 59037	3 – 4	Si I	LI65
5723.55	17466.92	0.02	4	*53387* – 59110	1 – 2	Si I	LI65
5769.67	17327.29	0.02	28	*53362* – 59131	3 – 4	Si I	LI65
5803.71	17225.64	0.02	4	*53387* – 59191	1 – 2	Si I	LI65
5940.79	16828.18	0.02	3	48264 – *54205*	3 – 2	Si I	LI65
5993.29	16680.77	0.02	29	48264 – *54257*	3 – 3	Si I	LI65
6082.92	16434.98	0.02	1	48102 – *54185*	2 – 1	Si I	LI65
6102.76	16381.55	0.02	16	48102 – *54205*	2 – 2	Si I	LI65
6103.30	16380.12	0.02	8	47284 – *53387*	1 – 1	Si I	LI65
6155.26	16241.84	0.02	7	48102 – *54257*	2 – 3	Si I	LI65
6165.19	16215.68	0.02	11	48020 – *54185*	1 – 1	Si I	LI65
6185.01	16163.71	0.02	60	48020 – *54205*	1 – 2	Si I	LI65
6211.49	16094.80	0.02	20	48102 – *54313*	2 – 1	Si I	LI65
6224.94	16060.03	0.02	95	48020 – *54245*	1 – 0	Si I	LI65
6263.94	15960.04	0.02	40	48264 – *54528*	3 – 2	Si I	LI65
6292.18	15888.39	0.02	190	*40991* – 47284	1 – 1	Si I	LI65
6293.76	15884.41	0.02	5	48020 – *54313*	1 – 1	Si I	LI65
6313.97	15833.58	0.02	7	50189 – *56503*	2 – 2	Si I	LI65
6425.88	15557.81	0.02	7	48102 – *54528*	2 – 2	Si I	LI65
6501.49	15376.88	0.02	4	50189 – *56690*	2 – 2	Si I	LI65
7028.19	14224.54	0.02	6	*40991* – 48020	1 – 1	Si I	LI65
7029.76	14221.36	0.02	2	47284 – *54313*	1 – 1	Si I	LI65
7103.67	14073.39	0.02	3	49399 – *56503*	1 – 2	Si I	LI65
7291.23	13711.36	0.02	5	49399 – *56690*	1 – 2	Si I	LI65
7300.55	13693.85	0.02	8	49399 – *56700*	1 – 1	Si I	LI65
7314.71	13667.35	0.02	3	49188 – *56503*	2 – 2	Si I	LI65

Si—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7333.71	13631.94	0.02	4	49399 – *56733*	1 – 0	Si I	LI65
7502.26	13325.67	0.02	3	49188 – *56690*	2 – 2	Si I	LI65
7511.64	13309.04	0.02	5	49188 – *56700*	2 – 1	Si I	LI65
7523.77	13287.58	0.02	9	*39760* – 47284	1 – 1	Si I	LI65
7586.96	13176.90	0.02	11	47284 – *54871*	1 – 1	Si I	LI65
7630.31	13102.05	0.02	3	49060 – *56690*	1 – 2	Si I	LI65
8065.03	12395.82	0.02	6	*39955* – 48020	2 – 1	Si I	LI65
8068.72	12390.16	0.02	4	*40991* – 49060	1 – 1	Si I	LI65
8147.28	12270.68	0.02	120	*39955* – 48102	2 – 2	Si I	LI65
8259.79	12103.53	0.02	150	*39760* – 48020	1 – 1	Si I	LI65
8274.50	12082.01	0.02	4	*50499* – 58774	2 – 3	Si I	LI65
8309.23	12031.51	0.02	440	*39955* – 48264	2 – 3	Si I	LI65
8336.91	11991.57	0.02	220	*39683* – 48020	0 – 1	Si I	LI65
8342.053	11984.18	0.02	10	*39760* – 48102	1 – 2	Si I	RA65
8544.49	11700.24	0.02	3	*50566* – 59110	1 – 2	Si I	LI65
8588.01	11640.96	0.02	4	*50602* – 59190	0 – 1	Si I	LI65
8610.10	11611.09	0.02	12	*50499* – 59109	2 – 3	Si I	LI65
8611.12	11609.72	0.02	1	*50499* – 59110	2 – 2	Si I	LI65
8623.99	11592.38	0.02	3	*50566* – 59190	1 – 1	Si I	LI65
8624.17	11592.14	0.11	4	*50566* – 59190	1 – 1	Si I	RA65
8624.64	11591.52	0.02	5	*50566* – 59191	1 – 2	Si I	LI65
8691.12	11502.84	0.11	4	*50499* – 59191	2 – 2	Si I	RA65
8704.00	11485.83	0.02	5	50189 – *58893*	2 – 3	Si I	LI65
8840.4	11308.5	0.40	2	*49933* – 58774	3 – 3	Si I	RA65
8855.107	11289.83	0.02	15	*49933* – 58788	3 – 4	Si I	RA65
8924.63	11201.88	0.03	4	*49850* – 58775	2 – 2	Si I	RA65
8928.68	11196.80	0.08	2	50189 – *59118*	2 – 3	Si I	RA65
8936.030	11187.588	0.01	16	*49850* – 58786	2 – 3	Si I	RA65
8982.240	11130.03	0.01	12	*50054* – 59037	4 – 4	Si I	RA65
9073.601	11017.965	0.01	80	*50054* – 59128	4 – 5	Si I	RA65
9077.121	11013.69	0.02	5	*50054* – 59131	4 – 4	Si I	RA65
9101.222	10984.527	0.01	20	*49933* – 59034	3 – 3	Si I	RA65
9103.266	10982.061	0.01	30	*49933* – 59037	3 – 4	Si I	RA65
9105.548	10979.308	0.01	80	*39955* – 49060	2 – 1	Si I	RA65
9184.155	10885.336	0.01	30	*49850* – 59034	2 – 3	Si I	RA65
9186.29	10882.80	0.02	5	48264 – *57450*	3 – 3	Si I	LI65
9197.501	10869.541	0.01	130	*40991* – 50189	1 – 2	Si I	RA65
9198.135	10868.79	0.01	30	*49933* – 59131	3 – 4	Si I	RA65
9219.288	10843.854	0.01	60	47284 – *56503*	1 – 2	Si I	RA65
9233.562	10827.091	0.01	140	*39955* – 49188	2 – 2	Si I	RA65
9260.10	10796.06	0.03	7	*49850* – 59110	2 – 2	Si I	RA65
9268.003	10786.856	0.01	80	*39760* – 49028	0 – 0	Si I	RA65
9269.976	10784.560	0.01	30	48102 – *57372*	2 – 2	Si I	RA65
9300.311	10749.384	0.01	60	*39760* – 49060	0 – 1	Si I	RA65
9319.364	10727.408	0.01	30	48264 – *57583*	3 – 4	Si I	RA65
9348.257	10694.251	0.01	30	48102 – *57450*	2 – 3	Si I	RA65
9352.220	10689.719	0.01	25	48020 – *57372*	1 – 2	Si I	RA65
9356.11	10685.28	0.09	6			Si	RA65
9377.436	10660.975	0.01	120	*39683* – 49060	0 – 1	Si I	RA65
9406.844	10627.647	0.01	20	47284 – *56690*	1 – 2	Si I	RA65
9428.326	10603.431	0.01	120	*39760* – 49188	1 – 2	Si I	RA65
9444.617	10585.141	0.01	120	*39955* – 49399	2 – 1	Si I	RA65
9447.298	10582.14	0.02	2	50189 – *59636*	2 – 1	Si I	RA65
9522.331	10498.75	0.01	1			Si	RA65
9599.179	10414.70	0.02	10			Si	RA65
9639.380	10371.269	0.01	30	*39760* – 49399	1 – 1	Si I	RA65
9716.510	10288.942	0.01	10	*39683* – 49399	0 – 1	Si I	RA65
9843.86	10155.83	0.05	5	49188 – *59032*	2 – 2	Si I	RA65
9899.70	10098.55	0.10	1			Si	RA65
9929.52	10068.22	0.10	2	49188 – *59118*	2 – 3	Si I	RA65
9971.52	10025.81	0.10	2	49060 – *59032*	1 – 2	Si I	RA65

Si References

LI65 Litzén, U., Ark. Fys. **28**, 239–248 (1965).
Source: Condensed hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

RA65 Radziemski, L. J., Jr., and Andrew, K. L., J. Opt. Soc. Amer. **55**, 474–491 (1965).
Source: Electrodeless discharge tube (2.45 GHz) and Silicon-argon arc
Instrument: 30′ grating spectrograph
Detector: Photographic

Additional References

Litzén, U., Ark. Fys. **31**, 453 (1966).
Radziemski, L. J., Jr., Andrew, K. L., Kaufman, V., and Litzén, U., J. Opt. Soc. Amer. **57**, 336 (1967).

Sodium

Na, Z = 11

Na I Normal state of valence electrons $2p^6 3s\ ^2S_{1/2}$ I.P. = 41449 cm^{-}

Na II Normal state of valence electrons $2p^6\ ^1S_0$ I.P. = 381395 cm^{-1}

Na

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2472.622	40431.880	0.01		*34586* – 37059		Na I	LZ70
4276.15	23379.14	0.01		*30272* – 34548	1½ – 2½	Na I	JO61
4281.78	23348.38	0.01		*30266* – 34548	½ – 1½	Na I	JO61
4527.00	22083.66	0.01		25739 – *30266*	½ – ½	Na I	JO61
4532.59	22056.40	0.01		25739 – *30272*	½ – 1½	Na I	JO61
5414.06	18465.39	0.01	B	29172 – *34586*		Na I	JO61
6105.62	16373.87	0.01		*30266* – 36372	½ – ½	Na I	JO61
6764.17	14779.75	0.01		*30272* – 37036	1½ – 2½	Na I	JO61
6769.76	14767.54	0.01		*30266* – 37036	½ – 1½	Na I	JO61
7884.79	12679.17	0.01	B	29172 – *37057*		Na I	JO61
8766.62	11403.78	0.03	12 V	*16973* – 25739	1½ – ½	Na I	RI56
8783.82	11381.45	0.03	11 V	*16956* – 25739	½ – ½	Na I	RI56
8928.35	11197.21	0.03	2 V	*30272* – 39200	1½ – 2½	Na I	RI56
8933.96	11190.19	0.03	1 V	*30266* – 39200	½ – 1½	Na I	RI56
9226.93	10834.87	0.03	8 VB	29172 – *38399*		Na I	RI56
9300.39	10749.29	0.03	9 V	25739 – *35040*	½ – ½	Na I	RI56
9302.86	10746.44	0.03	10 V	25739 – *35042*	½ – 1½	Na I	RI56
9456.11	10572.28	0.03	3 V	*30272* – 39728	1½ – 2½	Na I	RI56
9461.73	10566.00	0.03	1 V	*30266* – 39728	½ – 1½	Na I	RI56

Na References

RI56 Risberg, P. Ark. Fys. **10**, 583–605 (1956).
Source: Hollow cathode
Instrument: 21′ Wadsworth spectrograph
Detector: Photographic

JO61 Johansson, I., Ark. Fys. **20**, 135–146 (1961).
Source: Hollow cathode
Instrument: 1 m Pfund spectrometer
Detector: PbS

LZ70 Litzén, U., Physica Scripta **1**, 253–255 (1970).
Source: Hollow cathode
Instrument: 1 m Pfund and 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Sulphur

S, Z = 16

S I Normal state of valence electrons $3s^2 3p^4\ ^3P_2$ I.P. = 83558 cm^{-1}

S II Normal state of valence electrons $3s^2 3p^3\ ^4S^\circ_{3/2}$ I.P. = 188200 cm^{-1}

S

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2917.143	34270.76	0.01	12	*71350* – 74267	1 – 2	S I	JA67
2918.192	34258.45	0.01	6	*71350* – 74268	1 – 1	S I	JA67
2920.251	34234.29	0.02	2	*71350* – 74270	1 – 0	S I	JA67
3208.470	31159.00	0.01	11	*70701* – 73910	2 – 1	S I	JA67
3212.137	31123.43	0.01	18	*70701* – 73913	2 – 2	S I	JA67
3218.174	31065.04	0.01	23	*70701* – 73920	2 – 3	S I	JA67
3770.689	26513.12	0.01	13			S	JA67
3771.945	26504.29	0.01	9			S	JA67
3772.687	26499.08	0.01	6			S I	JA67
3817.928	26185.07	0.02	5			S I	JA67
3973.992	25156.75	0.02	2			S	JA67
4032.621	24791.00	0.02	3			S I	JA67
4077.843	24516.08	0.01	7			S I	JA67
4094.589	24415.81	0.01	21	*70173* – 74267	3 – 2	S I	JA67
4102.360	24369.56	0.02	4	*70165* – 74267	2 – 2	S I	JA67
4103.413	24363.31	0.01	11	*70165* – 74268	2 – 1	S I	JA67
4104.959	24354.13	0.02	3	*70163* – 74268	1 – 1	S I	JA67
4107.002	24342.02	0.02	4	*70163* – 74270	1 – 0	S I	JA67
4349.063	22987.18	0.02	5 B	73920 – *78269*	3 – 4	S I	JA67
4349.43	22985.25	0.02	5 B	73920 – *78269*	3 –	S I	JA67
4355.60	22952.70	0.02	2 B	73913 – *78269*	2 –	S I	JA67
4359.61	22931.55	0.02	2 B	73910 – *78270*	1 –	S I	JA67
4367.817	22888.488	0.01	26 B	63474 – *67841*	3 – 3	S I	JA67
4368.06	22887.23	0.01	26 B	63456 – *67824*	2 – 2	S I	JA67
4370.271	22875.640	0.02	1	63445 – *67815*	1 – 1	S I	JA67
4379.122	22829.400	0.02	5	63445 – *67824*	1 – 2	S I	JA67
4385.725	22795.029	0.01	70	63456 – *67841*	2 – 3	S I	JA67
4402.584	22707.738	0.01	1250	63474 – *67876*	3 – 4	S I	JA67
4412.746	22655.455	0.01	25	63474 – *67886*	3 – 2	S I	JA67
4414.958	22644.090	0.01	135	63474 – *67889*	3 – 3	S I	JA67
4428.386	22575.431	0.01	75	63456 – *67884*	2 – 1	S I	JA67
4430.655	22563.867	0.01	225	63456 – *67886*	2 – 2	S I	JA67
4432.866	22552.612	0.01	280	63456 – *67889*	2 – 3	S I	JA67
4438.093	22526.053	0.01	115	63445 – *67883*	1 – 0	S I	JA67
4439.462	22519.105	0.01	185	63445 – *67884*	1 – 1	S I	JA67
4441.733	22507.592	0.01	115	63445 – *67886*	1 – 2	S I	JA67
5272.070	18962.706	0.02	5	64891 – *70163*	2 – 1	S I	JA67
5273.23	18958.53	0.01	80 B	64890 – *70163*	0 – 1	S I	JA67
5273.58	18957.29	0.01	80 B	64891 – *70165*	2 – 2	S I	JA67
5275.685	18949.711	0.01	55	64888 – *70163*	1 – 1	S I	JA67
5277.223	18944.188	0.01	335	64888 – *70165*	1 – 2	S I	JA67
5281.378	18929.285	0.01	635	64891 – *70173*	2 – 3	S I	JA67
6023.453	16597.23	0.02	3	*67886* – 73910	2 – 1	S I	JA67
6024.922	16593.191	0.01	7	*67889* – 73913	3 – 2	S I	JA67
6025.734	16590.956	0.02	4	*67884* – 73910	1 – 1	S I	JA67
6027.128	16587.118	0.01	7	*67883* – 73910	0 – 1	S I?	JA67
6027.128	16587.118	0.01	7	*67886* – 73913	2 – 2	S I?	JA67
6030.943	16576.63	0.02	4	*67889* – 73920	3 – 3	S I	JA67
6043.325	16542.665	0.01	25	*67876* – 73920	4 – 3	S I	JA67
6458.816	15478.485	0.01	145	64891 – *71350*	2 – 1	S I	JA67
6460.014	15475.615	0.01	35	64890 – *71350*	0 – 1	S I	JA67
6462.436	15469.813	0.01	95	64888 – *71350*	1 – 1	S I	JA67
6482.365	15422.255	0.01	210 B	*70173* – 76655	3 –	S I	JA67
6490.147	15403.762	0.01	130 B	*70165* – 76655	2 –	S I	JA67
6491.708	15400.057	0.01	75	*70163* – 76655	1 – 2	S I	JA67
7130.911	14019.620	0.01	30	64891 – *72022*	2 – 2	S I	JA67

S—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7134.532	14012.505	0.02	1	64888 – *72022*	1 – 2	S I	JA67
7227.740	13831.803	0.01	240	63474 – *70701*	3 – 2	S I	JA67
7245.648	13797.616	0.01	160	63456 – *70701*	2 – 2	S I	JA67
7256.724	13776.556	0.01	145	63445 – *70701*	1 – 2	S I	JA67
7489.747	13347.935	0.01	7	64891 – *72381*	2 – 1	S I	JA67
7493.367	13341.488	0.01	8	64888 – *72381*	1 – 1	S I	JA67
7682.69	13012.72	0.01	5	64888 – *72570*	1 – 0	S I	JA67
7985.938	12518.585	0.01	6 B	*70165* – 78151	2 –	S I	JA67
7987.659	12515.888	0.01	4 B	*70163* – 78151	1 –	S I	JA67
8029.234	12451.082	0.01	10	*70173* – 78202	3 – 3	S I	JA67
8548.46	11694.82	0.02	2	63474 – *72022*	3 – 2	S I	JA67
8566.355	11670.381	0.01	10	63456 – *72022*	2 – 2	S I	JA67
8577.431	11655.312	0.01	10	63445 – *72022*	1 – 2	S I	JA67
8612.854	11607.375	0.02	4	*69236* – 77849	2 – 1	S I	JA67
8617.017	11601.768	0.01	13	*69236* – 77853	2 – 1	S I	JA67
8675.657	11523.350	0.01	6	*69236* – 77912	2 – 1	S I	JA67
8737.50	11441.79	0.02	4			S	JA67
8764.766	11406.195	0.01	165 B	*67889* – 76653	3 –	S I	JA67
8767.004	11403.283	0.01	150 B	*67886* – 76653	2 –	S I	JA67
8769.296	11400.303	0.01	85 B	*67884* – 76653	1 –	S I	JA67
8770.689	11398.492	0.01	30	*67883* – 76653	0 – 1	S I	JA67
8777.134	11390.122	0.01	265 B	*67876* – 76653	4 –	S I	JA67
8811.907	11345.175	0.01	24 B	*67841* – 76653	3 –	S I	JA67
8813.45	11343.19	0.02	2 B	*67841* – 76655	3 –	S I	JA67
8838.50	11311.03	0.02	1 B	*67815* – 76653	1 –	S I	JA67
8839.94	11309.20	0.02	1	*67815* – 76655	1 – 2	S I	JA67
8914.438	11214.687	0.01	28 B	*69236* – 78151	2 –	S I	JA67
8925.184	11201.183	0.01	5	63456 – *72381*	2 – 1	S I	JA67
8936.263	11187.297	0.01	16	63445 – *72381*	1 – 1	S I	JA67
8970.146	11145.037	0.01	25 B	*70173* – 79143	3 –	S I	JA67
8977.932	11135.373	0.01	18 B	*70165* – 79143	2 –	S I	JA67
8979.51	11133.42	0.01	13 M	*70163* – 79143	1 – 2	S I	JA67
9125.54	10955.26	0.01	9	63445 – *72570*	1 – 0	S I	JA67
9402.04	10633.08	0.01	210	*69236* – 78638	2 – 3	S I	JA67
9558.153	10459.406	0.01	1300	*55329* – 64888	1 – 1	S I	JA67
9560.575	10456.757	0.01	310	*55329* – 64890	1 – 0	S I	JA67
9561.769	10455.451	0.01	1850	*55329* – 64891	1 – 2	S I	JA67
9962.940	10034.447	0.01	1 L	*67886* – 77849	2 – 1	S I	JA67
9963.234	10034.151	0.01	2 L	*67889* – 77852	3 – 2	S I	JA67
9965.210	10032.161	0.01	2 L	*67884* – 77849	1 – 1	S I	JA67
9965.429	10031.941	0.01	2 L	*67886* – 77852	2 – 2	S I	JA67
9966.433	10030.930	0.01	1 L	*67889* – 77855	3 – 3	S I	JA67
9967.098	10030.261	0.01	1 L	*67886* – 77853	2 – 1	S I	JA67
9978.816	10018.483	0.01	4 L	*67876* – 77855	4 – 3	S I	JA67

S References

JA67 Jakobsson, L. R., Ark. Fys. 34, 19–31 (1967).
Source: Electrodeless discharge (18 MHz)
Instrument: 1 m Pfund spectrometer
Detector: PbS cooled with liquid nitrogen

Tellurium

Te, Z = 52

Te I Normal state of valence electrons $5s^25p^4\ ^3P_2$ I.P. = 72667 cm^{-1}

Te II Normal state of valence electrons $5s^25p^3\ ^4S°_{3/2}$ I.P. = 150000 cm-1

Te

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
3678.272	27179.26		7			Te	MO75
3764.921	26553.74		15			Te	MO75
3766.988	26539.17		38	*61133* – 64900	1 – 2	Te I	MO75
3782.745	26428.62		13			Te	MO75
3817.420	26188.56		6			Te	MO75
3842.590	26017.02		2			Te	MO75
3934.690	25408.03		4	*60629* – 64564	2 – 2	Te I	MO75
4019.989	24868.90		2	64900 – *68920*	2 – 1	Te I?	MO75
4019.989	24868.90		2	64900 – *68920*	2 – 2	Te I?	MO75
4022.385	24854.09		8			Te	MO75
4047.483	24699.97		2	64564 – *68611*	2 – 2	Te I?	MO75
4047.483	24699.97		2	64564 – *68611*	2 – 1	Te I?	MO75
4129.542	24209.15		2			Te	MO75
4154.468	24063.90		6	*64062* – 68216	4 – 4	Te I	MO75
4155.308	24059.04		25	*64062* – 68217	4 – 5	Te I	MO75
4157.739	24044.97		11	*64058* – 68216	2 – 3	Te I	MO75
4158.667	24039.61		4	*64058* – 68217	2 – 2	Te I	MO75
4166.210	23996.08		2	*64437* – 68603	2 – 2	Te I?	MO75
4166.210	23996.08		2	*64437* – 68603	2 – 3	Te I?	MO75
4168.916	23980.51		5	*64047* – 68216	3 – 3	Te I	MO75
4169.231	23978.70		17	*64047* – 68216	3 – 4	Te I	MO75
4196.704	23821.72		4			Te	MO75
4223.911	23668.28		4	*63993* – 68217	1 – 2	Te I	MO75
4227.045	23650.73		2			Te	MO75
4270.459	23410.30		2	*60629* – 64900	2 – 2	Te I	MO75
4291.424	23295.93		2	*60629* – 64921	2 – 3	Te I	MO75
4291.606	23294.94		27	54535 – *58826*	3 – 3	Te I	MO75
4318.670	23148.96		2	64088 – *68407*	1 – 1	Te I	MO75
4393.312	22755.66		48	54199 – *58592*	2 – 2	Te I	MO75
4403.284	22704.13		3	*63296* – 67700	2 – 2	Te I	MO75
4425.210	22591.63		2	63982 – *68407*	0 – 1	Te I	MO75
4432.340	22555.29		74	54160 – *58592*	1 – 2	Te I	MO75
4437.079	22531.20		3			Te	MO75
4486.191	22284.54		4	63921 – *68407*	2 – 1	Te I	MO75
4522.966	22103.35		4	64088 – *68611*	1 – 1	Te I?	MO75
4522.966	22103.35		4	64088 – *68611*	1 – 2	Te I?	MO75
4546.952	21986.75		7	54199 – *58746*	2 – 1	Te I	MO75
4570.557	21873.20		2	*61133* – 65703	1 – 1	Te I	MO75
4585.980	21799.64		37	54160 – *58746*	1 – 1	Te I	MO75
4593.550	21763.72		2			Te	MO75
4605.395	21707.74		10	*61133* – 65738	1 – 1	Te I	MO75
4621.495	21632.12		10	63741 – *68362*	3 – 2	Te I	MO75
4627.830	21602.50		464	54199 – *58826*	2 – 3	Te I	MO75
4692.661	21304.06		3	63669 – *68362*	1 – 2	Te I	MO75
4750.712	21043.73		1023	0 – 4750	2 – 1	Te I	MO75
4751.785	21038.98		8	63610 – *68362*	2 – 2	Te I	MO75
4760.529	21000.34		4			Te	MO75
4783.867	20897.89		42	*58826* – 63610	3 – 2	Te I	MO75
4796.857	20841.29		2	63610 – *68407*	2 – 1	Te I	MO75
4805.899	20802.08		3	63556 – *68362*	1 – 2	Te I	MO75
4806.377	20800.01		4			Te	MO75
4810.632	20781.62		57	*58746* – 63556	1 – 1	Te I	MO75
4831.239	20692.98		5	64088 – *68920*	1 – 1	Te I?	MO75
4831.239	20692.98		5	64088 – *68920*	1 – 2	Te I?	MO75
4839.700	20656.80		11			Te	MO75
4850.970	20608.81		3	63556 – *68407*	1 – 1	Te I	MO75

Te—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4864.745	20550.45		3	*58746* – 63610	1 – 2	Te I	MO75
4870.597	20525.76		8	*61133* – 66003	1 – 0	Te I	MO75
4923.870	20303.69		46	*58746* – 63669	1 – 1	Te I	MO75
4962.030	20147.54		239	55667 – *60629*	2 – 2	Te I	MO75
4963.749	20140.56		9			Te	MO75
4964.273	20138.44		66	*58592* – 63556	2 – 1	Te I	MO75
4998.754	19999.53		3	63921 – *68920*	2 – 1	Te I?	MO75
4998.754	19999.53		3	63921 – *68920*	2 – 2	Te I?	MO75
5018.385	19921.29		15	*58592* – 63610	2 – 2	Te I	MO75
5055.258	19775.99		5	63556 – *68611*	1 – 1	Te I?	MO75
5055.258	19775.99		5	63556 – *68611*	1 – 2	Te I?	MO75
5077.510	19689.32		37	*58592* – 63669	2 – 1	Te I	MO75
5094.534	19623.52		269	*58826* – 63921	3 – 2	Te I	MO75
5146.942	19423.71		5			Te	MO75
5175.411	19316.86		11	*58746* – 63921	1 – 2	Te I	MO75
5236.389	19091.92		91	*58746* – 63982	1 – 0	Te I	MO75
5274.116	18955.35		69	55355 – *60629*	1 – 2	Te I	MO75
5307.039	18837.76		3	*63296* – 68603	2 – 2	Te I?	MO75
5307.039	18837.76		3	*63296* – 68603	2 – 3	Te I?	MO75
5309.418	18829.31		4	63610 – *68920*	2 – 1	Te I?	MO75
5309.418	18829.31		4	63610 – *68920*	2 – 2	Te I?	MO75
5324.126	18777.30		394	55809 – *61133*	0 – 1	Te I	MO75
5325.890	18771.08		3			Te	MO75
5329.051	18759.94		48	*58592* – 63921	2 – 2	Te I	MO75
5363.531	18639.34		4	63556 – *68920*	1 – 1	Te I?	MO75
5363.531	18639.34		4	63556 – *68920*	1 – 2	Te I?	MO75
5401.222	18509.27		7			Te	MO75
5415.078	18461.91		16			Te	MO75
5465.500	18291.59		2782	55667 – *61133*	2 – 1	Te I	MO75
5496.564	18188.22		43	*58592* – 64088	2 – 1	Te I	MO75
5500.282	18175.92		4			Te	MO75
5519.516	18112.58		10			Te	MO75
5531.517	18073.29		11			Te	MO75
5533.064	18068.23		6			Te	MO75
5537.686	18053.15		6			Te	MO75
5737.528	17424.35		28	*58826* – 64564	3 – 2	Te I	MO75
5777.586	17303.54		1958	55355 – *61133*	1 – 1	Te I	MO75
5807.169	17215.39		11	4750 – 10557	1 – 2	Te I	MO75
5818.406	17182.14		30	*58746* – 64564	1 – 2	Te I	MO75
6073.296	16461.03		44	*58826* – 64900	3 – 2	Te I	MO75
6094.445	16403.90		3761	54535 – *60629*	3 – 2	Te I	MO75
6154.173	16244.70		14	*58746* – 64900	1 – 2	Te I	MO75
6307.814	15849.02		43	*58592* – 64900	2 – 2	Te I	MO75
6400.033	15620.65		4			Te	MO75
6430.669	15546.23		2430	54199 – *60629*	2 – 2	Te I	MO75
6442.499	15517.69		7	*57114* – 63556	2 – 1	Te I	MO75
6469.696	15452.45		1480	54160 – *60629*	1 – 2	Te I	MO75
6531.504	15306.23		14			Te	MO75
6555.740	15249.64		16	*57114* – 63669	2 – 1	Te I	MO75
6566.851	15223.84		30	*61133* – 67700	1 – 2	Te I	MO75
6630.018	15078.79		6			Te	MO75
6631.373	15075.71		10			Te	MO75
6679.870	14966.26		17			Te	MO75
6768.280	14770.77		15	*56842* – 63610	3 – 2	Te I	MO75
6807.117	14686.49		2			Te	MO75
6807.280	14686.14		19	*57114* – 63921	2 – 2	Te I	MO75
6868.763	14554.68		129	*58826* – 65695	3 – 4	Te I	MO75
6869.583	14552.95		26	*58826* – 65696	3 – 3	Te I	MO75
6887.521	14515.04		76	*58826* – 65714	3 – 3	Te I	MO75
6888.247	14513.51		1052	*58826* – 65715	3 – 4	Te I	MO75
6892.791	14503.95		4	*58826* – 65719	3 – 2	Te I	MO75
6898.573	14491.79		9	*56842* – 63741	3 – 3	Te I	MO75
6934.138	14417.46		220	54199 – *61133*	2 – 1	Te I	MO75
6957.743	14368.55		5	*58746* – 65703	1 – 1	Te I	MO75
6964.215	14355.20		76	*58746* – 65710	1 – 2	Te I	MO75
6973.165	14336.77		73	54160 – *61133*	1 – 1	Te I	MO75

Te—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6973.667	14335.74		434	*58746* – 65719	1 – 2	Te I	MO75
6974.793	14333.42		93	*57114* – 64088	2 – 1	Te I	MO75
6992.580	14296.96		12	*58746* – 65738	1 – 1	Te I	MO75
7070.320	14139.77		2	*60629* – 67700	2 – 2	Te I	MO75
7078.946	14122.54		3	*56842* – 63921	3 – 2	Te I	MO75
7104.101	14072.53		144	*58592* – 65696	2 – 3	Te I	MO75
7111.383	14058.12		8	*58592* – 65703	2 – 1	Te I	MO75
7122.039	14037.09		217	*58592* – 65714	2 – 3	Te I	MO75
7127.308	14026.71		42	*58592* – 65719	2 – 2	Te I	MO75
7146.220	13989.59		30	*58592* – 65738	2 – 1	Te I	MO75
7257.783	13774.55		4	*58746* – 66003	1 – 0	Te I	MO75
7361.768	13579.98		4			Te	MO75
7450.275	13418.65		5	*57114* – 64564	2 – 2	Te I	MO75
7507.357	13316.63		483	*46652* – 54160	1 – 1	Te I	MO75
7546.385	13247.75		1577	*46652* – 54199	1 – 2	Te I	MO75
7629.066	13104.18		400	55667 – *63296*	2 – 2	Te I	MO75
7705.173	12974.75		40	*55851* – 63556	1 – 1	Te I	MO75
7721.137	12947.92		88	*58826* – 66548	3 – 3	Te I	MO75
7721.941	12946.57		18	*56842* – 64564	3 – 2	Te I	MO75
7730.170	12932.79		10	*55826* – 63556	0 – 1	Te I	MO75
7759.286	12884.26		8	*55851* – 63610	1 – 2	Te I	MO75
7786.040	12839.99		2	*57114* – 64900	2 – 2	Te I	MO75
7793.508	12827.68		35	*55817* – 63610	2 – 2	Te I	MO75
7807.008	12805.50		161	*57114* – 64921	2 – 3	Te I	MO75
7818.409	12786.83		2	*55851* – 63669	1 – 1	Te I	MO75
7843.408	12746.07		5	*55826* – 63669	0 – 1	Te I	MO75
7852.633	12731.10		54	*55817* – 63669	2 – 1	Te I	MO75
7923.802	12616.75		5	*55817* – 63741	2 – 3	Te I	MO75
7924.892	12615.02		70	*55816* – 63741	4 – 3	Te I	MO75
7933.097	12601.97		35	*55677* – 63610	3 – 2	Te I	MO75
7941.152	12589.19		389	55355 – *63296*	1 – 2	Te I	MO75
7955.655	12566.24		188	*58592* – 66548	2 – 3	Te I	MO75
8063.390	12398.34		13	*55677* – 63741	3 – 3	Te I	MO75
8078.674	12374.88		37	*56842* – 64921	3 – 3	Te I	MO75
8104.174	12335.95		5	*55817* – 63921	2 – 2	Te I	MO75
8111.169	12325.31		38	*58826* – 66938	3 – 3	Te I	MO75
8145.634	12273.16		65	*58826* – 66972	3 – 4	Te I	MO75
8173.025	12232.02		45	*58826* – 66999	3 – 2	Te I	MO75
8212.290	12173.54		2	*58746* – 66958	1 – 1	Te I	MO75
8237.464	12136.34		4	*55851* – 64088	1 – 1	Te I	MO75
8243.762	12127.07		6	*55677* – 63921	3 – 2	Te I	MO75
8271.687	12086.12		23	*55817* – 64088	2 – 1	Te I	MO75
8325.788	12007.59		14	55667 – *63993*	2 – 1	Te I	MO75
8345.687	11978.96		280	*58592* – 66938	2 – 3	Te I	MO75
8365.901	11950.01		82	*58592* – 66958	2 – 1	Te I	MO75
8379.856	11930.11		13	55667 – *64047*	2 – 3	Te I	MO75
8391.033	11914.22		3	55667 – *64058*	2 – 2	Te I	MO75
8407.542	11890.83		8	*58592* – 66999	2 – 2	Te I	MO75
8499.008	11762.86		6	55809 – *64308*	0 – 1	Te I	MO75
8582.330	11648.66		55	*57114* – 65696	2 – 3	Te I	MO75
8589.610	11638.79		5	*57114* – 65703	2 – 1	Te I	MO75
8600.267	11624.36		138	*57114* – 65714	2 – 3	Te I	MO75
8605.536	11617.25		28	*57114* – 65719	2 – 2	Te I	MO75
8609.441	11611.98		8	55355 – *63965*	1 – 0	Te I	MO75
8624.449	11591.77		28	*57114* – 65738	2 – 1	Te I	MO75
8637.874	11573.75		23	55355 – *63993*	1 – 1	Te I	MO75
8676.637	11522.05		45	*54880* – 63556	2 – 1	Te I	MO75
8702.936	11487.23		6623	*46652* – 55355	1 – 1	Te I	MO75
8747.169	11429.14		9	*55817* – 64564	2 – 2	Te I	MO75
8761.480	11410.47		35	54535 – *63296*	3 – 2	Te I	MO75
8769.893	11399.53		125	55667 – *64437*	2 – 2	Te I	MO75
8789.874	11373.61		75	*54880* – 63669	2 – 1	Te I	MO75
8853.175	11292.29		35	*56842* – 65695	3 – 4	Te I	MO75
8871.933	11268.42		12	*56842* – 65714	3 – 3	Te I	MO75
8872.662	11267.49		10	*56842* – 65715	3 – 4	Te I	MO75
8872.821	11267.29		117	*54683* – 63556	1 – 1	Te I	MO75

Te—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8886.758	11249.62		5	*55677* – 64564	3 – 2	Te I	MO75
8952.468	11167.05		10	55355 – *64308*	1 – 1	Te I	MO75
8955.119	11163.74		508	55667 – *64622*	2 – 3	Te I	MO75
8986.059	11125.30		153	*54683* – 63669	1 – 1	Te I	MO75
9015.022	11089.56		10181	*46652* – 55667	1 – 2	Te I	MO75
9017.360	11086.68		106	55809 – *64826*	0 – 1	Te I	MO75
9041.415	11057.19		155	*54880* – 63921	2 – 2	Te I	MO75
9048.714	11048.27		19	*55851* – 64900	1 – 2	Te I	MO75
9081.979	11007.80		298	55355 – *64437*	1 – 2	Te I	MO75
9082.936	11006.64		42	*55817* – 64900	2 – 2	Te I	MO75
9097.703	10988.78		50	54199 – *63296*	2 – 2	Te I	MO75
9103.901	10981.29		79	*55817* – 64921	2 – 3	Te I	MO75
9107.678	10976.74		10	*58592* – 67700	2 – 2	Te I	MO75
9136.731	10941.84		50	54160 – *63296*	1 – 2	Te I	MO75
9150.322	10925.58		22			Te	MO75
9156.396	10918.34		1879	*46652* – 55809	1 – 0	Te I	MO75
9158.736	10915.55		6	55667 – *64826*	2 – 1	Te I	MO75
9208.927	10856.05		153	*54880* – 64088	2 – 1	Te I	MO75
9243.490	10815.46		14	*55677* – 64921	3 – 3	Te I	MO75
9298.578	10751.39		8	*54683* – 63982	1 – 0	Te I	MO75
9395.138	10640.89		3	*58826* – 68222	3 – 3	Te I	MO75
9397.945	10637.71		36			Te	MO75
9405.112	10629.60		60	*54683* – 64088	1 – 1	Te I	MO75
9433.883	10597.19		161	*57114* – 66548	2 – 3	Te I	MO75
9470.819	10555.86		43	55355 – *64826*	1 – 1	Te I	MO75
9478.411	10547.40		15			Te	MO75
9512.269	10509.86		197	54535 – *64047*	3 – 3	Te I	MO75
9523.444	10497.53		27	54535 – *64058*	3 – 2	Te I	MO75
9527.032	10493.57		745	54535 – *64062*	3 – 4	Te I	MO75
9629.658	10381.74		16	*58592* – 68222	2 – 3	Te I	MO75
9684.409	10323.05		205	*54880* – 64564	2 – 2	Te I	MO75
9705.549	10300.56		397	*56842* – 66548	3 – 3	Te I	MO75
9794.425	10207.09		51	54199 – *63993*	2 – 1	Te I	MO75
9805.018	10196.06		32	54160 – *63965*	1 – 0	Te I	MO75
9823.915	10176.45		171	*57114* – 66938	2 – 3	Te I	MO75
9833.452	10166.58		149	54160 – *63993*	1 – 1	Te I	MO75
9844.129	10155.56		33	*57114* – 66958	2 – 1	Te I	MO75
9848.492	10151.06		296	54199 – *64047*	2 – 3	Te I	MO75
9852.282	10147.15		27	*55851* – 65703	1 – 1	Te I	MO75
9858.755	10140.49		65	*55851* – 65710	1 – 2	Te I	MO75
9859.669	10139.55		174	54199 – *64058*	2 – 2	Te I	MO75
9868.208	10130.78		15	*55851* – 65719	1 – 2	Te I	MO75
9877.278	10121.47		34	*55826* – 65703	0 – 1	Te I	MO75
9879.223	10119.48		82	*55817* – 65696	2 – 3	Te I	MO75
9879.494	10119.20		34	*55816* – 65695	4 – 4	Te I	MO75
9880.594	10118.08		381	*54683* – 64564	1 – 2	Te I	MO75
9885.769	10112.78		9	*57114* – 66999	2 – 2	Te I	MO75
9886.507	10112.02		12	*55817* – 65703	2 – 1	Te I	MO75
9887.120	10111.40		33	*55851* – 65738	1 – 1	Te I	MO75
9892.350	10106.05		279	*55816* – 65708	4 – 5	Te I	MO75
9892.976	10105.41		49	*55817* – 65710	2 – 2	Te I	MO75
9897.160	10101.14		49	*55817* – 65714	2 – 3	Te I	MO75
9898.696	10099.57		104	54160 – *64058*	1 – 2	Te I	MO75
9907.094	10091.01		4097	*44253* – 54160	2 – 1	Te I	MO75
9912.116	10085.90		27	*55826* – 65738	0 – 1	Te I	MO75
9930.958	10066.76		44			Te	MO75
9946.122	10051.41		5950	*44253* – 54199	2 – 2	Te I	MO75

Te Reference

MO75 Morillon, C., and Vergès, J., Physica Scripta **12**, 129–144 (1975).

Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Average deviation between observed and calculated wavenumbers is 0.003 cm⁻¹

Additional References

Morillon, C., and Vergès, J., Physica Scripta **12**, 145–156 (1975).

Terbium

Tb, $Z = 65$

Tb I Normal state of valence electrons $4f^9 6s^2\ ^6H^\circ_{15/2}$ I.P. = 47200 cm^{-1}

Tb II Normal state of valence electrons $4f^9 6s\ ^7H^\circ_8$ I.P. = 92914 cm^{-1}

Tb

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4288.325	23312.768		1 L	*2771* – 7059	6½ – 6½	Tb I	KL70
4995.384	20013.020		1 L	*2771* – 7767	6½ – 7½	Tb I	KL70
5425.110	18427.775		4 L	*0* – 5425	7½ – 7½	Tb I	KL70
6160.451	16228.145		5 L	*2771* – 8932	6½ – 5½	Tb I	KL70
6351.816	15739.229		6 L	*0* – 6351	7½ – 6½	Tb I	KL70
6991.358	14299.465		3 L	*2771* – 9763	6½ – 6½	Tb I	KL70
7059.972	14160.491		7 L	*0* – 7059	7½ – 6½	Tb I	KL70
7767.107	12871.287		6 L	*0* – 7767	7½ – 7½	Tb I	KL70
8595.433	11630.90		1 LW	9145 – *17740*	4½ – 5½	Tb I	KL69
8719.831	11464.974		1 L	7824 – *16544*	4½ – 5½	Tb I	KL72
8775.276	11392.54		4 L	8277 – *17052*	6½ – 6½	Tb I	KL69
8777.891	11389.14		2 L	9867 – *18645*	3½ – 4½	Tb I	KL69
8839.703	11309.50		1 L	10920 – *19759*	1½ – 2½	Tb I	KL69
8853.685	11291.64		2 L	10456 – *19310*	2½ – 3½	Tb I	KL69
8861.840	11281.25		3 L	8190 – *17052*	7½ – 6½	Tb I	KL69
8893.785	11240.729		4 L	7059 – *15953*	6½ – 5½	Tb I	KL72
8902.920	11229.195		6 L	8506 – *17409*	8½ – 7½	Tb I	KL72
8975.627	11138.24		0 LW	9145 – *18120*	4½ – 3½	Tb I	KL69
8994.762	11114.558		2 L	10030 – *19025*	2½ – 3½	Tb I	KL72
9042.053	11056.407		2 L	9763 – *18805*	6½ – 6½	Tb I	KL72
9094.452	10992.71		9 L	8646 – *17740*	5½ – 5½	Tb I	KL69
9113.085	10970.229		0 L	11260 – *20373*	5½ – 5½	Tb I	KL72
9132.609	10946.775		6 LW	8277 – *17409*	6½ – 7½	Tb I	KL72
9157.479	10917.05		2 LW	9867 – *19025*	3½ – 3½	Tb I	KL69
9198.512	10868.35		1 LW	9145 – *18343*	4½ – 5½	Tb I	KL69
9219.176	10843.986		9 L	8190 – *17409*	7½ – 7½	Tb I	KL72
9226.349	10835.555		8 L	7059 – *16286*	6½ – 6½	Tb I?	KL72
9226.349	10835.555		8 L	11260 – *20486*	5½ – 4½	Tb I?	KL72
9238.038	10821.85		0 L	10456 – *19694*	2½ – 3½	Tb I	KL69
9250.882	10806.82		6 L	8932 – *18183*	5½ – 5½	Tb I	KL69
9257.328	10799.295		3 LW	9897 – *19155*	4½ – 4½	Tb I	KL72
9265.663	10789.580		3 LW	8994 – *18260*	3½ – 3½	Tb I	KL72
9279.562	10773.419		7 L	6674 – *15953*	5½ – 5½	Tb I	KL72
9281.569	10771.09		4 L	7441 – *16722*	4½ – 3½	Tb I	KL69
9285.306	10766.755		2 L	7767 – *17052*	7½ – 6½	Tb I	KL72
9287.467	10764.249		1 L	9867 – *19155*	3½ – 4½	Tb I	KL72
9294.655	10755.925		0 L	7824 – *17118*	4½ – 5½	Tb I	KL72
9303.210	10746.04		5 L	10456 – *19759*	2½ – 2½	Tb I	KL69
9322.727	10723.537		0 L	7839 – *17162*	3½ – 4½	Tb I	KL72
9338.368	10705.576		8 L	7824 – *17162*	4½ – 4½	Tb I	KL72
9351.926	10690.06		1 L	9145 – *18497*	4½ – 4½	Tb I	KL69
9369.441	10670.08		0 LW	6674 – *16043*	5½ – 6½	Tb I	KL69
9411.575	10622.31		1 LW	8932 – *18343*	5½ – 5½	Tb I	KL69
9419.550	10613.310		8 LW	9897 – *19317*	4½ – 5½	Tb I	KL72
9430.151	10601.379		1 LW	8130 – *17560*	2½ – 2½	Tb I	KL72
9434.794	10596.163		2 L	9897 – *19332*	4½ – 5½	Tb I	KL72
9442.728	10587.26		5 LW	9867 – *19310*	3½ – 3½	Tb I	KL69
9444.491	10585.29		3 L	10456 – *19901*	2½ – 3½	Tb I	KL69
9463.630	10563.88		8 L	8277 – *17740*	6½ – 5½	Tb I	KL69
9466.271	10560.93		2 L	9145 – *18611*	4½ – 4½	Tb I	KL69
9484.073	10541.105		8 L	7059 – *16544*	6½ – 5½	Tb I	KL72
9484.701	10540.41		4 L	10456 – *19941*	2½ – 3½	Tb I	KL69
9500.301	10523.10		7 LW	9145 – *18645*	4½ – 4½	Tb I	KL69
9509.870	10512.51		6 L	5829 – *15339*	4½ – 4½	Tb I	KL69
9532.720	10487.312		1 LW	11260 – *20793*	5½ – 6½	Tb I	KL72
9536.419	10483.244		9 LW	8506 – *18043*	8½ – 7½	Tb I	KL72

Tb—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9536.676	10482.97		1 L	8646 – *18183*	5½ – 5½	Tb I	KL69
9552.703	10465.373		2 L	9897 – *19450*	4½ – 4½	Tb I	KL72
9565.130	10451.78		5 L	8932 – *18497*	5½ – 4½	Tb I	KL69
9569.508	10446.995		4 L	9763 – *19332*	6½ – 5½	Tb I	KL72
9575.877	10440.05		1 LW	10456 – *20032*	2½ – 3½	Tb I	KL69
9585.974	10429.05		0 L	10456 – *20042*	2½ – 2½	Tb I	KL69
9601.944	10411.704		9 L	6351 – *15953*	6½ – 5½	Tb I	KL72
9612.094	10400.71		6 L	6674 – *16286*	5½ – 6½	Tb I	KL69
9650.862	10358.930		1 L	8994 – *18645*	3½ – 4½	Tb I	KL72
9664.387	10344.433		3 LW	10030 – *19694*	2½ – 3½	Tb I	KL72
9721.008	10284.19		0 L	7839 – *17560*	3½ – 2½	Tb I	KL69
9721.526	10283.633		1 L	7441 – *17162*	4½ – 4½	Tb I	KL72
9754.603	10248.762		0 L	11260 – *21015*	5½ – 5½	Tb I	KL72
9763.076	10239.867		3 L	*0* – 9763	7½ – 6½	Tb I	KL70
9823.496	10176.89		0 LW	9867 – *19691*	3½ – 4½	Tb I	KL69
9827.076	10173.18		0 L	9867 – *19694*	3½ – 3½	Tb I	KL69
9858.911	10140.329		1 LW	8277 – *18135*	6½ – 6½	Tb I	KL72
9869.846	10129.094		7 L	6674 – *16544*	5½ – 5½	Tb I	KL72
9872.839	10126.03		2 L	8932 – *18805*	5½ – 6½	Tb I	KL69
9896.563	10101.75		3 L	3719 – *13616*	6½ – 5½	Tb I	KL69
9903.000	10095.19		3 L	3719 – *13622*	6½ – 6½	Tb I	KL69
9918.808	10079.10		1 L	8932 – *18850*	5½ – 4½	Tb I	KL69
9945.487	10052.056		6 LW	8190 – *18135*	7½ – 6½	Tb I	KL72
9961.074	10036.33		4 L	8646 – *18607*	5½ – 6½	Tb I	KL69
9965.168	10032.21		4 L	6488 – *16453*	3½ – 3½	Tb I	KL69
9965.315	10032.06		4 L	8646 – *18611*	5½ – 4½	Tb I	KL69
9986.372	10010.91		5 L	5353 – *15339*	5½ – 4½	Tb I	KL69
9992.463	10004.799		0 LW	7059 – *17052*	6½ – 6½	Tb I	KL72
9999.352	9997.91		2 L	8646 – *18645*	5½ – 4½	Tb I	KL69

Tb References

KL69 Klinkenberg, P. F. A., and Meinders, E., Physica **42**, 213–241 (1969).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 9.15 m grating spectrograph
Detector: Photographic
Uncertainty in σ: Not given

KL70 Klinkenberg, P. F. A., and Van Kleef, Th.A. M., Physica **50**, 625–628 (1970).
For other details see KL69

KL72 Klinkenberg, P. F. A., Physica **57**, 594–615 (1972).
For other details see KL69

Additional References

Klinkenberg, P. F. A., Physica **32**, 1113 (1966).
Klinkenberg, P. F. A., and Meinders, E., Physica **32**, 1617 (1966).
Klinkenberg, P. F. A., Physica **37**, 197 (1967).
Meinders, E., and Klinkenberg, P. F. A., Physica **38**, 253 (1968).

Thorium

Th, $Z = 90$

Th I Normal state of valence electrons $6d^27s^2\ ^3F_2$ I.P. = 49038 cm^{-1}

Th II Normal state of valence electrons $(6d + 7s)^3\,J = 3/2$ I.P. = 96000 cm^{-1}

Th III Normal state of valence electrons $5f6d\ ^3H°_4$ I.P. = cm^{-1}

Th

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4010.692	24926.551		3 L	*9238* – 13248	4½ – 4½	Th II	GI74
4085.74	24468.69	0.02	30	4055 – *8141*	3 – 4	Th III	LI74
4115.586	24291.248		3 L	*4490* – 8605	2½ – 2½	Th II	GI74
4142.013	24136.264		3 L	*20522* – 24664	2 – 3	Th I	GI74
4164.145	24007.982		4 L	6362 – *10526*	2 – 3	Th I	GI74
4171.742	23964.262		3 L	16818 – *20989*	3½ – 4½	Th II	GI74
4203.33	23784.17	0.02	3	6537 – *10741*	4 – 3	Th III	LI74
4203.742	23781.839		4 L	13297 – *17501*	4 – 5	Th I	GI74
4210.770	23742.146		4 L	*6168* – 10379	3½ – 4½	Th II	GI74
4251.493	23514.732		5 L	*11241* – 15493	3 – 4	Th I	GI74
4265.498	23437.525		5 L	4113 – *8378*	2½ – 3½	Th II	GI74
4313.730	23175.469		3 L	16554 – *20867*	6 – 7	Th I	GI74
4317.805	23153.597		4 L	*15736* – 20054	1 – 2	Th I	GI74
4374.861	22851.632		3 L	8800 – *13175*	4 – 4	Th I	GI74
4402.107	22710.196		3 L	9804 – *14206*	5 – 4	Th I	GI74
4414.548	22646.195		3 L	11802 – *16217*	2 – 2	Th I	GI74
4420.758	22614.383		4 L	6362 – *10783*	2 – 2	Th I	GI74
4435.787	22537.763		3 L	*15618* – 20054	3 – 2	Th I	GI74
4442.022	22506.128		4 L	8460 – *12902*	1½ – 1½	Th II	GI74
4474.281	22343.861		3 L	13248 – *17722*	4½ – 4½	Th II	GI74
4490.259	22264.353		6 L	0 – *4490*	1½ – 2½	Th II	GI74
4522.907	22103.641		4 L	16554 – *21077*	6 – 5	Th I	GI74
4555.612	21944.958		4 L	3687 – *8243*	2 – 2	Th I	GI74
4597.715	21743.999		5 L	10855 – *15453*	3½ – 3½	Th II?	GI74
4597.715	21743.999		5 L	7280 – *11877*	2 – 1	Th I?	GI74
4604.370	21712.571		4 L	*8243* – 12847	2 – 3	Th I	GI74
4622.161	21628.998		4 L	*11241* – 15863	3 – 2	Th I	GI74
4648.99	21504.18	0.02	5	*2527* – 7176	3 – 2	Th III	LI74
4677.060	21375.118		3 L	9804 – *14481*	5 – 6	Th I	GI74
4681.864	21353.185		3 L	18431 – *23113*	3 – 4	Th I	GI74
4724.006	21162.697		5 L	7001 – *11725*	1½ – ½	Th II	GI74
4727.175	21148.510		3 L	*23306* – 28034	6 – 5	Th I	GI74
4728.369	21143.170		4 L	*11241* – 15970	3 – 3	Th I	GI74
4738.99	21095.78	0.02	50	6537 – *11276*	4 – 5	Th III	LI74
4763.57	20986.93	0.02	15	63 – *4826*	2 – 3	Th III	LI74
4790.385	20869.452		4 L	*17847* – 22637	2 – 3	Th I	GI74
4831.452	20692.063		6 L	1859 – *6691*	1½ – 1½	Th II	GI74
4833.595	20682.889		4 L	9711 – *14545*	3½ – 2½	Th II	GI74
4834.241	20680.125		4 L	7280 – *12114*	2 – 2	Th I	GI74
4844.962	20634.364		6 L	*8243* – 13088	2 – 3	Th I	GI74
4863.782	20554.521		3 L	10379 – *15242*	4½ – 4½	Th II	GI74
4869.857	20528.880		4 L	*8378* – 13248	3½ – 4½	Th II	GI74
4884.186	20468.653		4 L	8018 – *12902*	1½ – 1½	Th II	GI74
4895.401	20421.761		3 L	17959 – *22855*	4 – 3	Th I	GI74
4901.647	20395.738		3 L	12219 – *17121*	1½ – 1½	Th II	GI74
4903.096	20389.710		4 L	6213 – *11116*	4½ – 3½	Th II	GI74
4905.117	20381.309		3 L	21143 – *26048*	5 – 4	Th I	GI74
4910.51	20358.93	0.02	10	10542 – *15453*	4 – 3	Th III	LI74
4920.455	20317.777		4 L	*23113* – 28034	4 – 5	Th I	GI74
4924.54	20300.92	0.02	20	4055 – *8980*	3 – 4	Th III	LI74
4951.256	20191.383		3 L	*19039* – 23990	2 – 2	Th I	GI74
4957.720	20165.057		3 L			Th	GI74
4966.678	20128.687		3 L	*10526* – 15493	3 – 4	Th I	GI74
4997.29	20005.38	0.02	70	63 – *5060*	2 – 3	Th III	LI74

Th—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5013.16	19942.05	0.02	20	10440 – *15453*	2 – 3	Th III	LI74
5023.071	19902.706		4 L	14204 – *19227*	5 – 6	Th I	GI74
5052.698	19786.004		5 L	*7795* – 12847	4 – 3	Th I	GI74
5055.690	19774.295		6 L	4146 – *9202*	3½ – 3½	Th II	GI74
5058.022	19765.178		3 L	*21738* – 26796	2 – 3	Th I	GI74
5064.107	19741.428		5 L	8111 – *13175*	4 – 4	Th I	GI74
5079.034	19683.409		5 L	9711 – *14790*	3½ – 3½	Th II	GI74
5079.084	19683.215		4 L	*10414* – 15493	4 – 4	Th I	GI74
5081.325	19674.535		3 L	*21890* – 26971	3 – 4	Th I	GI74
5082.894	19668.461		4 L	*20322* – 25405	5 – 4	Th I	GI74
5089.088	19644.523		4 L	*14790* – 19880	3½ – 4½	Th II	GI74
5101.928	19595.083		3 L	*18930* – 24032	3 – 4	Th I	GI74
5144.588	19432.597		3 L	9400 – *14545*	2½ – 2½	Th II	GI74
5153.105	19400.479		3 L	*20737* – 25890	1 – 2	Th I	GI74
5169.493	19338.976		7 L	1521 – *6691*	2½ – 1½	Th II	GI74
5175.137	19317.885		3 L	17073 – *22248*	1 – 2	Th I	GI74
5212.499	19179.419		3 L	8605 – *13818*	2½ – 3½	Th II	GI74
5220.012	19151.815		4 L	5563 – *10783*	1 – 2	Th I	GI74
5221.094	19147.846		3 L	12847 – *18069*	3 – 3	Th I	GI74
5221.706	19145.601		7 L	*4490* – 9711	2½ – 3½	Th II	GI74
5237.296	19088.610		3 L	19532 – *24769*	4 – 3	Th I	GI74
5238.963	19082.536		3 L	*12488* – 17727	4½ – 5½	Th II	GI74
5241.196	19074.406		3 L	*14032* – 19273	2 – 2	Th I	GI74
5293.290	18886.685		6 L	*7795* – 13088	4 – 3	Th I	GI74
5299.210	18865.586		3 L	*16346* – 21645	4 – 4	Th I	GI74
5314.339	18811.879		7 L	*16783* – 22098	4 – 4	Th I	GI74
5317.014	18802.414		3 L	16351 – *21668*	0 – 1	Th I	GI74
5325.502	18772.446		3 L	*14206* – 19532	4 – 4	Th I	GI74
5376.069	18595.874		3 L	*18614* – 23990	1 – 2	Th I	GI74
5387.046	18557.981		3 L	*18382* – 23769	0 – 1	Th I	GI74
5390.027	18547.718		3 L	9400 – *14790*	2½ – 3½	Th II	GI74
5406.664	18490.644		4 L	8800 – *14206*	4 – 4	Th I	GI74
5413.160	18468.454		3 L	*17224* – 22637	2 – 3	Th I	GI74
5421.368	18440.493		4 L	11802 – *17224*	2 – 2	Th I	GI74
5438.829	18381.291		3 L	4146 – *9585*	3½ – 2½	Th II	GI74
5471.550	18271.367		5 L	1859 – *7331*	1½ – 2½	Th II	GI74
5472.048	18269.704		3 L	4113 – *9585*	2½ – 2½	Th II	GI74
5481.137	18239.409		5 L	6244 – *11725*	½ – ½	Th II	GI74
5484.456	18228.371		4 L	9061 – *14545*	2½ – 2½	Th II	GI74
5515.440	18125.969		5 L	6362 – *11877*	2 – 1	Th I	GI74
5528.590	18082.856		4 L	*6691* – 12219	1½ – 1½	Th II	GI74
5531.807	18072.340		4 L	*17501* – 23032	5 – 4	Th I	GI74
5555.962	17993.769		3 L	*10414* – 15970	4 – 3	Th I	GI74
5561.151	17976.979		4 L	17959 – *23521*	4 – 3	Th I	GI74
5564.884	17964.920		6 L	*4961* – *10526*	4 – 3	Th I	GI74
5570.820	17945.777		3 L			Th	GI74
5573.722	17936.434		7 L	4146 – *9720*	3½ – 3½	Th II	GI74
5584.971	17900.307		4 L	*9720* – 15305	3½ – 4½	Th II	GI74
5588.819	17887.982		3 L	*20522* – 26111	2 – 1	Th I	GI74
5606.941	17830.167		5 L	4113 – *9720*	2½ – 3½	Th II	GI74
5608.291	17825.875		5 L	11802 – *17411*	2 – 3	Th I	GI74
5617.831	17795.604		3 L	12219 – *17837*	1½ – ½	Th II	GI74
5621.759	17783.170		4 L	*17411* – 23032	3 – 4	Th I	GI74
5633.884	17744.898		5 L	*17354* – 22988	1 – 2	Th I	GI74
5641.445	17721.115		4 L	8460 – *14101*	1½ – ½	Th II	GI74
5646.528	17705.162		3 L	*12472* – 18118	2½ – 1½	Th II	GI74
5647.003	17703.673		3 L	21143 – *26790*	5 – 4	Th I	GI74
5653.346	17683.810		3 L	*15490* – 21143	5 – 5	Th I	GI74
5655.370	17677.481		3 L	13847 – *19503*	2 – 3	Th I	GI74
5657.888	17669.614		3 L	*25306* – 30964	2 – 3	Th I	GI74
5669.208	17634.332		4 L	13847 – *19516*	2 – 2	Th I	GI74
5671.873	17626.046		3 L	15493 – *21165*	4 – 3	Th I	GI74
5672.823	17623.094		6 L	7502 – *13175*	3 – 4	Th I	GI74
5685.268	17584.517		7 L	9804 – *15490*	5 – 5	Th I	GI74
5688.957	17573.115		3 L	*20566* – 26255	4 – 4	Th I	GI74
5695.583	17552.671		4 L	17398 – *23093*	3 – 2	Th I	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5701.484	17534.504		5 L	*11116* – 16818	3½ – 3½	Th II	GI74
5718.921	17481.041		7 L	*8243* – 13962	2 – 1	Th I	GI74
5725.072	17462.260		3 L	13248 – *18973*	4½ – 3½	Th II	GI74
5729.894	17447.564		3 L	9061 – *14790*	2½ – 3½	Th II	GI74
5743.769	17405.417		3 L	9400 – *15144*	2½ – 1½	Th II	GI74
5744.127	17404.332		4 L	14204 – *19948*	5 – 4	Th I	GI74
5750.392	17385.370		4 L	*25180* – 30930	7 – 6	Th I	GI74
5751.537	17381.909		7 L	*16346* – 22098	4 – 4	Th I	GI74
5751.967	17380.610		5 L	6362 – *12114*	2 – 2	Th I	GI74
5776.210	17307.662		7 L	*17501* – 23277	5 – 5	Th I	GI74
5789.500	17267.932		3 L	19532 – *25321*	4 – 3	Th I	GI74
5790.761	17264.172		3 L	*17411* – 23201	3 – 3	Th I	GI74
5803.704	17225.670		3 L	17073 – *22877*	1 – 1	Th I	GI74
5809.591	17208.215		8 L	1521 – *7331*	2½ – 2½	Th II	GI74
5834.302	17135.330		4 L	8111 – *13945*	4 – 3	Th I	GI74
5834.698	17134.167		4 L	*23306* – 29141	6 – 5	Th I	GI74
5839.077	17121.318		3 L	*22141* – 27980	3 – 3	Th I	GI74
5853.614	17078.798		3 L	*16783* – 22637	4 – 3	Th I	GI74
5854.659	17075.750		3 L	13962 – *19817*	1 – 1	Th I	GI74
5870.311	17030.220		3 L	*6700* – 12570	4½ – 3½	Th II	GI74
5879.122	17004.697		3 L	*21165* – 27044	3 – 3	Th I	GI74
5902.018	16938.730		3 L	*19503* – 25405	3 – 4	Th I	GI74
5919.023	16890.066		5 L	*7331* – 13250	2½ – 2½	Th II	GI74
5961.916	16768.550		6 L	12847 – *18809*	3 – 4	Th I	GI74
5969.077	16748.433		5 L	*11197* – 17166	5 – 5	Th I	GI74
5975.644	16730.028		3 L	17073 – *23049*	1 – 1	Th I	GI74
5981.931	16712.444		3 L	*21539* – 27521	4 – 4	Th I	GI74
5984.726	16704.639		3 L	*18930* – 24915	3 – 3	Th I	GI74
6022.687	16599.350		3 L	*14032* – 20054	2 – 2	Th I	GI74
6026.875	16587.815		3 L	*15618* – 21645	3 – 4	Th I	GI74
6044.143	16540.424		5 L	11802 – *17847*	2 – 2	Th I	GI74
6044.883	16538.399		3 L	16351 – *22396*	0 – 1	Th I	GI74
6051.279	16520.919		3 L	10855 – *16906*	3½ – 3½	Th II	GI74
6052.068	16518.765		3 L	9400 – *15453*	2½ – 3½	Th II	GI74
6057.559	16503.791		4 L	*18614* – 24671	1 – 2	Th I	GI74
6082.418	16436.339		3 L			Th	GI74
6091.133	16412.823		3 L	*21252* – 27343	2 – 3	Th I	GI74
6103.004	16380.898		6 L	*9202* – 15305	3½ – 4½	Th II	GI74
6129.269	16310.703		3 L	*20867* – 26997	7 – 6	Th I	GI74
6131.733	16304.149		3 L	*21902* – 28034	4 – 5	Th I	GI74
6140.722	16280.282		3 L	17166 – *23306*	5 – 6	Th I	GI74
6144.930	16269.133		3 L	*10673* – 16818	2½ – 3½	Th II	GI74
6156.668	16238.115		3 L	*11241* – 17398	3 – 3	Th I	GI74
6163.263	16220.740		3 L	*22399* – 28562	5 – 4	Th I	GI74
6185.155	16163.327		3 L	8605 – *14790*	2½ – 3½	Th II	GI74
6191.179	16147.600		3 L	12847 – *19039*	3 – 2	Th I	GI74
6205.707	16109.798		5 L	13297 – *19503*	4 – 3	Th I	GI74
6220.073	16072.590		3 L			Th	GI74
6233.287	16038.518		3 L	*24274* – 30508	5 – 5	Th I	GI74
6245.049	16008.311		3 L	*18382* – 24627	0 – 1	Th I	GI74
6246.043	16005.763		4 L	11601 – *17847*	1 – 2	Th I	GI74
6266.132	15954.449		4 L	11802 – *18069*	2 – 3	Th I	GI74
6273.239	15936.374		4 L	7828 – *14101*	½ – ½	Th II	GI74
6273.359	15936.069		3 L	*20522* – 26796	2 – 3	Th I	GI74
6274.800	15932.409		6 L	6213 – *12488*	4½ – 4½	Th II	GI74
6278.851	15922.130		4 L	15970 – *22248*	3 – 2	Th I	GI74
6287.767	15899.553		3 L	*24084* – 30372	6 – 6	Th I	GI74
6290.813	15891.854		3 L	*16346* – 22637	4 – 3	Th I	GI74
6290.928	15891.564		4 L	13297 – *19588*	4 – 5	Th I	GI74
6308.327	15847.733		3 L	20054 – *26363*	2 – 2	Th I	GI74
6314.695	15831.752		7 L	5563 – *11877*	1 – 1	Th I	GI74
6321.187	15815.492		6 L	9711 – *16033*	3½ – 2½	Th II	GI74
6340.405	15767.555		3 L	*13818* – 20158	3½ – 2½	Th II	GI74
6362.358	15713.149		4 L	14204 – *20566*	5 – 4	Th I	GI74
6367.157	15701.306		3 L	13847 – *20214*	2 – 3	Th I	GI74
6377.368	15676.166		3 L	*23306* – 29684	6 – 5	Th I	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6391.566	15641.344		3 L	*23741* – 30132	1 – 2	Th I	GI74
6391.936	15640.438		5 L	9061 – *15453*	2½ – 3½	Th II	GI74
6393.276	15637.160		3 L	*11725* – 18118	½ – 1½	Th II	GI74
6396.912	15628.272		3 L	15493 – *21890*	4 – 3	Th I	GI74
6408.995	15598.808		4 L	*7795* – 14204	4 – 5	Th I	GI74
6409.049	15598.676		4 L	15493 – *21902*	4 – 4	Th I	GI74
6414.579	15585.229		3 L	13088 – *19503*	3 – 3	Th I	GI74
6418.139	15576.584		6 L	*16783* – 23201	4 – 3	Th I	GI74
6419.980	15572.117		4 L	*16217* – 22637	2 – 3	Th I	GI74
6421.055	15569.510		3 L	*22141* – 28562	3 – 4	Th I	GI74
6428.417	15551.679		4 L	13088 – *19516*	3 – 2	Th I	GI74
6443.018	15516.436		6 L	7502 – *13945*	3 – 3	Th I	GI74
6461.162	15472.846		3 L	17959 – *24421*	4 – 3	Th I	GI74
6474.867	15440.113		4 L	*18930* – 25405	3 – 4	Th I	GI74
6479.202	15429.783		7 L	*15618* – 22098	3 – 4	Th I	GI74
6510.463	15355.694		5 L	14226 – *20737*	0 – 1	Th I	GI74
6526.563	15317.814		3 L	4146 – *10673*	3½ – 2½	Th II	GI74
6527.366	15315.929		5 L	8018 – *14545*	1½ – 2½	Th II	GI74
6531.046	15307.300		6 L	*17501* – 24032	5 – 4	Th I	GI74
6538.897	15288.921		4 L	8605 – *15144*	2½ – 1½	Th II	GI74
6548.526	15266.440		4 L	*6700* – 13248	4½ – 4½	Th II	GI74
6559.783	15240.242		7 L	4113 – *10673*	2½ – 2½	Th II	GI74
6560.193	15239.289		4 L	13962 – *20522*	1 – 2	Th I	GI74
6581.143	15190.777		3 L	*20214* – 26796	3 – 3	Th I	GI74
6581.976	15188.855		5 L	17727 – *24309*	5½ – 5½	Th II	GI74
6620.998	15099.336		4 L	*17411* – 24032	3 – 4	Th I	GI74
6644.728	15045.413		3 L	*20922* – 27566	2 – 2	Th I	GI74
6649.742	15034.068		3 L	9061 – *15710*	2½ – 1½	Th II	GI74
6655.171	15021.804		3 L	12847 – *19503*	3 – 3	Th I	GI74
6660.391	15010.031		3 L	*21902* – 28562	4 – 4	Th I	GI74
6667.221	14994.654		3 L	*19588* – 26255	5 – 4	Th I	GI74
6669.913	14988.603		4 L	15493 – *22163*	4 – 4	Th I	GI74
6671.569	14984.882		4 L	*11877* – 18549	1 – 2	Th I	GI74
6674.932	14977.332		3 L	*22877* – 29552	5 – 6	Th I	GI74
6689.826	14943.987		6 L	8800 – *15490*	4 – 5	Th I	GI74
6691.391	14940.492		7 L	0 – *6691*	1½ – 1½	Th II	GI74
6696.519	14929.051		3 L			Th	GI74
6696.773	14928.485		4 L	*11877* – 18574	1 – 1	Th I	GI74
6700.359	14920.495		3 L	16818 – *23518*	3½ – 3½	Th II	GI74
6741.148	14830.215		3 L	17959 – *24701*	4 – 5	Th I	GI74
6751.965	14806.456		5 L	7280 – *14032*	2 – 2	Th I	GI74
6752.440	14805.415		3 L	*19503* – 26255	3 – 4	Th I	GI74
6767.700	14772.031		3 L	*25690* – 32458	5 – 4	Th I	GI74
6774.763	14756.630		3 L	13962 – *20737*	1 – 1	Th I	GI74
6781.795	14741.329		5 L	11601 – *18382*	1 – 0	Th I	GI74
6792.176	14718.799		5 L	*19588* – 26380	5 – 5	Th I	GI74
6802.908	14695.579		3 L	*21539* – 28342	4 – 5	Th I	GI74
6811.404	14677.249		5 L	11802 – *18614*	2 – 1	Th I	GI74
6821.785	14654.914		7 L	*11877* – 18699	1 – 2	Th I	GI74
6823.383	14651.482		3 L	20054 – *26878*	2 – 3	Th I	GI74
6831.961	14633.086		3 L	13248 – *20080*	4½ – 3½	Th II	GI74
6834.395	14627.874		4 L	15305 – *22139*	4½ – 4½	Th II	GI74
6838.555	14618.976		7 L	3687 – *10526*	2 – 3	Th I	GI74
6845.775	14603.558		3 L	15493 – *22338*	4 – 3	Th I	GI74
6856.961	14579.735		6 L	1521 – *8378*	2½ – 3½	Th II	GI74
6861.378	14570.349		3 L	17398 – *24259*	3 – 4	Th I	GI74
6867.668	14557.004		4 L	10855 – *17722*	3½ – 4½	Th II	GI74
6878.813	14533.419		4 L	*22877* – 29756	5 – 4	Th I	GI74
6893.129	14503.235		6 L	10379 – *17272*	4½ – 4½	Th II	GI74
6906.176	14475.836		4 L	15493 – *22399*	4 – 5	Th I	GI74
6917.682	14451.758		4 L	3865 – *10783*	1 – 2	Th I	GI74
6923.891	14438.799		3 L	18431 – *25355*	3 – 4	Th I	GI74
6930.737	14424.537		7 L	*16346* – 23277	4 – 5	Th I	GI74
6936.508	14412.536		4 L	*14206* – 21143	4 – 5	Th I	GI74
6962.933	14357.839		3 L	7502 – *14465*	3 – 2	Th I	GI74
6970.010	14343.260		6 L	4146 – *11116*	3½ – 3½	Th II	GI74

Th—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6984.262	14313.992		4 L	*10414* – 17398	4 – 3	Th I	GI74
7011.078	14259.243		5 L	*19986* – 26997	6 – 6	Th I	GI74
7013.306	14254.713		5 L	11601 – *18614*	1 – 1	Th I	GI74
7024.831	14231.327		4 L	13297 – *20322*	4 – 5	Th I	GI74
7044.137	14192.323		4 L	*20522* – 27566	2 – 2	Th I	GI74
7055.896	14168.671		7 L	8111 – *15166*	4 – 3	Th I	GI74
7089.558	14101.396		3 L	*20522* – 27612	2 – 3	Th I	GI74
7095.168	14090.246		7 L	3687 – *10783*	2 – 2	Th I	GI74
7100.423	14079.818		5 L	12847 – *19948*	3 – 4	Th I	GI74
7105.003	14070.742		5 L	8605 – *15710*	2½ – 1½	Th II	GI74
7105.277	14070.200		3 L			Th	GI74
7126.367	14028.560		4 L	13088 – *20214*	3 – 3	Th I	GI74
7126.547	14028.205		3 L	8018 – *15144*	1½ – 1½	Th II	GI74
7127.360	14026.605		5 L	11802 – *18930*	2 – 3	Th I	GI74
7153.202	13975.932		4 L	*19227* – 26380	6 – 5	Th I	GI74
7173.320	13936.736		5 L	*20322* – 27495	5 – 4	Th I	GI74
7176.668	13930.234		3 L	15493 – *22669*	4 – 3	Th I	GI74
7189.955	13904.491		6 L	*11241* – 18431	3 – 3	Th I	GI74
7194.642	13895.433		3 L	9711 – *16906*	3½ – 3½	Th II	GI74
7199.256	13886.527		4 L	*20322* – 27521	5 – 4	Th I	GI74
7238.374	13811.481		4 L	*20288* – 27526	5½ – 4½	Th II	GI74
7248.376	13792.422		5 L	*16783* – 24032	4 – 4	Th I	GI74
7255.481	13778.916		6 L	6213 – *13468*	4½ – 4½	Th II	GI74
7276.054	13739.956		5 L	*18614* – 25890	1 – 2	Th I	GI74
7276.781	13738.583		3 L	*22141* – 29418	3 – 2	Th I	GI74
7297.695	13699.211		3 L	*23187* – 30484	6½ – 5½	Th II	GI74
7316.177	13664.604		3 L	7828 – *15144*	½ – 1½	Th II	GI74
7325.289	13647.606		5 L	*18930* – 26255	3 – 4	Th I	GI74
7331.490	13636.063		5 L	0 – *7331*	1½ – 2½	Th II	GI74
7336.842	13626.116		4 L	15305 – *22642*	4½ – 4½	Th II	GI74
7351.092	13599.702		3 L	*20922* – 28273	2 – 2	Th I	GI74
7351.688	13598.599		3 L	*24850* – 32202	6 – 5	Th I	GI74
7356.999	13588.783		4 L	*22399* – 29756	5 – 4	Th I	GI74
7362.077	13579.410		4 L	15493 – *22855*	4 – 3	Th I	GI74
7366.959	13570.411		3 L	12847 – *20214*	3 – 3	Th I	GI74
7369.536	13565.665		7 L	*15618* – 22988	3 – 2	Th I	GI74
7383.097	13540.748		3 L	*19588* – 26971	5 – 4	Th I	GI74
7395.443	13518.143		6 L	*11877* – 19273	1 – 2	Th I	GI74
7404.833	13501.001		4 L	13847 – *21252*	2 – 2	Th I	GI74
7408.983	13493.439		4 L			Th	GI74
7414.002	13484.304		3 L	*15618* – 23032	3 – 4	Th I	GI74
7414.357	13483.659		3 L			Th	GI74
7427.310	13460.143		3 L	8605 – *16033*	2½ – 2½	Th II	GI74
7433.355	13449.197		4 L	*10526* – 17959	3 – 4	Th I	GI74
7434.152	13447.755		4 L	13088 – *20522*	3 – 2	Th I	GI74
7436.270	13443.925		4 L	*20922* – 28358	2 – 3	Th I	GI74
7438.119	13440.583		4 L	11601 – *19039*	1 – 2	Th I	GI74
7442.134	13433.332		3 L	14226 – *21668*	0 – 1	Th I	GI74
7445.568	13427.136		3 L	*10673* – 18118	2½ – 1½	Th II	GI74
7445.695	13426.907		3 L	*18809* – 26255	4 – 4	Th I	GI74
7449.763	13419.576		4 L	*22399* – 29849	5 – 4	Th I	GI74
7457.895	13404.943		4 L	*11241* – 18699	3 – 2	Th I	GI74
7463.046	13395.691		4 L	4113 – *11576*	2½ – 1½	Th II	GI74
7470.562	13382.214		4 L	*15166* – 22637	3 – 3	Th I	GI74
7475.229	13373.859		3 L			Th	GI74
7478.062	13368.792		6 L	13088 – *20566*	3 – 4	Th I	GI74
7496.050	13336.712		3 L	*22338* – 29835	3 – 3	Th I	GI74
7527.238	13281.453		4 L	*19516* – 27044	2 – 3	Th I	GI74
7530.698	13275.351		5 L	16554 – *24084*	6 – 6	Th I	GI74
7541.076	13257.081		3 L	*19503* – 27044	3 – 3	Th I	GI74
7542.907	13253.863		5 L	*15490* – 23032	5 – 4	Th I	GI74
7546.399	13247.730		4 L	8800 – *16346*	4 – 4	Th I	GI74
7550.951	13239.744		4 L	15970 – *23521*	3 – 3	Th I	GI74
7552.993	13236.164		3 L	19713 – *27266*	3 – 4	Th I	GI74
7560.292	13223.385		3 L	9711 – *17272*	3½ – 4½	Th II	GI74
7570.652	13205.290		6 L	*18809* – 26380	4 – 5	Th I	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
7582.911	13183.941		3 L	6362 – *13945*	2 – 3	Th I	GI74
7583.002	13183.783		3 L	*15618* – 23201	3 – 3	Th I	GI74
7604.852	13145.904		7 L	6213 – *13818*	4½ – 3½	Th II	GI74
7615.268	13127.923		5 L	*16783* – 24399	4 – 3	Th I	GI74
7648.529	13070.834		6 L	*10783* – 18431	2 – 3	Th I	GI74
7649.369	13069.399		3 L	*13945* – 21594	3 – 3	Th I	GI74
7657.284	13055.889		6 L	2869 – *10526*	3 – 3	Th I	GI74
7664.612	13043.407		4 L	7502 – *15166*	3 – 3	Th I	GI74
7671.831	13031.133		3 L	*23655* – 31326	4 – 4	Th I	GI74
7674.744	13026.187		6 L	12847 – *20522*	3 – 2	Th I	GI74
7680.373	13016.640		5 L	1521 – *9202*	2½ – 3½	Th II	GI74
7684.202	13010.154		3 L	17166 – *24850*	5 – 6	Th I	GI74
7685.574	13007.832		5 L	*16346* – 24032	4 – 4	Th I	GI74
7687.677	13004.273		4 L			Th	GI74
7693.440	12994.532		3 L	*22141* – 29835	3 – 3	Th I	GI74
7697.949	12986.920		4 L	*7795* – 15493	4 – 4	Th I	GI74
7714.047	12959.819		7 L	11802 – *19516*	2 – 2	Th I	GI74
7718.655	12952.082		5 L	12847 – *20566*	3 – 4	Th I	GI74
7725.471	12940.654		7 L	1859 – *9585*	1½ – 2½	Th II	GI74
7728.709	12935.233		3 L	*18382* – 26111	0 – 1	Th I	GI74
7729.721	12933.539		5 L	*4490* – 12219	2½ – 1½	Th II	GI74
7734.294	12925.892		3 L			Th	GI74
7737.203	12921.032		3 L			Th	GI74
7738.241	12919.299		3 L	*24274* – 32012	5 – 4	Th I	GI74
7739.630	12916.981		4 L	15863 – *23603*	2 – 2	Th I	GI74
7750.500	12898.865		4 L	*20522* – 28273	2 – 2	Th I	GI74
7766.252	12872.702		3 L	*10783* – 18549	2 – 2	Th I	GI74
7769.909	12866.644		7 L	*19227* – 26997	6 – 6	Th I	GI74
7772.925	12861.651		4 L	*16217* – 23990	2 – 2	Th I	GI74
7791.768	12830.547		3 L	*20566* – 28358	4 – 3	Th I	GI74
7794.041	12826.806		3 L	17959 – *25753*	4 – 5	Th I	GI74
7821.620	12781.578		4 L	*15166* – 22988	3 – 2	Th I	GI74
7833.560	12762.096		6 L	13088 – *20922*	3 – 2	Th I	GI74
7851.102	12733.582		3 L	*23113* – 30964	4 – 3	Th I	GI74
7865.780	12709.820		4 L	*18930* – 26796	3 – 3	Th I	GI74
7866.083	12709.330		5 L	*15166* – 23032	3 – 4	Th I	GI74
7877.183	12691.421		4 L	15863 – *23741*	2 – 1	Th I	GI74
7881.296	12684.798		3 L			Th	GI74
7882.281	12683.213		4 L	7828 – *15710*	½ – 1½	Th II	GI74
7905.141	12646.536		8 L	*10526* – 18431	3 – 3	Th I	GI74
7905.665	12645.697		4 L	*20322* – 28227	5 – 4	Th I	GI74
7907.765	12642.339		3 L			Th	GI74
7908.363	12641.383		3 L	17398 – *25306*	3 – 2	Th I	GI74
7911.643	12636.142		5 L	*18011* – 25923	5 – 4	Th I	GI74
7913.896	12632.545		3 L	2869 – *10783*	3 – 2	Th I	GI74
7941.971	12587.889		4 L	*20737* – 28679	1 – 2	Th I	GI74
7958.620	12561.555		3 L	18549 – *26508*	2 – 3	Th I	GI74
7964.024	12553.032		5 L	*19227* – 27191	6 – 5	Th I	GI74
7964.170	12552.801		4 L	*23306* – 31271	6 – 5	Th I	GI74
7986.187	12518.195		3 L	*18809* – 26796	4 – 3	Th I	GI74
8012.364	12477.297		7 L	3865 – *11877*	1 – 1	Th I	GI74
8013.001	12476.305		3 L	*20214* – 28227	3 – 4	Th I	GI74
8017.549	12469.228		4 L	*10414* – 18431	4 – 3	Th I	GI74
8020.234	12465.053		3 L	*20322* – 28342	5 – 5	Th I	GI74
8022.864	12460.967		4 L	*10526* – 18549	3 – 2	Th I	GI74
8027.828	12453.262		3 L	15493 – *23521*	4 – 3	Th I	GI74
8031.552	12447.488		5 L	*11241* – 19273	3 – 2	Th I	GI74
8032.904	12445.393		3 L	*15736* – 23769	1 – 1	Th I	GI74
8035.086	12442.013		5 L	*15166* – 23201	3 – 3	Th I	GI74
8047.837	12422.300		4 L	*19986* – 28034	6 – 5	Th I	GI74
8052.465	12415.160		5 L	*16346* – 24399	4 – 3	Th I	GI74
8062.095	12400.331		3 L	6213 – *14275*	4½ – 4½	Th II	GI74
8063.709	12397.849		4 L	*19503* – 27566	3 – 2	Th I	GI74
8074.152	12381.813		3 L	12847 – *20922*	3 – 2	Th I	GI74
8080.240	12372.484		4 L	*4490* – 12570	2½ – 3½	Th II	GI74
8093.648	12351.988		3 L			Th	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8102.825	12337.998		7 L	6362 – *14465*	2 – 2	Th I	GI74
8113.925	12321.120		3 L	*18930* – 27044	3 – 3	Th I	GI74
8115.947	12318.050		3 L	15493 – *23609*	4 – 5	Th I	GI74
8121.209	12310.069		3 L	*21890* – 30011	3 – 3	Th I	GI74
8161.573	12249.188		4 L	*18809* – 26971	4 – 4	Th I	GI74
8164.042	12245.483		3 L	13088 – *21252*	3 – 2	Th I	GI74
8164.384	12244.970		3 L	16818 – *24982*	3½ – 3½	Th II	GI74
8172.240	12233.199		5 L	*14465* – 22637	2 – 3	Th I	GI74
8173.080	12231.942		8 L	*10526* – 18699	3 – 2	Th I	GI74
8176.934	12226.177		4 L	*11877* – 20054	1 – 2	Th I	GI74
8189.851	12206.894		7 L	3687 – *11877*	2 – 1	Th I	GI74
8198.405	12194.157		8 L	1521 – *9720*	2½ – 3½	Th II	GI74
8206.574	12182.019		3 L	9804 – *18011*	5 – 5	Th I	GI74
8213.454	12171.815		4 L	4961 – *13175*	4 – 4	Th I	GI74
8216.150	12167.821		3 L	11601 – *19817*	1 – 1	Th I	GI74
8219.791	12162.431		3 L			Th	GI74
8234.331	12140.955		3 L	*18809* – 27044	4 – 3	Th I	GI74
8240.395	12132.020		3 L	*20322* – 28562	5 – 4	Th I	GI74
8242.157	12129.427		5 L	13297 – *21539*	4 – 4	Th I	GI74
8243.601	12127.302		8 L	0 – *8243*	2 – 2	Th I	GI74
8244.201	12126.419		5 L	*18011* – 26255	5 – 4	Th I	GI74
8248.810	12119.644		3 L	9804 – *18053*	5 – 4	Th I	GI74
8255.765	12109.434		3 L	*20423* – 28679	1 – 2	Th I	GI74
8271.428	12086.503		3 L	9711 – *17983*	3½ – 2½	Th II	GI74
8305.004	12037.639		4 L	17398 – *25703*	3 – 2	Th I	GI74
8318.078	12018.718		7 L	*16346* – 24664	4 – 3	Th I	GI74
8318.538	12018.054		4 L	15863 – *24182*	2 – 2	Th I	GI74
8319.994	12015.950		4 L	*23306* – 31626	6 – 5	Th I	GI74
8325.604	12007.854		5 L	4146 – *12472*	3½ – 2½	Th II	GI74
8341.714	11984.664		8 L	4146 – *12488*	3½ – 4½	Th II	GI74
8358.821	11960.136		3 L	4113 – *12472*	2½ – 2½	Th II	GI74
8364.467	11952.063		4 L	*19227* – 27591	6 – 5	Th I	GI74
8369.159	11945.362		6 L	*18011* – 26380	5 – 5	Th I	GI74
8371.424	11942.130		5 L	*15618* – 23990	3 – 2	Th I	GI74
8372.470	11940.638		7 L	2869 – *11241*	3 – 3	Th I	GI74
8389.369	11916.586		3 L	*22163* – 30552	4 – 4	Th I	GI74
8392.950	11911.501		4 L			Th	GI74
8401.177	11899.837		4 L	13847 – *22248*	2 – 2	Th I	GI74
8404.634	11894.942		3 L	12847 – *21252*	3 – 2	Th I	GI74
8411.997	11884.530		5 L	11802 – *20214*	2 – 3	Th I	GI74
8419.316	11874.199		3 L	12570 – *20989*	3½ – 4½	Th II	GI74
8423.449	11868.373		3 L			Th	GI74
8425.392	11865.636		4 L	15305 – *23730*	4½ – 4½	Th II	GI74
8426.378	11864.247		7 L	3687 – *12114*	2 – 2	Th I	GI74
8430.546	11858.382		4 L	*14206* – 22637	4 – 3	Th I	GI74
8450.965	11829.730		4 L	15970 – *24421*	3 – 3	Th I	GI74
8451.029	11829.640		5 L	13088 – *21539*	3 – 4	Th I	GI74
8452.499	11827.583		4 L	17073 – *25526*	1 – 1	Th I	GI74
8456.033	11822.640		4 L	*19817* – 28273	1 – 2	Th I	GI74
8467.04	11807.27	0.02	30	10542 – *19009*	4 – 5	Th III	LI74
8468.943	11804.617		6 L	5563 – *14032*	1 – 2	Th I	GI74
8469.303	11804.116		3 L	*21903* – 30372	7 – 6	Th I	GI74
8489.233	11776.403		5 L	*9238* – 17727	4½ – 5½	Th II	GI74
8490.127	11775.163		4 L	*10783* – 19273	2 – 2	Th I	GI74
8529.631	11720.628		3 L			Th	GI74
8535.754	11712.220		3 L	*17354* – 25890	1 – 2	Th I	GI74
8542.145	11703.457		7 L	*15490* – 24032	5 – 4	Th I	GI74
8545.523	11698.831		3 L	13962 – *22508*	1 – 2	Th I	GI74
8548.845	11694.285		3 L	*21738* – 30286	2 – 1	Th I	GI74
8568.369	11667.638		5 L	*16346* – 24915	4 – 3	Th I	GI74
8573.124	11661.167		3 L	*19039* – 27612	2 – 3	Th I	GI74
8591.552	11636.155		3 L	15970 – *24561*	3 – 3	Th I	GI74
8592.699	11634.601		4 L	13297 – *21890*	4 – 3	Th I	GI74
8594.659	11631.948		3 L	10379 – *18973*	4½ – 3½	Th II	GI74
8604.837	11618.190		3 L	13297 – *21902*	4 – 4	Th I	GI74
8605.376	11617.462		5 L	*14032* – 22637	2 – 3	Th I	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8608.447	11613.318		3 L			Th	GI74
8614.266	11605.473		3 L	*19948* – 28562	4 – 4	Th I	GI74
8621.314	11595.985		6 L	*16783* – 25405	4 – 4	Th I	GI74
8625.801	11589.953		4 L	16554 – *25180*	6 – 7	Th I	GI74
8636.558	11575.518		4 L	*18930* – 27566	3 – 2	Th I	GI74
8639.568	11571.485		5 L	*19588* – 28227	5 – 4	Th I	GI74
8649.488	11558.214		3 L	13088 – *21738*	3 – 2	Th I	GI74
8650.144	11557.337		3 L	17398 – *26048*	3 – 4	Th I	GI74
8661.268	11542.494		3 L	8460 – *17121*	1½ – 1½	Th II	GI74
8669.948	11530.938		3 L	*21165* – 29835	3 – 3	Th I	GI74
8672.982	11526.904		5 L			Th	GI74
8673.316	11526.460		4 L	14204 – *22877*	5 – 5	Th I	GI74
8680.850	11516.456		5 L	5563 – *14243*	1 – 1	Th I	GI74
8681.979	11514.959		4 L	*18930* – 27612	3 – 3	Th I	GI74
8684.163	11512.063		3 L	5563 – *14247*	1 – 0	Th I	GI74
8684.538	11511.566		6 L	*20867* – 29552	7 – 6	Th I	GI74
8685.698	11510.028		3 L	*18809* – 27495	4 – 4	Th I	GI74
8691.621	11502.185		3 L	12847 – *21539*	3 – 4	Th I	GI74
8692.155	11501.478		4 L	*13945* – 22637	3 – 3	Th I	GI74
8700.925	11489.885		5 L	8800 – *17501*	4 – 5	Th I	GI74
8711.637	11475.757		3 L	*18809* – 27521	4 – 4	Th I	GI74
8717.075	11468.598		3 L			Th	GI74
8719.781	11465.039		5 L	11802 – *20522*	2 – 2	Th I	GI74
8744.528	11432.593		4 L	*14243* – 22988	1 – 2	Th I	GI74
8746.738	11429.704		6 L	*10526* – 19273	3 – 2	Th I	GI74
8756.234	11417.309		3 L	*19516* – 28273	2 – 2	Th I	GI74
8780.130	11386.235		5 L	*15618* – 24399	3 – 3	Th I	GI74
8781.491	11384.471		3 L	15493 – *24274*	4 – 5	Th I	GI74
8781.916	11383.920		3 L	*18809* – 27591	4 – 5	Th I	GI74
8789.024	11374.713		6 L	4113 – *12902*	2½ – 1½	Th II	GI74
8801.570	11358.499		3 L	13088 – *21890*	3 – 3	Th I	GI74
8804.503	11354.715		8 L	6362 – *15166*	2 – 3	Th I	GI74
8806.668	11351.924		6 L	*19227* – 28034	6 – 5	Th I	GI74
8813.046	11343.709		4 L	*11241* – 20054	3 – 2	Th I	GI74
8813.708	11342.857		3 L	13088 – *21902*	3 – 4	Th I	GI74
8822.117	11332.045		4 L	13847 – *22669*	2 – 3	Th I	GI74
8823.376	11330.428		5 L			Th	GI74
8826.067	11326.973		3 L	*14206* – 23032	4 – 4	Th I	GI74
8841.412	11307.314		3 L	*19516* – 28358	2 – 3	Th I	GI74
8844.171	11303.787		5 L	13297 – *22141*	4 – 3	Th I	GI74
8844.361	11303.544		4 L	*17411* – 26255	3 – 4	Th I?	GI74
8844.361	11303.544		4 L	7502 – *16346*	3 – 4	Th I?	GI74
8865.322	11276.818		4 L	*15166* – 24032	3 – 4	Th I	GI74
8867.873	11273.574		4 L	*21890* – 30758	3 – 2	Th I	GI74
8879.363	11258.986		4 L	*17501* – 26380	5 – 5	Th I	GI74
8880.038	11258.130		3 L	*21252* – 30132	2 – 2	Th I	GI74
8882.435	11255.092		3 L	17166 – *26048*	5 – 4	Th I	GI74
8902.080	11230.255		9 L	5563 – *14465*	1 – 2	Th I	GI74
8905.825	11225.532		3 L	15863 – *24769*	2 – 3	Th I	GI74
8921.683	11205.579		4 L	11601 – *20522*	1 – 2	Th I	GI74
8933.532	11190.716		3 L			Th	GI74
8937.359	11185.925		5 L	7280 – *16217*	2 – 2	Th I	GI74
8942.811	11179.105		3 L	11601 – *20543*	1 – 0	Th I	GI74
8956.436	11162.099		3 L	*14032* – 22988	2 – 2	Th I	GI74
8974.299	11139.881		3 L	*19588* – 28562	5 – 4	Th I	GI74
8975.153	11138.821		4 L	*18069* – 27044	3 – 3	Th I	GI74
8983.649	11128.287		5 L	4961 – *13945*	4 – 3	Th I	GI74
8985.866	11125.541		4 L	*18011* – 26997	5 – 6	Th I	GI74
8987.090	11124.026		3 L	*23306* – 32293	6 – 5	Th I	GI74
8995.070	11114.157		3 L	*14206* – 23201	4 – 3	Th I	GI74
9005.079	11101.804		5 L	9804 – *18809*	5 – 4	Th I	GI74
9014.066	11090.735		3 L	*19516* – 28531	2 – 2	Th I	GI74
9027.029	11074.809		5 L			Th	GI74
9027.904	11073.735		3 L	*19503* – 28531	3 – 2	Th I	GI74
9031.726	11069.049		3 L	7001 – *16033*	1½ – 2½	Th II	GI74
9041.561	11057.009		4 L	13297 – *22338*	4 – 3	Th I	GI74

Th—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9043.213	11054.989		4 L	*13945* – 22988	3 – 2	Th I	GI74
9045.742	11051.898		7 L	*15618* – 24664	3 – 3	Th I	GI74
9050.389	11046.224		4 L	*18930* – 27980	3 – 3	Th I	GI74
9052.911	11043.146		3 L	*15618* – 24671	3 – 2	Th I	GI74
9058.511	11036.319		4 L	*16346* – 25405	4 – 4	Th I	GI74
9070.470	11021.768		3 L	*14206* – 23277	4 – 5	Th I	GI74
9074.571	11016.787		4 L	13088 – *22163*	3 – 4	Th I	GI74
9086.933	11001.800		3 L	13962 – *23049*	1 – 1	Th I	GI74
9101.963	10983.633		5 L	13297 – *22399*	4 – 5	Th I	GI74
9102.502	10982.982		3 L	*22163* – 31265	4 – 3	Th I	GI74
9102.562	10982.910		4 L	14204 – *23306*	5 – 6	Th I	GI74
9119.189	10962.885		5 L	11802 – *20922*	2 – 2	Th I	GI74
9131.459	10948.154		4 L	13962 – *23093*	1 – 2	Th I	GI74
9136.234	10942.432		3 L	16554 – *25690*	6 – 5	Th I	GI74
9136.391	10942.244		8 L	6213 – *15349*	4½ – 5½	Th II	GI74
9136.914	10941.617		4 L	*6168* – 15305	3½ – 4½	Th II	GI74
9151.245	10924.483		4 L	1521 – *10673*	2½ – 2½	Th II	GI74
9160.386	10913.581		3 L	13088 – *22248*	3 – 2	Th I	GI74
9170.796	10901.193		4 L	*18809* – 27980	4 – 3	Th I	GI74
9179.980	10890.287		4 L	*18011* – 27191	5 – 5	Th I	GI74
9197.141	10869.967		4 L	*17847* – 27044	2 – 3	Th I	GI74
9203.456	10862.508		4 L	*20214* – 29418	3 – 2	Th I	GI74
9211.130	10853.458		3 L	8800 – *18011*	4 – 5	Th I	GI74
9218.820	10844.405		4 L	17166 – *26384*	5 – 4	Th I	GI74
9227.521	10834.179		3 L			Th	GI74
9239.549	10820.075		5 L	6213 – *15453*	4½ – 3½	Th II	GI74
9245.105	10813.573		4 L	2869 – *12114*	3 – 2	Th I	GI74
9245.257	10813.395		6 L	4961 – *14206*	4 – 4	Th I	GI74
9246.209	10812.281		5 L	13847 – *23093*	2 – 2	Th I	GI74
9250.433	10807.344		3 L	13088 – *22338*	3 – 3	Th I	GI74
9253.367	10803.918		4 L	8800 – *18053*	4 – 4	Th I	GI74
9256.589	10800.157		4 L	6362 – *15618*	2 – 3	Th I	GI74
9256.678	10800.053		5 L	*13945* – 23201	3 – 3	Th I	GI74
9261.821	10794.056		3 L	9711 – *18973*	3½ – 3½	Th II	GI74
9268.420	10786.371		3 L	*20566* – 29835	4 – 3	Th I	GI74
9268.814	10785.912		4 L	8800 – *18069*	4 – 3	Th I	GI74
9276.493	10776.984		4 L	15493 – *24769*	4 – 3	Th I	GI74
9296.035	10754.328		4 L	*15618* – 24915	3 – 3	Th I	GI74
9300.268	10749.434		3 L	17959 – *27260*	4 – 3	Th I	GI74
9315.163	10732.245		5 L	12847 – *22163*	3 – 4	Th I	GI74
9319.782	10726.926		8 L	2558 – *11877*	0 – 1	Th I	GI74
9321.092	10725.418		6 L	11601 – *20922*	1 – 2	Th I	GI74
9322.394	10723.921		7 L	4146 – *13468*	3½ – 4½	Th II	GI74
9340.95	10702.62		4			Th	KL50
9362.161	10678.369		3 L	11802 – *21165*	2 – 3	Th I	GI74
9374.570	10664.234		5 L	6362 – *15736*	2 – 1	Th I	GI74
9377.549	10660.847		3 L	8605 – *17983*	2½ – 2½	Th II	GI74
9418.044	10615.008		4 L	*18809* – 28227	4 – 4	Th I	GI74
9419.481	10613.388		4 L	13088 – *22508*	3 – 2	Th I	GI74
9426.519	10605.464		4 L	*18069* – 27495	3 – 4	Th I	GI74
9442.870	10587.100		3 L	15863 – *25306*	2 – 2	Th I	GI74
9462.349	10565.306		6 L	*13175* – 22637	4 – 3	Th I	GI74
9470.283	10556.454		7 L	*17501* – 26971	5 – 4	Th I	GI74
9471.734	10554.837		4 L	*16783* – 26255	4 – 4	Th I	GI74
9484.205	10540.958		5 L	*18011* – 27495	5 – 4	Th I	GI74
9491.024	10533.385		3 L	12847 – *22338*	3 – 3	Th I	GI74
9494.82	10529.18		5	*11276* – 20771	5 – 6	Th III	KL50
9496.069	10527.789		5 L	*17501* – 26997	5 – 6	Th I	GI74
9497.826	10525.841		4 L			Th	GI74
9510.143	10512.209		5 L	*18011* – 27521	5 – 4	Th I	GI74
9518.851	10502.592		4 L	13962 – *23481*	1 – 1	Th I	GI74
9522.565	10498.496		5 L	*14247* – 23769	0 – 1	Th I	GI74
9525.879	10494.843		6 L	*14243* – 23769	1 – 1	Th I	GI74
9528.229	10492.255		6 L	*10526* – 20054	3 – 2	Th I	GI74
9536.313	10483.360		4 L			Th	GI74
9551.506	10466.685		3 L			Th	GI74

Th—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9557.864	10459.723		4 L	13297 – *22855*	4 – 3	Th I	GI74
9566.346	10450.448		3 L	*19986* – 29552	6 – 6	Th I	GI74
9576.374	10439.505		3 L	*16346* – 25923	4 – 4	Th I	GI74
9580.422	10435.094		3 L	*18011* – 27591	5 – 5	Th I	GI74
9585.409	10429.665		6 L	0 – *9585*	1½ – 2½	Th II	GI74
9594.692	10419.574		7 L	1521 – *11116*	2½ – 3½	Th II	GI74
9600.753	10412.996		4 L	*18930* – 28531	3 – 2	Th I	GI74
9608.591	10404.502		3 L			Th	GI74
9640.998	10369.528		4 L	13962 – *23603*	1 – 2	Th I	GI74
9649.867	10359.998		3 L	9400 – *19050*	2½ – 1½	Th II	GI74
9651.573	10358.167		3 L	11601 – *21252*	1 – 2	Th I	GI74
9660.074	10349.051		5 L	12847 – *22508*	3 – 2	Th I	GI74
9662.419	10346.540		3 L	15863 – *25526*	2 – 1	Th I	GI74
9673.277	10334.926		3 L	13847 – *23521*	2 – 3	Th I	GI74
9690.184	10316.894		4 L	*17501* – 27191	5 – 5	Th I	GI74
9698.028	10308.549		5 L	*19986* – 29684	6 – 5	Th I	GI74
9698.54	10308.01		2			Th	KL50
9704.984	10301.161		6 L	4113 – *13818*	2½ – 3½	Th II	GI74
9712.630	10293.052		4 L	14204 – *23916*	5 – 4	Th I	GI74
9716.467	10288.987		4 L	1859 – *11576*	1½ – 1½	Th II	GI74
9722.012	10283.118		4 L	7502 – *17224*	3 – 2	Th I	GI74
9746.21	10257.59		5	*8141* – 17887	4 – 5	Th III	KL50
9746.413	10257.374		5 L	*14243* – 23990	1 – 2	Th I	GI74
9752.773	10250.684		4 L	*18809* – 28562	4 – 4	Th I	GI74
9755.746	10247.561		4 L	13847 – *23603*	2 – 2	Th I	GI74
9766.735	10236.031		4 L	13088 – *22855*	3 – 3	Th I	GI74
9778.551	10223.662		3 L	13962 – *23741*	1 – 1	Th I	GI74
9783.554	10218.434		5 L	9804 – *19588*	5 – 5	Th I	GI74
9812.377	10188.418		3 L			Th	GI74
9821.917	10178.522		5 L	12847 – *22669*	3 – 3	Th I	GI74
9825.305	10175.012		4 L	*14206* – 24032	4 – 4	Th I	GI74
9855.084	10144.266		4 L	6362 – *16217*	2 – 2	Th I	GI74
9857.870	10141.399		6 L	*13175* – 23032	4 – 4	Th I	GI74
9858.808	10140.434		4 L	*20867* – 30726	7 – 7	Th I	GI74
9865.497	10133.559		7 L	1859 – *11725*	1½ – ½	Th II	GI74
9908.935	10089.136		7 L	7502 – *17411*	3 – 3	Th I?	GI74
9908.935	10089.136		7 L	*16346* – 26255	4 – 4	Th I?	GI74
9914.190	10083.788		5 L	*19227* – 29141	6 – 5	Th I	GI74
9915.083	10082.880		4 L	*15490* – 25405	5 – 4	Th I	GI74
9949.461	10048.041		3 L	15493 – *25442*	4 – 3	Th I	GI74
9958.060	10039.364		7 L	8111 – *18069*	4 – 3	Th I	GI74
9985.877	10011.398		3 L	*20566* – 30552	4 – 4	Th I	GI74

Th References

KL50 Klinkenberg, P. F. A., Physica **XVI,** 618–650 (1950).
Source: Intermittent vacuum spark (Th III)
Instrument: 2 m grating spectrograph
Detector: Photographic
Uncertainty in σ: Not given

GI74 Giacchetti, A., Blaise, J., Corliss, C. H., and Zalubus, R., J. Res. Nat. Bur.Stand. (U.S.) **78A,** 247–281 (1974).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: Fourier transform spectrometer
Detector: PbS cooled with liquid nitrogen
Uncertainty in σ: Average deviation between observed and calculated wavenumbers is less than 0.002 cm⁻¹

LI74 Litzèn, U., Physica Scripta **10,** 103–104 (1974).
Source: Pulsed hollow cathode (Th III)
Instrument: 1.5 m Czerny-Turner spectrometer
Detector: PbS cooled with liquid nitrogen

Additional References

Steers, E. B. M., Spectrochim. Acta **23B,** 135 (1967).

Thulium

Tm, $Z = 69$

Tm I Normal state of valence electrons $4f^{13}6s^2\ {}^2F^\circ_{7/2}$ I.P. = 49877 cm^{-1}

Tm II Normal state of valence electrons $4f^{13}({}^2F^\circ_{7/2})6s(7/2, 1/2)^\circ_4$ I.P. = 97189 cm^{-1}

Tm

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4083.34	24483.08	0.10	3 L	28024 – *32107*	4½ – 5½	Tm I	CA69
4117.24	24281.49	0.15	2 L	*22457* – 26574	4 – 4	Tm II	CA69
4121.28	24257.69	0.20	1 L	*22457* – 26578	4 – 3	Tm II	CA69
4136.26	24169.84	0.20	1 L			Tm	CA69
4162.10	24019.78	0.20	1 L			Tm	CA69
4171.15	23967.66	0.15	1 L			Tm	CA69
4192.58	23845.16	0.05	6 L	19748 – *23941*	4½ – 4½	Tm I	CA69
4266.35	23432.85	0.10	3 L	*21713* – 25980	3 – 3	Tm II	CA69
4299.62	23251.53	0.15	2 L	19132 – *23431*	1½ – 2½	Tm I	CA69
4300.96	23244.28	0.20	1 L	28555 – *32856*	3½ – 2½	Tm I	CA69
4304.92	23222.90	0.20	1 L			Tm	CA69
4370.97	22871.98	0.15	2 L	21997 – *26368*	5½ – 5½	Tm I	CA69
4380.08	22824.41	0.20	1 L	*22457* – 26837	4 – 3	Tm II	CA69
4381.52	22816.90	0.15	2 L	*33961* – 38342	3½ – 3½	Tm I	CA69
4382.55	22811.54	0.20	1 L			Tm	CA69
4408.08	22679.43	0.15	2 L	28448 – *32856*	2½ – 2½	Tm I	CA69
4442.21	22505.18	0.05	6 L	19132 – *23574*	1½ – 1½	Tm I	CA69
4469.87	22365.91	0.20	1 L			Tm	CA69
4472.81	22351.21	0.15	2 L	*33961* – 38433	3½ –	Tm I	CA69
4482.13	22304.73	0.20	1 L	26439 – *30921*	3½ – 3½	Tm I	CA69
4492.62	22252.65	0.05	6 L	19753 – *24246*	3½ – 3½	Tm I	CA69
4497.75	22227.27	0.10	3 L	18837 – *23335*	4½ – 3½	Tm I	CA69
4507.68	22178.31	0.20	1 L	26439 – *30947*	3½ – 4½	Tm I	CA69
4540.97	22015.72	0.10	4 L	*33961* – 38502	3½ –	Tm I	CA69
4551.90	21962.85	0.15	3 L	*22457* – 27009	4 – 4	Tm II	CA69
4558.43	21931.39	0.20	1 L	23781 – *28340*	4½ – 3½	Tm I	CA69
4565.54	21897.24	0.20	1 L			Tm	CA69
4578.91	21833.30	0.10	3 L	21120 – *25699*	3½ – 4½	Tm I	CA69
4582.50	21816.20	0.15	2 L			Tm	CA69
4589.53	21782.78	0.15	2 L			Tm	CA69
4600.07	21732.87	0.20	1 L	*21978* – 26578	2 – 3	Tm II	CA69
4601.93	21724.08	0.10	3 L	*24273* – 28875	5 – 5	Tm II	CA69
4606.44	21702.82	0.15	2 L			Tm	CA69
4630.75	21588.88	0.20	1 L	21737 – *26368*	4½ – 5½	Tm I	CA69
4636.42	21562.48	0.15	2 L	28143 – *32780*	1½ – 1½	Tm I	CA69
4644.42	21525.34	0.15	2 L	29316 – *33961*	4½ – 3½	Tm I	CA69
4649.70	21500.90	0.15	2 L	22791 – *27440*	3½ – 4½	Tm I	CA69
4661.35	21447.16	0.10	3 L			Tm	CA69
4681.43	21355.17	0.20	1 L			Tm	CA69
4684.62	21340.62	0.10	3 L	28555 – *33240*	3½ – 3½	Tm I	CA69
4686.96	21329.97	0.20	1 L	26701 – *31388*	3½ – 4½	Tm I	CA69
4697.64	21281.48	0.05	5 L	19548 – *24246*	2½ – 3½	Tm I	CA69
4705.64	21245.30	0.20	1 L			Tm	CA69
4712.98	21212.21	0.15	3 L	28143 – *32856*	1½ – 2½	Tm I	CA69
4716.89	21194.63	0.15	2 L			Tm	CA69
4727.75	21145.94	0.20	1 L			Tm	CA69
4735.78	21110.08	0.15	2 L	*33961* – 38696	3½ –	Tm I	CA69
4743.87	21074.08	0.20	1 L	*23524* – 28267	4 – 3	Tm II	CA69
4761.80	20994.73	0.20	1 L			Tm	CA69
4766.20	20975.35	0.20	1 L			Tm	CA69
4775.86	20932.92	0.15	2 L			Tm	CA69
4781.51	20908.19	0.20	1 L	28168 – *32950*	5½ – 6½	Tm I	CA69
4794.69	20850.71	0.10	3 L	26126 – *30921*	2½ – 3½	Tm I	CA69
4796.93	20840.98	0.15	2 L	*22457* – 27254	4 – 4	Tm II	CA69
4806.10	20801.21	0.05	6 L	17613 – *22419*	4½ – 4½	Tm I	CA69
4840.23	20654.54	0.15	2 L			Tm	CA69

Tm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
4843.84	20639.15	0.05	6 L			Tm	CA69
4854.41	20594.20	0.05	7 L	17613 – *22468*	4½ – 5½	Tm I	CA69
4860.96	20566.46	0.10	3 L	*21713* – 26574	3 – 4	Tm II	CA69
4865.05	20549.17	0.10	4 L	*21713* – 26578	3 – 3	Tm II	CA69
4867.04	20540.76	0.15	2 L	27314 – *32181*	½ – 1½	Tm I	CA69
4882.09	20477.44	0.20	1 L			Tm	CA69
4885.36	20463.74	0.15	2 L			Tm	CA69
4887.75	20453.73	0.20	1 L			Tm	CA69
4892.46	20434.04	0.20	1 L	26701 – *31593*	3½ – 2½	Tm I	CA69
4910.21	20360.17	0.10	4 L	*24273* – 29183	5 – 4	Tm II	CA69
4945.89	20213.29	0.05	7 L	17613 – *22559*	4½ – 5½	Tm I	CA69
4947.27	20207.65	0.05	7 L	19753 – *24701*	3½ – 4½	Tm I	CA69
4948.84	20201.24	0.10	4 L	26439 – *31388*	3½ – 4½	Tm I	CA69
4950.71	20193.61	0.10	4 L	18990 – *23941*	5½ – 4½	Tm I	CA69
4952.57	20186.03	0.10	5 L	19748 – *24701*	4½ – 4½	Tm I	CA69
4954.26	20179.14	0.05	7 L	19753 – *24708*	3½ – 3½	Tm I	CA69
5006.02	19970.50	0.10	3 L			Tm	CA69
5010.41	19953.00	0.10	3 L	26488 *31499*	1½ 1½	Tm I	CA69
5013.27	19941.62	0.05	6 L	17454 – *22468*	6½ – 5½	Tm I	CA69
5014.86	19935.29	0.15	2 L	26439 – *31454*	3½ – 4½	Tm I	CA69
5028.44	19881.46	0.05	7 L	19132 – *24160*	1½ – ½	Tm I	CA69
5054.79	19777.82	0.20	1 L	*21133* – 26188	6 – 5	Tm II	CA69
5062.48	19747.77	0.05	7 L	19548 – *24611*	2½ – 2½	Tm I	CA69
5076.39	19693.66	0.10	6 L	17343 – *22419*	3½ – 4½	Tm I	CA69
5087.26	19651.58	0.10	3 L	18853 – *23941*	5½ – 4½	Tm I	CA69
5104.70	19584.44	0.15	2 L	17454 – *22559*	6½ – 5½	Tm I	CA69
5149.15	19415.38	0.20	1 L	28143 – *33292*	1½ – 2½	Tm I	CA69
5159.24	19377.41	0.05	5 L	19548 – *24708*	2½ – 3½	Tm I	CA69
5170.90	19333.72	0.20	2 L			Tm	CA69
5178.57	19305.08	0.10	3 L			Tm	CA69
5186.23	19276.57	0.25	1 L			Tm	CA69
5200.46	19223.82	0.20	1 L	*33961* – 39161	3½ –	Tm I	CA69
5209.28	19191.27	0.05	6 L	19748 – *24957*	4½ – 5½	Tm I	CA69
5214.08	19173.60	0.20	1 L			Tm	CA69
5216.41	19165.04	0.20	1 L	28024 – *33240*	4½ – 3½	Tm I	CA69
5217.55	19160.85	0.20	1 L			Tm	CA69
5218.80	19156.26	0.20	1 L			Tm	CA69
5237.75	19086.96	0.25	1 L			Tm	CA69
5265.64	18985.86	0.15	2 L	25656 – *30921*	2½ – 3½	Tm I	CA69
5267.05	18980.78	0.20	1 L			Tm	CA69
5287.98	18905.65	0.10	4 L	17454 – *22742*	6½ – 6½	Tm I	CA69
5295.68	18878.16	0.20	1 L	*21713* – 27009	3 – 4	Tm II	CA69
5302.66	18853.31	0.20	2 L			Tm	CA69
5306.09	18841.13	0.25	1 L			Tm	CA69
5329.95	18756.78	0.20	1 L			Tm	CA69
5334.30	18741.49	0.25	1 L	26439 – *31773*	3½ – 2½	Tm I	CA69
5340.11	18721.10	0.25	1 L			Tm	CA69
5347.34	18695.78	0.25	1 L			Tm	CA69
5351.03	18682.89	0.25	1 L	*23524* – 28875	4 – 5	Tm II	CA69
5351.74	18680.41	0.25	1 L			Tm	CA69
5359.72	18652.60	0.15	3 L			Tm	CA69
5365.46	18632.64	0.15	3 L			Tm	CA69
5372.12	18609.54	0.25	1 L	26126 – *31499*	2½ – 1½	Tm I	CA69
5422.61	18436.27	0.20	2 L			Tm	CA69
5447.35	18352.54	0.05	5 L	17454 – *22902*	6½ – 6½	Tm I	CA69
5458.64	18314.58	0.25	1 L	27491 – *32950*	5½ – 6½	Tm I	CA69
5462.79	18300.67	0.10	3 L	16957 – *22419*	3½ – 4½	Tm I	CA69
5465.29	18292.30	0.25	1 L	27314 – *32780*	½ – 1½	Tm I	CA69
5465.68	18291.00	0.25	1 L			Tm	CA69
5479.09	18246.22	0.10	4 L	19132 – *24611*	1½ – 2½	Tm I	CA69
5490.29	18209.00	0.20	1 L			Tm	CA69
5493.72	18197.63	0.15	2 L			Tm	CA69
5519.08	18114.02	0.15	3 L	25488 – *31007*	5½ – 5½	Tm I	CA69
5524.23	18097.13	0.15	2 L			Tm	CA69
5550.71	18010.80	0.25	1 L			Tm	CA69
5570.53	17946.71	0.25	1 L			Tm	CA69

Tm—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5584.00	17903.42	0.25	1 L			Tm	CA69
5586.18	17896.43	0.25	1 L			Tm	CA69
5599.28	17854.56	0.25	1 L	*33961* – 39560	3½ –	Tm I	CA69
5643.73	17713.94	0.25	1 L	28168 – *33812*	5½ – 6½	Tm I	CA69
5646.85	17704.15	0.20	1 L	26126 – *31773*	2½ – 2½	Tm I	CA69
5649.09	17697.13	0.25	1 L			Tm	CA69
5658.90	17666.45	0.20	1 L	19548 – *25207*	2½ – 1½	Tm I	CA69
5659.36	17665.02	0.20	1 L	*23524* – 29183	4 – 4	Tm II	CA69
5677.53	17608.49	0.05	6 L	16742 – *22419*	3½ – 4½	Tm I	CA69
5679.23	17603.21	0.05	7 L	17752 – *23431*	2½ – 2½	Tm I	CA69
5692.90	17560.94	0.15	2 L	26488 – *32181*	1½ – 1½	Tm I	CA69
5702.74	17530.64	0.25	1 L	21737 – *27440*	4½ – 4½	Tm I	CA69
5721.50	17473.16	0.05	4 L	17613 – *23335*	4½ – 3½	Tm I	CA69
5729.21	17449.65	0.20	2 L			Tm	CA69
5756.54	17366.80	0.20	1 L			Tm	CA69
5758.59	17360.62	0.25	1 L			Tm	CA69
5761.32	17352.39	0.20	2 L			Tm	CA69
5763.68	17345.29	0.20	1 L			Tm	CA69
5772.42	17319.03	0.20	2 L	19748 – *25520*	4½ – 5½	Tm I	CA69
5776.58	17306.55	0.25	1 L			Tm	CA69
5783.48	17285.91	0.25	1 L			Tm	CA69
5810.39	17205.85	0.25	1 L	*22457* – 28267	4 – 3	Tm II	CA69
5821.80	17172.13	0.10	4 L	17752 – *23574*	2½ – 1½	Tm I	CA69
5822.24	17170.83	0.25	1 L			Tm	CA69
5839.28	17120.72	0.25	1 L			Tm	CA69
5847.22	17097.48	0.25	1 L	18853 – *24701*	5½ – 4½	Tm I	CA69
5848.65	17093.29	0.25	1 L	25745 – *31593*	2½ – 2½	Tm I	CA69
5854.07	17077.47	0.20	1 L			Tm	CA69
5863.22	17050.82	0.25	1 L			Tm	CA69
5863.68	17049.48	0.25	1 L	18837 – *24701*	4½ – 4½	Tm I	CA69
5876.47	17012.37	0.25	1 L	25717 – *31593*	3½ – 2½	Tm I	CA69
5900.92	16941.88	0.10	3 L	*23524* – 29425	4 – 3	Tm II	CA69
5903.53	16934.39	0.10	3 L			Tm	CA69
5905.94	16927.48	0.25	1 L			Tm	CA69
5909.76	16916.54	0.25	1 L	28051 – *33961*	2½ – 3½	Tm I	CA69
5913.52	16905.79	0.25	1 L			Tm	CA69
5916.71	16896.67	0.25	1 L	21120 – *27037*	3½ – 3½	Tm I	CA69
5931.22	16855.33	0.25	1 L			Tm	CA69
5945.91	16813.69	0.25	1 L	19753 – *25699*	3½ – 4½	Tm I	CA69
5951.16	16798.86	0.25	1 L	19748 – *25699*	4½ – 4½	Tm I	CA69
5954.60	16789.15	0.25	1 L			Tm	CA69
5967.08	16754.04	0.05	6 L	18990 – *24957*	5½ – 5½	Tm I	CA69
5983.20	16708.90	0.25	1 L			Tm	CA69
5988.71	16693.53	0.25	1 L	*21713* – 27702	3 – 3	Tm II	CA69
5991.77	16685.00	0.05	5 L	17343 – *23335*	3½ – 3½	Tm I	CA69
6032.48	16572.40	0.25	1 L			Tm	CA69
6054.49	16512.16	0.25	1 L	26126 – *32181*	2½ – 1½	Tm I	CA69
6069.49	16471.35	0.25	1 L	19466 – *25536*	6½ – 7½	Tm I	CA69
6103.66	16379.14	0.05	7 L	18853 – *24957*	5½ – 5½	Tm I	CA69
6103.91	16378.47	0.20	2 L	*24273* – 30377	5 – 4	Tm II	CA69
6142.63	16275.23	0.25	1 L			Tm	CA69
6235.64	16032.47	0.25	1 L	*24273* – 30508	5 – 4	Tm II	CA69
6320.05	15818.34	0.25	1 L	21120 – *27440*	3½ – 4½	Tm I	CA69
6327.45	15799.84	0.05	7 L	17613 – *23941*	4½ – 4½	Tm I	CA69
6345.92	15753.85	0.05	6 L	*20228* – 26574	5 – 4	Tm II	CA69
6367.99	15699.25	0.15	3 L	26488 – *32856*	1½ – 2½	Tm I	CA69
6378.19	15674.15	0.15	3 L	16957 – *23335*	3½ – 3½	Tm I	CA69
6417.09	15579.13	0.25	1 L	26439 – *32856*	3½ – 2½	Tm I	CA69
6417.59	15577.92	0.25	1 L	*22457* – 28875	4 – 5	Tm II	CA69
6474.85	15440.16	0.25	1 L	16957 – *23431*	3½ – 2½	Tm I	CA69
6483.28	15420.08	0.25	1 L			Tm	CA69
6493.79	15395.12	0.05	7 L	17752 – *24246*	2½ – 3½	Tm I	CA69
6499.16	15382.40	0.20	2 L			Tm	CA69
6506.00	15366.23	0.20	2 L			Tm	CA69
6516.96	15340.39	0.10	4 L	21997 – *28514*	5½ – 4½	Tm I	CA69
6525.46	15320.40	0.15	3 L	25656 – *32181*	2½ – 1½	Tm I	CA69

Tm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
6530.61	15308.32	0.15	3 L	18990 – *25520*	5½ – 5½	Tm I	CA69
6554.19	15253.25	0.25	1 L	*21713* – 28267	3 – 3	Tm II	CA69
6567.55	15222.22	0.15	2 L	*24273* – 30840	5 – 4	Tm II	CA69
6592.93	15163.62	0.05	7 L	16742 – *23335*	3½ – 3½	Tm I	CA69
6597.74	15152.57	0.05	5 L	17343 – *23941*	3½ – 4½	Tm I	CA69
6602.54	15141.55	0.20	3 L	21737 – *28340*	4½ – 3½	Tm I	CA69
6619.77	15102.14	0.25	1 L	19748 – *26368*	4½ – 5½	Tm I	CA69
6632.65	15072.81	0.10	5 L	17613 – *24246*	4½ – 3½	Tm I	CA69
6653.02	15026.66	0.15	2 L	26126 – *32780*	2½ – 1½	Tm I	CA69
6667.03	14995.09	0.10	3 L	18853 – *25520*	5½ – 5½	Tm I	CA69
6683.63	14957.84	0.20	1 L	18837 – *25520*	4½ – 5½	Tm I	CA69
6689.64	14944.40	0.05	6 L	16742 – *23431*	3½ – 2½	Tm I	CA69
6709.35	14900.50	0.20	1 L	18990 – *25699*	5½ – 4½	Tm I	CA69
6741.79	14828.80	0.25	1 L			Tm	CA69
6749.75	14811.32	0.25	1 L			Tm	CA69
6749.99	14810.79	0.25	1 L			Tm	CA69
6750.11	14810.53	0.25	1 L			Tm	CA69
6776.75	14752.30	0.20	2 L	21737 – *28514*	4½ – 4½	Tm I	CA69
6780.67	14743.78	0.20	2 L	*20228* – 27009	5 – 4	Tm II	CA69
6800.88	14699.96	0.25	1 L	26439 – *33240*	3½ – 3½	Tm I	CA69
6804.08	14693.05	0.25	1 L	26488 – *33292*	1½ – 2½	Tm I	CA69
6843.07	14609.33	0.05	4 L	18693 – *25536*	7½ – 7½	Tm I	CA69
6845.89	14603.31	0.10	3 L	18853 – *25699*	5½ – 4½	Tm I	CA69
6858.68	14576.08	0.05	4 L	17752 – *24611*	2½ – 2½	Tm I	CA69
6862.32	14568.35	0.05	4 L	18837 – *25699*	4½ – 4½	Tm I	CA69
6864.19	14564.38	0.10	4 L			Tm	CA69
6880.25	14530.38	0.05	5 L	15587 – *22468*	5½ – 5½	Tm I	CA69
6891.08	14507.55	0.05	5 L	19466 – *26357*	6½ – 6½	Tm I	CA69
6899.42	14490.01	0.20	2 L	19548 – *26448*	2½ – 2½	Tm I	CA69
6901.77	14485.08	0.05	5 L	19466 – *26368*	6½ – 5½	Tm I	CA69
6903.05	14482.39	0.05	6 L	17343 – *24246*	3½ – 3½	Tm I	CA69
6956.53	14371.06	0.15	2 L			Tm	CA69
6964.39	14354.84	0.25	1 L			Tm	CA69
6971.73	14339.72	0.05	4 L	15587 – *22559*	5½ – 5½	Tm I	CA69
6984.07	14314.39	0.15	2 L	16957 – *23941*	3½ – 4½	Tm I	CA69
7025.69	14229.59	0.05	4 L	*20228* – 27254	5 – 4	Tm II	CA69
7071.93	14136.55	0.20	2 L	26889 – *33961*	4½ – 3½	Tm I	CA69
7087.44	14105.61	0.05	6 L	17613 – *24701*	4½ – 4½	Tm I	CA69
7094.22	14092.13	0.25	1 L	17613 – *24708*	4½ – 3½	Tm I	CA69
7113.43	14054.07	0.20	1 L	26126 – *33240*	2½ – 3½	Tm I	CA69
7142.61	13996.66	0.20	1 L	*21133* – 28276	6 – 5	Tm II	CA69
7143.71	13994.50	0.20	2 L	*22142* – 29285	1 – 2	Tm II	CA69
7154.96	13972.50	0.05	4 L	15587 – 22742	5½ – 6½	Tm I	CA69
7160.51	13961.67	0.20	1 L	*23524* – 30684	4 – 3	Tm II	CA69
7178.85	13926.00	0.10	3 L	21161 – *28340*	2½ – 3½	Tm I	CA69
7198.84	13887.33	0.05	7 L	16742 – *23941*	3½ – 4½	Tm I	CA69
7219.30	13847.97	0.25	1 L	21120 – *28340*	3½ – 3½	Tm I	CA69
7259.75	13770.81	0.15	3 L	26701 – *33961*	3½ – 3½	Tm I	CA69
7267.93	13755.32	0.15	3 L	17343 – *24611*	3½ – 2½	Tm I	CA69
7283.62	13725.68	0.20	1 L	19753 – *27037*	3½ – 3½	Tm I	CA69
7289.43	13714.74	0.05	5 L	16957 – *24246*	3½ – 3½	Tm I	CA69
7301.79	13691.53	0.25	1 L			Tm	CA69
7307.01	13681.75	0.25	1 L	*21978* – 29285	2 – 2	Tm II	CA69
7314.35	13668.02	0.25	1 L	15587 – *22902*	5½ – 6½	Tm I	CA69
7314.82	13667.14	0.25	1 L	26646 – *33961*	4½ – 3½	Tm I	CA69
7316.03	13664.88	0.25	1 L	19132 – *26448*	1½ – 2½	Tm I	CA69
7316.68	13663.67	0.25	1 L	*23524* – 30840	4 – 4	Tm II	CA69
7336.51	13626.73	0.25	1 L			Tm	CA69
7339.03	13622.05	0.25	1 L			Tm	CA69
7346.07	13609.00	0.25	1 L	24348 – *31694*	4½ – 3½	Tm I	CA69
7357.70	13587.49	0.25	1 L	17343 – *24701*	3½ – 4½	Tm I	CA69
7362.83	13578.02	0.20	1 L			Tm	CA69
7364.68	13574.61	0.05	4 L	17343 – *24708*	3½ – 3½	Tm I	CA69
7367.34	13569.71	0.20	1 L	18990 – *26357*	5½ – 6½	Tm I	CA69
7377.98	13550.14	0.07	4 L	18990 – *26368*	5½ – 5½	Tm I	CA69
7382.27	13542.27	0.10	3 L	24137 – *31519*	6½ – 5½	Tm I	CA69

Tm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
7393.51	13521.68	0.20	1 L	21120 – *28514*	3½ – 4½	Tm I	CA69
7421.11	13471.39	0.25	1 L	26889 – *34310*	4½ – 4½	Tm I	CA69
7446.24	13425.93	0.20	2 L	*21978* – 29425	2 – 3	Tm II	CA69
7453.17	13413.44	0.20	1 L	*24273* – 31726	5 – 5	Tm II	CA69
7455.08	13410.01	0.05	5 L	17752 – *25207*	2½ – 1½	Tm I	CA69
7469.60	13383.94	0.20	1 L	*21713* – 29183	3 – 4	Tm II	CA69
7471.75	13380.09	0.05	6 L	15271 – *22742*	7½ – 6½	Tm I	CA69
7504.17	13322.28	0.05	5 L	16742 – *24246*	3½ – 3½	Tm I	CA69
7514.57	13303.84	0.05	4 L	18853 – *26368*	5½ – 5½	Tm I	CA69
7530.01	13276.56	0.20	1 L			Tm	CA69
7531.02	13274.78	0.05	4 L	18837 – *26368*	4½ – 5½	Tm I	CA69
7582.22	13185.14	0.17	2 L			Tm	CA69
7626.82	13108.04	0.10	3 L	*24273* – 31900	5 4	Tm II	CA69
7631.17	13100.57	0.05	7 L	15271 – *22902*	7½ – 6½	Tm I	CA69
7632.91	13097.58	0.10	3 L	23374 – *31007*	6½ – 5½	Tm I	CA69
7636.77	13090.96	0.15	2 L	25656 – *33292*	2½ – 2½	Tm I	CA69
7653.66	13062.07	0.25	1 L	*24273* – 31926	5 – 5	Tm II	CA69
7654.28	13061.01	0.15	2 L	16957 – *24611*	3½ – 2½	Tm I	CA69
7664.72	13043.22	0.05	6 L	18693 – *26357*	7½ – 6½	Tm I	CA69
7672.65	13029.74	0.20	1 L	23781 – *31454*	4½ – 4½	Tm I	CA69
7687.02	13005.39	0.20	1 L	19753 – *27440*	3½ – 4½	Tm I	CA69
7711.31	12964.42	0.15	2 L	*21713* – 29425	3 – 3	Tm II	CA69
7720.57	12948.87	0.20	1 L	23873 – *31593*	3½ – 2½	Tm I	CA69
7741.47	12913.91	0.05	6 L	*21133* – 28875	6 – 5	Tm II	CA69
7744.09	12909.54	0.15	3 L	16957 – *24701*	3½ – 4½	Tm I	CA69
7763.36	12877.50	0.25	1 L	24418 – *32181*	2½ – 1½	Tm I	CA69
7770.46	12865.73	0.25	1 L			Tm	CA69
7781.71	12847.13	0.20	1 L			Tm	CA69
7791.16	12831.55	0.20	1 L			Tm	CA69
7797.08	12821.81	0.15	3 L			Tm	CA69
7797.76	12820.69	0.25	1 L			Tm	CA69
7803.29	12811.60	0.25	1 L			Tm	CA69
7810.80	12799.29	0.15	2 L			Tm	CA69
7821.47	12781.82	0.20	2 L	23873 – *31694*	3½ – 3½	Tm I	CA69
7825.20	12775.73	0.15	3 L	*22142* – 29967	1 – 2	Tm II	CA69
7834.58	12760.44	0.25	1 L			Tm	CA69
7848.08	12738.49	0.25	1 L			Tm	CA69
7848.77	12737.37	0.25	1 L			Tm	CA69
7869.08	12704.49	0.20	2 L	16742 – *24611*	3½ – 2½	Tm I	CA69
7869.58	12703.68	0.10	3 L			Tm	CA69
7907.35	12643.00	0.10	3 L	17613 – *25520*	4½ – 5½	Tm I	CA69
7913.12	12633.78	0.15	2 L	23781 – *31694*	4½ – 3½	Tm I	CA69
7919.68	12623.32	0.13	2 L	*22457* – 30377	4 – 4	Tm II	CA69
7924.05	12616.36	0.25	1 L			Tm	CA69
7926.01	12613.24	0.25	1 L			Tm	CA69
7934.03	12600.49	0.25	1 L	31510 – *39444*	3½ – 4½	Tm I	CA69
7935.25	12598.55	0.25	1 L			Tm	CA69
7941.37	12588.84	0.25	1 L	24418 – *32359*	2½ – 3½	Tm I	CA69
7941.75	12588.24	0.25	1 L	26646 – *34587*	4½ – 4½	Tm I	CA69
7952.70	12570.91	0.25	1 L	32811 – *40763*	3½ – 4½	Tm I	CA69
7958.89	12561.13	0.20	2 L	16742 – *24701*	3½ – 4½	Tm I	CA69
7965.91	12550.06	0.15	3 L	16742 – *24708*	3½ – 3½	Tm I	CA69
7969.99	12543.64	0.25	1 L	24137 – *32107*	6½ – 5½	Tm I	CA69
7970.90	12542.20	0.25	1 L	*8771* – 16742	2½ – 3½	Tm I	CA69
7988.43	12514.68	0.05	4 L	*21978* – 29967	2 – 2	Tm II	CA69
7993.04	12507.46	0.25	1 L			Tm	CA69
7994.88	12504.53	0.20	1 L			Tm	CA69
8015.19	12472.90	0.25	1 L			Tm	CA69
8018.29	12468.08	0.25	1 L	26439 – *34457*	3½ – 4½	Tm I	CA69
8031.86	12447.01	0.25	1 L			Tm	CA69
8033.15	12445.01	0.25	1 L			Tm	CA69
8040.69	12433.34	0.25	1 L			Tm	CA69
8041.62	12431.90	0.25	1 L			Tm	CA69
8047.50	12422.82	0.25	1 L	*20228* – 28276	5 – 5	Tm II	CA69
8051.34	12416.90	0.25	1 L	*22457* – 30508	4 – 4	Tm II	CA69
8061.22	12401.68	0.20	1 L	24418 – *32479*	2½ – 2½	Tm I	CA69

Tm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
8066.21	12394.01	0.15	2 L	17454 – *25520*	6½ – 5½	Tm I	CA69
8078.36	12375.36	0.25	1 L	23309 – *31388*	5½ – 4½	Tm I	CA69
8081.35	12370.79	0.10	3 L	17454 – *25536*	6½ – 7½	Tm I	CA69
8086.10	12363.52	0.10	3 L	17613 – *25699*	4½ – 4½	Tm I	CA69
8144.37	12275.06	0.10	3 L	23309 – *31454*	5½ – 4½	Tm I	CA69
8156.00	12257.56	0.20	1 L	22791 – *30947*	3½ – 4½	Tm I	CA69
8160.75	12250.42	0.25	1 L			Tm	CA69
8167.16	12240.81	0.10	3 L			Tm	CA69
8169.68	12237.03	0.25	1 L			Tm	CA69
8174.40	12229.97	0.25	1 L			Tm	CA69
8185.04	12214.07	0.25	1 L			Tm	CA69
8185.81	12212.92	0.25	1 L	*8771* – 16957	2½ – 3½	Tm I	CA69
8192.26	12203.31	0.25	1 L			Tm	CA69
8200.03	12191.74	0.25	1 L	18837 – *27037*	4½ – 3½	Tm I	CA69
8209.51	12177.66	0.15	2 L	23309 – *31519*	5½ – 5½	Tm I	CA69
8211.26	12175.07	0.25	1 L			Tm	CA69
8215.89	12168.21	0.10	4 L	25745 – *33961*	2½ – 3½	Tm I	CA69
8221.47	12159.95	0.25	1 L	*23524* – 31745	4 – 3	Tm II	CA69
8227.47	12151.08	0.15	2 L			Tm	CA69
8243.98	12126.75	0.10	3 L	25717 – *33961*	3½ – 3½	Tm I	CA69
8246.02	12123.75	0.25	1 L			Tm	CA69
8253.33	12113.01	0.25	1 L	*21713* – 29967	3 – 2	Tm II	CA69
8305.00	12037.65	0.15	3 L	25656 – *33961*	2½ – 3½	Tm I	CA69
8307.20	12034.46	0.15	3 L			Tm	CA69
8323.54	12010.83	0.15	3 L	25488 – *33812*	5½ – 6½	Tm I	CA69
8343.94	11981.47	0.20	1 L	23873 – *32217*	3½ – 4½	Tm I	CA69
8349.23	11973.88	0.15	3 L			Tm	CA69
8353.20	11968.19	0.10	4 L	15587 – *23941*	5½ – 4½	Tm I	CA69
8355.40	11965.03	0.10	4 L	*17624* – 25980	2 – 3	Tm II	CA69
8356.37	11963.65	0.25	1 L	17343 – *25699*	3½ – 4½	Tm I	CA69
8362.13	11955.40	0.25	1 L			Tm	CA69
8366.17	11949.63	0.15	3 L			Tm	CA69
8367.18	11948.19	0.20	1 L			Tm	CA69
8376.04	11935.55	0.25	1 L	*23524* – 31900	4 – 4	Tm II	CA69
8383.28	11925.24	0.20	1 L	*22457* – 30840	4 – 4	Tm II	CA69
8394.89	11908.75	0.10	4 L			Tm	CA69
8402.26	11898.30	0.25	1 L			Tm	CA69
8406.18	11892.76	0.25	1 L			Tm	CA69
8407.78	11890.49	0.25	1 L			Tm	CA69
8429.86	11859.35	0.20	1 L			Tm	CA69
8438.01	11847.89	0.20	1 L	34297 – *42735*	3½ – 2½	Tm I	CA69
8450.50	11830.38	0.25	1 L	18990 – *27440*	5½ – 4½	Tm I	CA69
8474.21	11797.28	0.25	1 L			Tm	CA69
8481.78	11786.75	0.25	1 L			Tm	CA69
8487.41	11778.93	0.25	1 L			Tm	CA69
8495.95	11767.09	0.25	1 L			Tm	CA69
8508.67	11749.50		5			Tm	SU73
8540.14	11706.21	0.25	1 L			Tm	CA69
8565.62	11671.38	0.25	1 L			Tm	CA69
8572.19	11662.44	0.20	1 L	*8771* – 17343	2½ – 3½	Tm I	CA69
8576.60	11656.44	0.25	1 L	22791 – *31367*	3½ – 3½	Tm I	CA69
8577.99	11654.55	0.25	1 L			Tm	CA69
8581.12	11650.30		4			Tm	SU73
8582.08	11649.00		5 H	*33961* – 42543	3½ – 3½	Tm I	SU73
8586.51	11642.99	0.25	1 L	19753 – *28340*	3½ – 3½	Tm I	CA69
8593.15	11633.99	0.15	2 L	25717 – *34310*	3½ – 4½	Tm I	CA69
8596.97	11628.82	0.25	1 L	22791 – *31388*	3½ – 4½	Tm I	CA69
8598.56	11626.67	0.25	1 L			Tm	CA69
8601.15	11623.17	0.25	1 L			Tm	CA69
8603.55	11619.93	0.20	1 L	18837 – *27440*	4½ – 4½	Tm I	CA69
8606.18	11616.38	0.25	1 L	23873 – *32479*	3½ – 2½	Tm I	CA69
8609.03	11612.53	0.25	1 L			Tm	CA69
8620.83	11596.64	0.25	1 L	25745 – *34365*	2½ – 3½	Tm I	CA69
8646.40	11562.34	0.25	1 L	*20228* – 28875	5 – 5	Tm II	CA69
8650.09	11557.41	0.25	1 L	34085 – *42735*	3½ – 2½	Tm I	CA69
8657.14	11548.00	0.25	1 L			Tm	CA69

Tm—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8660.14	11544.00		5			Tm	SU73
8663.14	11540.00		5	22791 – *31454*	3½ – 4½	Tm I	SU73
8663.97	11538.90		3	22929 – *31593*	2½ – 2½	Tm I	SU73
8676.49	11522.24	0.25	1 L	12457 – *21133*	6 – 6	Tm II	CA69
8681.72	11515.30		50	25130 – *33812*	7½ – 6½	Tm I	SU73
8688.52	11506.29	0.25	1 L			Tm	CA69
8695.62	11496.90		10	17752 – *26448*	2½ – 2½	Tm I	SU73
8705.77	11483.49	0.25	1 L	*21978* – 30684	2 – 3	Tm II	CA69
8729.48	11452.30		1			Tm	SU73
8742.76	11434.90		200	16957 – *25699*	3½ – 4½	Tm I	SU73
8751.72	11423.20		1			Tm	SU73
8754.78	11419.20		10	17613 – *26368*	4½ – 5½	Tm I	SU73
8764.99	11405.90		7	22929 – *31694*	2½ – 3½	Tm I	SU73
8771.22	11397.80		1			Tm	SU73
8772.76	11395.80		1	28448 – *37221*	2½ – 3½	Tm I	SU73
8779.23	11387.40		4			Tm	SU73
8781.82	11384.04	0.20	1 L			Tm	CA69
8802.50	11357.30		3	22791 – *31593*	3½ – 2½	Tm I?	SU73
8802.50	11357.30		3	27377 – *36179*	6½ – 7½	Tm I?	SU73
8812.82	11344.00		30	25130 – *33943*	7½ – 6½	Tm I?	SU73
8812.82	11344.00		30	24137 – *32950*	6½ – 6½	Tm I?	SU73
8821.76	11332.50		5	25488 – *34310*	5½ – 4½	Tm I	SU73
8851.86	11293.97	0.25	1 L			Tm	CA69
8858.27	11285.80		3			Tm	SU73
8859.60	11284.10		4			Tm	SU73
8870.76	11269.90		6	25717 – *34587*	3½ – 4½	Tm I	SU73
8872.10	11268.20		8	26126 – *34999*	2½ – 1½	Tm I	SU73
8877.46	11261.40		2	*25207* – 34085	1½ – 2½	Tm I	SU73
8882.43	11255.10	0.10	3 L			Tm	CA69
8883.78	11253.39	0.10	3 L			Tm	CA69
8902.92	11229.20		100	17454 – *26357*	6½ – 6½	Tm I	SU73
8903.55	11228.40		10	22791 – *31694*	3½ – 3½	Tm I	SU73
8913.63	11215.70		200	17454 – *26368*	6½ – 5½	Tm I	SU73
8920.55	11207.00		2	35261 – *44182*	2½ – 2½	Tm I	SU73
8924.22	11202.40		2	26439 – *35363*	3½ – 4½	Tm I	SU73
8945.86	11175.30		1			Tm	SU73
8948.10	11172.50		2	*22142* – 31090	1 – 2	Tm II	SU73
8951.88	11167.78	0.25	1 L	*24273* – 33224	5 – 5	Tm II	CA69
8954.17	11164.92	0.15	3 L	*17624* – 26578	2 – 3	Tm II	CA69
8954.67	11164.30		20	*31694* – 40649	3½ – 3½	Tm I	SU73
8954.68	11164.29	0.25	1 L	*20228* – 29183	5 – 4	Tm II	CA69
8957.48	11160.80		5	16742 – *25699*	3½ – 4½	Tm I	SU73
8962.70	11154.30		1			Tm	SU73
8963.50	11153.30		1			Tm	SU73
8969.68	11145.62	0.25	1 L			Tm	CA69
8970.59	11144.49	0.20	1 L	*21713* – 30684	3 – 3	Tm II	CA69
8977.99	11135.30		40	24418 – *33395*	2½ – 3½	Tm I	SU73
8981.38	11131.10		2	*8771* – 17752	2½ – 2½	Tm I	SU73
8983.44	11128.55		3 H	23873 – *32856*	3½ – 2½	Tm I	SU73
9003.10	11104.25		2			Tm	SU73
9005.81	11100.90		2	*39542* – 48547	3½ – 4½	Tm I	SU73
9010.11	11095.60		20	21997 *31007*	5½ 5½	Tm I	SU73
9018.00	11085.90	0.25	1 L			Tm	CA69
9029.91	11071.28		2			Tm	SU73
9031.19	11069.71		2	29316 – *38347*	4½ – 5½	Tm I	SU73
9044.35	11053.60		20	25488 – *34532*	5½ – 5½	Tm I	SU73
9055.53	11039.95		20			Tm	SU73
9063.73	11029.96		5	*21133* – 30197	6 – 5	Tm II	SU73
9079.22	11011.15		2000	16456 – *25536*	8½ – 7½	Tm I	SU73
9083.37	11006.11		2	21997 – *31080*	5½ – 5½	Tm I	SU73
9099.46	10986.66		10	25488 – *34587*	5½ – 4½	Tm I	SU73
9104.89	10980.10		100	17343 – *26448*	3½ – 2½	Tm I	SU73
9110.54	10973.29	0.25	1 L			Tm	CA69
9111.32	10972.35		15	30302 – *39413*	2½ – 3½	Tm I	SU73
9111.37	10972.29	0.25	1 L	*21978* – 31090	2 – 2	Tm II	CA69
9118.33	10963.92	0.25	1 L	*24273* – 33391	5 – 4	Tm II	CA69

Tm—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9127.02	10953.48		10	*21713* – 30840	3 – 4	Tm II	SU73
9157.15	10917.44		1			Tm	SU73
9165.85	10907.07		3	29316 – *38482*	4½ – 3½	Tm I	SU73
9180.31	10889.90		4			Tm	SU73
9197.45	10869.60		30			Tm	SU73
9203.25	10862.75		4	25488 – *34691*	5½ – 5½	Tm I	SU73
9211.93	10852.52		10			Tm	SU73
9212.89	10851.39	0.25	1 L	*17624* – 26837	2 – 3	Tm II	CA69
9212.93	10851.34		40	28555 – *37768*	3½ – 4½	Tm I	SU73
9214.87	10849.05		15			Tm	SU73
9222.14	10840.50		2 H			Tm	SU73
9223.50	10838.90		1			Tm	SU73
9224.86	10837.30		2 H			Tm	SU73
9233.47	10827.20		30			Tm	SU73
9236.25	10823.94	0.25	1 L			Tm	CA69
9245.83	10812.73		5 H	33489 – *42735*	1½ – 2½	Tm I	SU73
9253.90	10803.30		1	25745 – *34999*	2½ – 1½	Tm I	SU73
9256.97	10799.71	0.25	1 L			Tm	CA69
9258.99	10797.36		3			Tm	SU73
9267.97	10786.90		2			Tm	SU73
9268.80	10785.93	0.25	1 L	*22457* – 31726	4 – 5	Tm II	CA69
9269.88	10784.67		4	21737 – *31007*	4½ – 5½	Tm I	SU73
9279.82	10773.12	0.15	2 L			Tm	CA69
9284.83	10767.31		80	17752 – *27037*	2½ – 3½	Tm I	SU73
9287.94	10763.70		3			Tm	SU73
9288.57	10762.97	0.20	1 L			Tm	CA69
9293.47	10757.30		2	30915 – *40208*	4½ – 4½	Tm I	SU73
9294.87	10755.68	0.25	1 L			Tm	CA69
9300.26	10749.44		5	13119 – *22419*	4½ – 4½	Tm I	SU73
9303.37	10745.85		4	*39244* – 48547	4½ – 4½	Tm I	SU73
9309.91	10738.30		1			Tm	SU73
9319.72	10727.00		5			Tm	SU73
9341.71	10701.75		1			Tm	SU73
9342.97	10700.30		8	25656 – *34999*	2½ – 1½	Tm I	SU73
9348.45	10694.03		2000	13119 – *22468*	4½ – 5½	Tm I	SU73
9350.73	10691.42	0.25	1 L			Tm	CA69
9353.23	10688.57	0.25	1 L			Tm	CA69
9358.41	10682.65	0.05	6 L			Tm	CA69
9360.35	10680.43		40	24418 – *33778*	2½ – 3½	Tm I	SU73
9366.34	10673.60		1			Tm	SU73
9367.13	10672.70		6	23873 – *33240*	3½ – 3½	Tm I	SU73
9368.80	10670.80		1			Tm	SU73
9369.68	10669.80		2	15587 – *24957*	5½ – 5½	Tm I	SU73
9377.33	10661.10		4	*24246* – 33623	3½ – 3½	Tm I	SU73
9383.66	10653.90		1			Tm	SU73
9403.39	10631.55		20 D			Tm	SU73
9419.12	10613.80		2			Tm	SU73
9425.95	10606.10		8	22791 – *32217*	3½ – 4½	Tm I	SU73
9428.27	10603.50		1			Tm	SU73
9429.60	10602.00		7	22929 – *32359*	2½ – 3½	Tm I	SU73
9439.89	10590.44	0.05	7 L	13119 – *22559*	4½ – 5½	Tm I	CA69
9442.49	10587.53	0.25	1 L			Tm	CA69
9444.48	10585.30		6	24348 – *33793*	4½ – 5½	Tm I	SU73
9458.43	10569.68		2	*39089* – 48547	5½ – 4½	Tm I	SU73
9462.62	10565.00		10			Tm	SU73
9469.33	10557.52	0.25	1 L	*22457* – 31926	4 – 5	Tm II	CA69
9471.89	10554.66	0.20	1 L			Tm	CA69
9485.11	10539.95		20			Tm	SU73
9491.24	10533.14		6	16957 – *26448*	3½ – 2½	Tm I	SU73
9492.99	10531.20		3			Tm	SU73
9493.85	10530.25		3	*21133* – 30627	6 – 5	Tm II	SU73
9502.86	10520.27		20	18837 – *28340*	4½ – 3½	Tm I	SU73
9522.01	10499.11		200	21997 – *31519*	5½ – 5½	Tm I	SU73
9524.01	10496.90		7	18990 – *28514*	5½ – 4½	Tm I	SU73
9542.97	10476.05		2000	24418 – *33961*	2½ – 3½	Tm I	SU73
9543.70	10475.25	0.25	1 L			Tm	CA69

Tm—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9546.70	10471.96		5	26126 – *35673*	2½ – 2½	Tm I?	SU73
9546.70	10471.96		5	26889 – *36435*	4½ – 3½	Tm I?	SU73
9562.55	10454.60		10			Tm	SU73
9568.17	10448.46		2	22791 – *32359*	3½ – 3½	Tm I	SU73
9574.73	10441.30		1			Tm	SU73
9611.39	10401.47	0.20	1 L			Tm	CA69
9612.31	10400.48		2000	24348 – *33961*	4½ – 3½	Tm I	SU73
9630.02	10381.35		10	21737 – *31367*	4½ – 3½	Tm I	SU73
9644.80	10365.44		10	25745 – *35389*	2½ – 3½	Tm I	SU73
9650.62	10359.19		4	21737 – *31388*	4½ – 4½	Tm I	SU73
9656.30	10353.10		1			Tm	SU73
9660.59	10348.50		40	18853 – *28514*	5½ – 4½	Tm I	SU73
9664.90	10343.88		200			Tm	SU73
9666.89	10341.75		1			Tm	SU73
9673.65	10334.53		2	*31519* – 41193	5½ – 6½	Tm I	SU73
9688.09	10319.12		6	22791 – *32479*	3½ – 2½	Tm I	SU73
9690.72	10316.32		4	30972 – *40663*	5½ – 5½	Tm I	SU73
9694.08	10312.75		200	17343 – *27037*	3½ – 3½	Tm I	SU73
9706.01	10300.07		3	16742 – *26448*	3½ – 2½	Tm I	SU73
9716.59	10288.86		80	21737 – *31454*	4½ – 4½	Tm I	SU73
9722.98	10282.10		1			Tm	SU73
9734.73	10269.68		2			Tm	SU73
9744.49	10259.40	0.25	1 L			Tm	CA69
9765.11	10237.73	0.20	1 L			Tm	CA69
9766.72	10236.05	0.25	1 L	*21978* – 31745	2 – 3	Tm II	CA69
9772.87	10229.61		20 H	29316 – *39089*	4½ – 5½	Tm I	SU73
9777.11	10225.17		3 H	32928 – *42705*	1½ – 2½	Tm I	SU73
9781.82	10220.25	0.15	2 L	21737 – *31519*	4½ – 5½	Tm I	CA69
9785.84	10216.05		1			Tm	SU73
9803.60	10197.54		2			Tm	SU73
9806.43	10194.60		30	32928 – *42735*	1½ – 2½	Tm I	SU73
9818.50	10182.06		20	*25207* – 35026	1½ – 2½	Tm I	SU73
9826.33	10173.95		4	21120 – *30947*	3½ – 4½	Tm I	SU73
9827.21	10173.04		200	17613 – *27440*	4½ – 4½	Tm I	SU73
9837.33	10162.57		9			Tm	SU73
9844.47	10155.20		2			Tm	SU73
9850.30	10149.19		2	22929 – *32780*	2½ – 1½	Tm I	SU73
9865.07	10134.00		2 H			Tm	SU73
9909.29	10088.78		6 H	24137 – *34046*	6½ – 7½	Tm I	SU73
9929.93	10067.80		1			Tm	SU73
9933.16	10064.53		70	15587 – *25520*	5½ – 5½	Tm I	SU73
9939.61	10058.00		2			Tm	SU73
9946.49	10051.04		2			Tm	SU73
9947.59	10049.93		8	24418 – *34365*	2½ – 3½	Tm I	SU73
9949.93	10047.57		9	*31519* – 41469	5½ – 6½	Tm I	SU73
9955.62	10041.83		2			Tm	SU73
9957.06	10040.37		30	21737 – *31694*	4½ – 3½	Tm I	SU73
9961.64	10035.76		10	24348 – *34310*	4½ – 4½	Tm I	SU73
9965.06	10032.31		2 H	25717 – *35682*	3½ – 3½	Tm I	SU73
9985.90	10011.38		5			Tm	SU73
9987.90	10009.37		2 H			Tm	SU73

Tm References

CA69 Camus, P., Guelachvili, G., and Vergès, J., Spectrochim. Acta **24B**, 373–388 (1969).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: SISAM spectrometer
Detector: PbS

SU73 Sugar, J., Meggers, W. F. and Camus, P., J. Res. Nat. Bur. Stds. **77A**, 1–43 (1973).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 6.4 m Wadsworth spectrograph
Detector: Photographic

Tungsten

W, Z = 74

W I Normal state of valence electrons $5d^4 6s^2\ ^5D_0$ I.P. = 64400 cm^{-1}

W II Normal state of valence electrons $5d^4 6s\ ^6D_{1/2}$ I.P. = 143000 cm^{-1}

W

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9541.22	10477.97		0 L	19256 – *28797*	4 – 4	W I	LA68
9565.87	10450.97		1 L	19827 – *29393*	3 – 2	W I	LA68
9603.73	10409.77		2 L	20983 – *30586*	2 – 3	W I	LA68
9661.74	10347.27		3 L	18116 – *27778*	2 – 1	W I	LA68
9700.39	10306.04		0 L	20983 – *30683*	2 – 1	W I	LA68
9761.40	10241.63		4 L	22476 – *32238*	4 – 3	W I	LA68
9784.56	10217.38		0 L	*36673* – 46458	2 – 1	W I	LA68
9858.71	10140.54		1 L	28347 – *38206*	3 – 3	W I	LA68
9871.96	10126.93		2 L	*38206* – 48078	3 – 2	W I	LA68
9883.09	10115.52		3 L	19256 – *29139*	4 – 3	W I	LA68
9894.44	10103.91		2 L			W	LA68
9896.64	10101.67		1 L			W	LA68
9918.39	10079.52		1 L	18280 – *28198*	2 – 1	W I	LA68
9947.22	10050.31		4 L	19826 – *29773*	5 – 5	W I	LA68
9975.81	10021.50		2 L			W	LA68
9994.61	10002.65		15 L	19648 – *29643*	6 – 6	W I	LA68
9996.60	10000.66		1 L			W	LA68

W Reference

LA68 Laun, D. D., and Corliss, C. H., J. Res. Nat. Bur. Stds. **72A**, 609–755 (1968).
Source: D.C. arc
Instrument: 22′ Wadsworth spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Xenon

Xe, Z = 54

Xe I Normal state of valence electrons $5p^6\ ^1S_0$ I.P. = 97834 cm^{-1}

Xe II Normal state of valence electrons $5p^5\ ^2P^\circ_{3/2}$ I.P. = 171068 cm^{-1}

Xe

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
2408.112	41514.978		15	88745 – *91153*	1 – 2	Xe I	HU73
2452.859	40757.634		12	88352 – *90805*	2 – 2	Xe I	HU73
2487.112	40196.317		25	*85440* – 87927	1 – 1	Xe I	HU73
2502.125	39955.140		120	77269 – *79771*	1 – 0	Xe I	HU73
2522.979	39624.876		8	*90032* – 92555	1 – 0	Xe I	HU73
2553.309	39154.184		20	88379 – *90932*	1 – 1	Xe I	HU73
2567.380	38939.602		270	78403 – *80970*	3 – 3	Xe I	HU73
2580.753	38737.815		175	88352 – *90932*	2 – 1	Xe I	HU73
2584.211	38685.985		140	89162 – *91747*	2 – 3	Xe I	HU73
2596.926	38496.568		10	*90805* – 93401	2 – 3	Xe I	HU73
2683.458	37255.184		25	88469 – *91153*	3 – 2	Xe I	HU73
2713.051	36848.818		190	79212 – *81926*	2 – 2	Xe I	HU73
2717.475	36788.827		850	77269 – *79987*	1 – 1	Xe I	HU73
2730.380	36614.952		20	*89535* – 92265	3 – 3	Xe I	HU73
2738.352	36508.360		450	*85189* – 87927	2 – 1	Xe I	HU73
2759.258	36231.741		150	*76197* – 78956	0 – 1	Xe I	HU73
2760.976	36209.206		250	88686 – *91447*	2 – 2	Xe I	HU73
2773.546	36045.094		20	88379 – *91153*	1 – 2	Xe I	HU73
2800.990	35691.926		30	88352 – *91153*	2 – 2	Xe I	HU73
2836.354	35246.924		110	*89535* – 92371	3 – 2	Xe I	HU73
2850.642	35070.253		5000 I	78120 – *80970*	2 – 3	Xe I	HU73
2854.025	35028.676		75	89860 – *92714*	0 – 1	Xe I	HU73
2877.410	34744.002		170	87927 – *90805*	1 – 2	Xe I	HU73
2911.663	34335.274		450	*85440* – 88352	1 – 2	Xe I	HU73
2933.917	34074.837		90	*77185* – 80119	1 – 0	Xe I	HU73
2939.106	34014.669		150	*85440* – 88379	1 – 1	Xe I	HU73
2969.485	33666.692		3500 I	78956 – *81926*	1 – 2	Xe I	HU73
2978.262	33567.470		50	88469 – *91447*	3 – 2	Xe I	HU73
3005.304	33265.433		75	87927 – *90932*	1 – 1	Xe I	HU73
3053.604	32739.262		1800 I	77269 – *80323*	1 – 2	Xe I	HU73
3068.350	32581.916		12	88379 – *91447*	1 – 2	Xe I	HU73
3089.808	32355.650		70	*89243* – 92333	2 – 1	Xe I	HU73
3095.794	32293.081		100	88352 – *91447*	2 – 2	Xe I	HU73
3162.903	31607.907		555	*85189* – 88352	2 – 2	Xe I	HU73
3190.346	31336.011		125	*85189* – 88379	2 – 1	Xe I	HU73
3196.471	31275.972		80	*89025* – 92221	3 – 2	Xe I	HU73
3217.741	31069.227		6000 I	79212 – *82430*	2 – 3	Xe I	HU73
3240.059	30855.221		15	*89025* – 92265	3 – 3	Xe I	HU73
3246.481	30794.182		500	*85440* – 88686	1 – 2	Xe I	HU73
3277.352	30504.116		100	88469 – *91747*	3 – 3	Xe I	HU73
3280.434	30475.455		1500 I	*85189* – 88469	2 – 3	Xe I	HU73
3286.033	30423.535		60	88842 – *92128*	0 – 1	Xe I	HU73
3304.540	30253.143		600	*85440* – 88745	1 – 1	Xe I	HU73
3334.089	29985.025		75	*90032* – 93366	1 – 2	Xe I	HU73
3353.257	29813.622		100	*88912* – 92265	4 – 3	Xe I	HU73
3371.809	29649.585		100	*90032* – 93404	1 – 2	Xe I	HU73
3383.730	29545.127		20	88745 – *92128*	1 – 1	Xe I	HU73
3394.884	29448.055		150	88352 – *91747*	2 – 3	Xe I	HU73
3402.238	29384.406		300	*85440* – 88842	1 – 0	Xe I	HU73
3441.789	29046.734		75	88686 – *92128*	2 – 1	Xe I	HU73
3444.812	29021.247		8	*88708* – 92153	2 – 1	Xe I	HU73
3483.772	28696.690		15	89162 – *92646*	2 – 3	Xe I	HU73
3497.721	28582.246		750	*85189* – 88686	2 – 2	Xe I	HU73
3512.895	28458.790		8	*88708* – 92221	2 – 2	Xe I	HU73
3522.455	28381.545		250	78403 – *81926*	3 – 2	Xe I	HU73
3555.780	28115.553		50	*85189* – 88745	2 – 1	Xe I	HU73

Xe—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
3559.178	28088.713		15	89162 – *92722*	2 – 2	Xe I	HU73
3603.502	27743.212		15	*88550* – 92153	1 – 1	Xe I	HU73
3662.258	27298.111		30 B	*88491* – 92153	0 – 1	Xe I?	HU73
3662.456	27296.636		30 B	*88708* – 92371	2 – 2	Xe I?	HU73
3771.010	26510.861		2500 I	80119 – *83890*	0 – 1	Xe I	HU73
3776.608	26471.568		8	88352 – *92128*	2 – 1	Xe I	HU73
3805.718	26269.084		2000 I	78120 – *81926*	2 – 2	Xe I	HU73
3838.686	26043.472		10	*85440* – 89279	1 – 1	Xe I	HU73
3842.046	26020.700		50	*88491* – 92333	0 – 1	Xe I	HU73
3871.784	25820.844		30	88842 – *92714*	0 – 1	Xe I	HU73
3933.960	25412.748		45	88745 – *92679*	1 – 2	Xe I	HU73
3973.576	25159.384		60	*85189* – 89162	2 – 2	Xe I	HU73
3975.716	25145.842		175	88469 – *92445*	3 – 4	Xe I	HU73
4027.145	24824.712		1800 I	78403 – *82430*	3 – 3	Xe I	HU73
4035.033	24776.187		30	88686 – *92722*	2 – 2	Xe I	HU73
4047.099	24702.317		60	88686 – *92734*	2 – 3	Xe I	HU73
4089.926	24443.648		70	*85189* – 89279	2 – 1	Xe I	HU73
4176.914	23934.491		30	88469 – *92646*	3 – 3	Xe I	HU73
4201.158	23796.466		60	87927 – *92128*	1 – 1	Xe I	HU73
4264.386	23443.639		35	88469 – *92734*	3 – 3	Xe I	HU73
4294.445	23279.541		110	88352 – *92646*	2 – 3	Xe I	HU73
4299.393	23252.750		35	88379 – *92679*	1 – 2	Xe I	HU73
4310.408	23193.332		1250 I	78120 – *82430*	2 – 3	Xe I	HU73
4326.837	23105.265		8	88352 – *92679*	2 – 2	Xe I	HU73
4332.802	23073.456		45	87927 – *92260*	1 – 0	Xe I	HU73
4342.407	23022.418		10	88379 – *92722*	1 – 2	Xe I	HU73
4353.307	22964.776		40	*89025* – 93378	3 – 4	Xe I	HU73
4395.931	22742.102		5 B	*89025* – 93421	3 – 3	Xe I?	HU73
4396.009	22741.699		5 B	*89025* – 93421	3 – 4	Xe I?	HU73
4419.996	22618.283		90	*85440* – 89860	1 – 0	Xe I	HU73
4461.710	22406.818		75	*83890* – 88352	1 – 2	Xe I	HU73
4465.781	22386.390		40 B	*88912* – 93377	4 – 5	Xe I?	HU73
4466.505	22382.762		40 B	*88912* – 93378	4 – 4	Xe I?	HU73
4489.154	22269.836		60	*83890* – 88379	1 – 1	Xe I	HU73
4656.372	21470.089		250	77269 – *81926*	1 – 2	Xe I	HU73
4677.508	21373.073		50	79212 – *83890*	2 – 1	Xe I	HU73
4933.941	20262.242		3000 I	78956 – *83890*	1 – 1	Xe I	HU73
4952.285	20187.190		150	*83890* – 88842	1 – 0	Xe I	HU73
5321.057	18788.128		350	80119 – *85440*	0 – 1	Xe I	HU73
5757.109	17365.086		50	88469 – *94226*	3 – 4	Xe I	HU73
5770.174	17325.767		1500	78120 – *83890*	2 – 1	Xe I	HU73
5832.505	17140.611		5 B	*88912* – 94744	4 – 5	Xe I?	HU73
5833.024	17139.084		5 B	*88912* – 94745	4 – 4	Xe I?	HU73
5921.476	16883.069		40	*82430* – 88352	3 – 2	Xe I	HU73
5938.546	16834.541		15	88352 – *94290*	2 – 3	Xe I	HU73
5970.043	16745.724		50	*83890* – 89860	1 – 0	Xe I	HU73
5976.315	16728.150		1500	79212 – *85189*	2 – 2	Xe I	HU73
6039.008	16554.489		125	*82430* – 88469	3 – 3	Xe I	HU73
6227.555	16053.281		1000	79212 – *85440*	2 – 1	Xe I	HU73
6232.748	16039.905		100	78956 – *85189*	1 – 2	Xe I	HU73
6256.295	15979.536		250	*82430* – 88686	3 – 3	Xe I	HU73
6300.875	15866.476		5	87927 – *94228*	1 – 1	Xe I	HU73
6358.523	15722.628		5	87927 – *94286*	1 – 2	Xe I	HU73
6426.166	15557.128		150	*81926* – 88352	2 – 2	Xe I	HU73
6453.610	15490.971		45	*81926* – 88379	2 – 1	Xe I	HU73
6483.988	15418.394		2500 I	78956 – *85440*	1 – 1	Xe I	HU73
6537.654	15291.827		5	*89025* – 95563	3 – 2	Xe I	HU73
6620.828	15099.725		100	77269 – *83890*	1 – 1	Xe I	HU73
6638.212	15060.181		10	89162 – *95801*	2 – 1	Xe I	HU73
6732.150	14850.038		20	*82430* – 89162	3 – 2	Xe I	HU73
6749.650	14811.534		10	89162 – *95912*	2 – 3	Xe I	HU73
6781.344	14742.310		25	*85440* – 92221	1 – 2	Xe I	HU73
6785.719	14732.805		3000 I	78403 – *85189*	3 – 2	Xe I	HU73
6819.044	14660.806		140	*81926* – 88745	2 – 1	Xe I	HU73
6893.049	14503.404		10	*85440* – 92333	1 – 1	Xe I	HU73
6930.905	14424.187		15	*85440* – 92371	1 – 2	Xe I	HU73

Xe—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6949.805	14384.961		35	*83890* – 90840	1 – 1	Xe I	HU73
6959.468	14364.987		375	*83890* 90849	1 2	Xe I	HU73
7020.080	14240.959		800	*83890* – 90910	1 – 2	Xe I	HU73
7068.981	14142.444		1250 I	78120 – *85189*	2 – 2	Xe I	HU73
7076.172	14128.073		50	*85189* – 92265	2 – 3	Xe I	HU73
7115.117	14050.741		5	*85440* – 92555	1 – 0	Xe I	HU73
7182.145	13919.611		15	*85189* – 92371	2 – 2	Xe I	HU73
7236.839	13814.410		10	*81926* – 89162	2 – 2	Xe I	HU73
7320.221	13657.055		2000 I	78120 – *85440*	2 – 1	Xe I	HU73
7381.242	13544.152		250	*80970* – 88352	3 – 2	Xe I	HU73
7498.774	13331.868		75	*80970* – 88469	3 – 3	Xe I	HU73
7919.635	12623.391		2500 I	77269 – *85189*	1 – 2	Xe I	HU73
7940.511	12590.203		300	*79987* – 87927	1 – 1	Xe I	HU73
8028.934	12451.547		75	*80323* – 88352	2 – 2	Xe I	HU73
8056.378	12409.131		20	*80323* – 88379	2 – 1	Xe I	HU73
8146.466	12271.904		50	*80323* – 88469	2 – 3	Xe I	HU73
8155.862	12257.765		100	*79771* – 87927	0 – 1	Xe I	HU73
8170.875	12235.243		375	77269 – *85440*	1 – 1	Xe I	HU73
8191.915	12203.818		50	*80970* – 89162	3 – 2	Xe I	HU73
9018.534	11085.241		I	*81926* – 90944	2 – 3	Xe I	HU70
9175.736	10895.324		I	*79987* – 89162	1 – 2	Xe I	HU70
9223.983	10838.335		I	*68045* – 77269	1 – 1	Xe I	HU70
9292.087	10758.898		I	*79987* – 89279	1 – 1	Xe I	HU70
9337.315	10706.783		I	79212 – *88550*	2 – 1	Xe I	HU70
9496.004	10527.861		I	79212 – *88708*	2 – 2	Xe I	HU70
9507.437	10515.200		I	*79771* – 89279	0 – 1	Xe I	HU70
9534.991	10484.814		I	78956 – *88491*	1 – 0	Xe I	HU70
9752.438	10251.037		I	78956 – *88708*	1 – 2	Xe I	HU70
9812.428	10188.365		I	79212 – *89025*	2 – 3	Xe I	HU70
9873.396	10125.452		I	*79987* – 89860	1 – 0	Xe I	HU70
9891.067	10107.362		I	*80970* – 90862	3 – 4	Xe I	HU70
9913.195	10084.800		I	80119 – *90032*	0 – 1	Xe I	HU70
9936.651	10060.994		I	*80970* – 90907	3 – 3	Xe I	HU70
9973.611	10023.711		I	*80970* – 90944	3 – 3	Xe I	HU70
9973.694	10023.628		I	*80970* – 90944	3 – 4	Xe I	HU70

Xe References

HU70 Humphreys, C. J., and Paul, E., Jr., J. Opt. Soc. Amer. **60,** 1302–1310 (1970).

Source: Electrodeless discharge tube (2.45 GHz)

All wavelengths determined interferometrically.

HU73 Humphreys, C. J., J. Phys. Chem. Ref. Data **2,** 519–529 (1973).

Source: Electrodeless discharge tube (2.45 GHz)

Instrument: 1 m Littrow spectrometer

Detector: PbS cooled with liquid nitrogen

Uncertainty in σ: *Not given—observed wavenumbers calculated from established energy levels (see HU70)*

Additional References

Meggers, W. F., J. Res. Nat. Bur. Stds. **14,** 487 (1935).

Sittner, W. R., and Peck, E. R., J. Opt. Soc. Amer. **39,** 474 (1949).

Humphreys, C. J., and Kostkowski, H. J., J. Res. Nat. Bur. Stds. **49,** 73 (1952).

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Humphreys, C. J., and Paul, E., Jr., NAVWEPS report 5996, 23 (1960).

Humphreys, C. J., Paul, E., Jr., Cowan, R. D., and Andrew, K. L., J. Opt. Soc. Amer. 57, 855 (1967).

Morillon, C., Spectrochim. Acta **28B,** 527 (1972).

Ytterbium

Yb, Z = 70

Yb I Normal state of valence electrons $6s^2\ {}^1S_0$ I.P. = 50441 cm^{-1}

Yb II Normal state of valence electrons $6s\ {}^2S_{1/2}$ I.P. = 98270 cm^{-1}

Yb

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4101.06	24377.26		250	22960 – *27061*	1½ – ½	Yb II	ME67
6059.53	16498.42		1500	24332 – *30392*	2½ – 1½	Yb II	ME67
7431.46	13452.62		300	22960 – *30392*	1½ – 1½	Yb II	ME67
7876.53	12692.48		450	*40035* – 47912	3½ – 3½	Yb II	ME67
8615.41	11603.94		20			Yb I	ME66
8648.86	11559.05		5	24332 – *32981*	2½ – 1½	Yb II	ME67
8736.80	11442.70		1			Yb II	ME67
8847.31	11299.78		5 H			Yb II	ME67
8864.53	11277.83		1	*40035* – 48900	3½ – 3½	Yb II	ME67
8876.78	11262.27		250			Yb I	ME66
9038.91	11060.25		2 H			Yb II	ME67
9046.44	11051.05		2	*47329* – 56375	2½ – 2½	Yb II	ME67
9059.47	11035.15		1 H			Yb II	ME67
9069.15	11023.37		1 H			Yb II	ME67
9085.98	11002.95		4	*54640* – 63726	4½ – 4½	Yb II	ME67
9104.58	10980.47		3 H			Yb II	ME67
9121.64	10959.94		1 H			Yb II	ME67
9135.62	10943.17		1	*55462* – 64598	3½ – 3½	Yb II	ME67
9186.19	10882.92		1 H			Yb II	ME67
9208.76	10856.25		1	*48556* – 57765	3½ – 4½	Yb II	ME67
9217.86	10845.53		3 H			Yb II	ME67
9230.77	10830.36		100			Yb II	ME67
9231.84	10829.11		40			Yb II	ME67
9247.46	10810.82		5 H			Yb II	ME67
9254.61	10802.47		4	*56621* – 65875	5½ – 6½	Yb II	ME67
9277.25	10776.11		1	*44438* – 53715	3½ – 3½	Yb II	ME67
9278.73	10774.38		1			Yb II	ME67
9282.43	10770.10		2000			Yb I	ME66
9295.46	10754.99		1	*53716* – 63011	2½ – 1½	Yb II	ME67
9303.35	10745.87		3	*54640* – 63944	4½ – 5½	Yb II	ME67
9315.43	10731.94		3			Yb II	ME67
9319.10	10727.72		200			Yb I	ME66
9324.34	10721.68		3 H			Yb II	ME67
9328.35	10717.07		2			Yb II	ME67
9328.40	10717.02		2			Yb I	ME66
9333.12	10711.60		80	*63706* – 73039	½ – ½	Yb II	KA73
9351.08	10691.02		1 H	*61442* – 70793	5½ – 5½	Yb II	ME67
9352.67	10689.20		2 H			Yb II	ME67
9361.92	10678.64		1	*66189* – 75550	1½ – 2½	Yb II	ME67
9363.60	10676.73		30	*44940* – 54304	1½ – ½	Yb II?	ME67
9363.60	10676.73		30	56375 – *65739*	2½ – 2½	Yb II?	ME67
9372.75	10666.30		2 H			Yb II	ME67
9385.90	10651.36		5	*64365* – 73750	4½ – 4½	Yb II?	ME67
9385.90	10651.36		5	75058 – *84444*	2½ – 3½	Yb II?	ME67
9397.38	10638.35		1	*65594* – 74991	2½ – 1½	Yb II	ME67
9401.90	10633.24		5			Yb I	ME66
9402.20	10632.89		400	54304 – *63706*	½ – ½	Yb II	KA73
9406.43	10628.11		4	*57798* – 67204	2½ – 1½	Yb II	ME67
9428.93	10602.75		2 H			Yb II	ME67
9444.86	10584.87		1	*64191* – 73636	1½ – ½	Yb II	ME67
9448.55	10580.74		1	*43956* – 53404	2½ – 2½	Yb II	ME67
9454.12	10574.50		2 H	*58484* – 67938	4½ – 3½	Yb II	ME67
9457.69	10570.51		1			Yb II	ME67
9460.3	10567.5		1			Yb I	ME66
9460.46	10567.42		3	*55462* – 64923	3½ – 4½	Yb II	ME67
9462.21	10565.46		4	*40035* – 49498	3½ – 2½	Yb II	ME67

Yb—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9470.26	10556.48		2 H	*56480* – 65950	4½ – 4½	Yb II	ME67
9476.46	10546.24		1			Yb II	ME67
9478.07	10547.78		4	*58672* – 68150	½ – 1½	Yb II	ME67
9506.13	10516.65		40			Yb II	ME67
9506.17	10516.61		60			Yb I	ME66
9518.88	10502.56		1	*53644* – 63163	3½ – 4½	Yb II	ME67
9520.22	10501.08		4	*56056* – 65577	2½ – 3½	Yb II	ME67
9530.25	10490.03		1			Yb II	ME67
9534.31	10485.56		2	*54192* – 63726	5½ – 4½	Yb II	ME67
9541.97	10477.15		1 H			Yb II	ME67
9560.46	10456.88		1			Yb II	ME67
9561.38	10455.88		2			Yb II	ME67
9570.28	10446.15		1	*38342* – 47912	4½ – 3½	Yb II	ME67
9571.09	10445.27		4 H			Yb II	ME67
9589.31	10425.42		2	*53644* – 63234	3½ – 2½	Yb II	ME67
9597.84	10416.16		5	*64970* – 74568	3½ – 4½	Yb II	ME67
9599.69	10414.15		1	*62163* – 71763	2½ – 1½	Yb II	ME67
9602.23	10411.40		10	*42915* – 52517	5½ – 5½	Yb II	ME67
9614.62	10397.98		3			Yb II	ME67
9614.72	10397.88		4			Yb I	ME66
9620.48	10391.64		1 H			Yb II	ME67
9623.07	10388.85		2 H			Yb II	ME67
9646.24	10363.89		3			Yb II	ME67
9663.28	10345.62		1 H			Yb II	ME67
9664.80	10343.99		4 H			Yb II	ME67
9664.94	10343.85		3			Yb I	ME66
9666.88	10341.77		7			Yb I	ME66
9669.01	10339.49		2 H			Yb II	ME67
9671.01	10337.35		1 H			Yb II	ME67
9679.07	10328.74		2 H			Yb II	ME67
9680.39	10327.33		1			Yb II	ME67
9685.70	10321.68		500			Yb I	ME66
9712.30	10293.40		2 H			Yb II	ME67
9721.76	10283.38		2			Yb II	ME67
9728.92	10275.82		1			Yb II	ME67
9736.93	10267.37		300			Yb I	ME66
9743.98	10259.93		3 H			Yb II	ME67
9745.85	10257.97		1 H			Yb II	ME67
9751.66	10251.85		10	*54192* – 63944	5½ – 5½	Yb II	ME67
9760.76	10242.30		1 H	48900 – *58661*	3½ – 2½	Yb II	ME67
9779.20	10222.98		2 H	77606 – *87385*	2½ – 3½	Yb II	ME67
9789.39	10212.34		1 H			Yb II	ME67
9789.46	10212.27		1			Yb I	ME66
9802.27	10198.92		1 H	*51248* – 61051	2½ – 3½	Yb II	ME67
9811.31	10189.53		10 H			Yb II	ME67
9814.68	10186.03		5	*49008* – 58823	3½ – 2½	Yb II	ME67
9827.84	10172.39		2			Yb II	ME67
9831.39	10168.71		1 H			Yb II	ME67
9832.64	10167.42		1 H			Yb II	ME67
9842.12	10157.63		1	*65149* – 74991	½ – 1½	Yb II	ME67
9850.57	10148.91		3	*56500* – 66351	3½ – 2½	Yb II	ME67
9854.08	10145.30		4 H			Yb II	ME67
9862.79	10136.34		3 H			Yb II	ME67
9887.64	10110.87		10			Yb I	ME66
9891.33	10107.09		1	*53120* – 63011	2½ – 1½	Yb II	ME67
9895.10	10103.24		3	*56500* – 66395	3½ – 2½	Yb II	ME67
9897.89	10100.39		1 H			Yb II	ME67
9911.36	10086.67		1			Yb II	ME67
9928.96	10068.79		2 H			Yb II	ME67
9930.26	10067.47		1	*43007* – 52938	½ – 1½	Yb II	ME67
9931.41	10066.30		5	*53716* – 63647	2½ – 1½	Yb II	ME67
9934.45	10063.22		2 H			Yb II	ME67
9950.54	10046.95		2			Yb II	ME67
9957.53	10039.90		1	*54640* – 64598	4½ – 3½	Yb II	ME67
9964.82	10032.55		50	*45737* – 55702	1½ – 1½	Yb II	ME67
9976.61	10020.70		1			Yb II	ME67

Yb—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
9980.51	10016.78		15	*52880* – 62861	4½ – 5½	Yb II	ME67
9989.31	10007.96		3			Yb II	ME67
9993.88	10003.38		4	*56088* – 66082	4½ – 5½	Yb II	ME67

Yb References

ME66 Meggers, W. F., and Corliss, C. H., J. Res. Nat. Bur. Stds. **70A**, 63–106 (1966).
Source: Ring discharge and electrodeless discharge tube (2.45 GHz)
Instrument: 6.5 m Wadsworth spectrograph
Detector: Photographic
Uncertainty in λ: Stated as being 0.01 Å for most cases

ME67 Meggers, W. F., J. Res. Nat. Bur. Stds. **71A**, 396–544 (1967).
For other details see ME66

KA73 Kaufman, V., and Sugar, J., J. Opt. Soc. Amer. **63**, 1168–1172 (1973).
Used some observations of ME67

Yttrium

Y, Z = 39

Y I Normal state of valence electrons $5s^24d\ ^2D_{3/2}$ I.P. = 51447 cm^{-1}

Y II Normal state of valence electrons $5s^2\ ^1S_0$ I.P. = 98690 cm^{-1}

Y

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8704.8	11484.8			15994 – *24698*	1½ – ½	Y I	BO55
9153.9	10921.3			15326 – *24480*	2½ – 1½	Y I	BO55
9192.0	10876.0			15326 – *24518*	2½ – 2½	Y I	BO55
9270.0	10784.5			15476 *24746*	2½ 2½	Y I	BO55
9323.5	10722.6			*24518* – 33842	2½ – 1½	Y I	BO55
9357.8	10683.4			*24899* – 34257	3½ – 2½	Y I	BO55
9426.8	10605.2			14018 – *23445*	1 – 0	Y II	BO55
9484.9	10540.2			*24746* – 34231	2½ – 1½	Y I	BO55
9510.8	10511.5			*24746* – 34257	2½ – 2½	Y I	BO55
9621.6	10390.4			*24899* – 34521	3½ – 2½	Y I	BO55
9637.2	10373.7			*24518* – 34155	2½ – 1½	Y I	BO55
9678.1	10329.8			14098 – *23776*	2 – 1	Y II	BO55
9712.7	10293.0			*24518* – 34231	2½ – 1½	Y I	BO55
9758.0	10245.2			14018 – *23776*	1 – 1	Y II	BO55
9814.3	10186.4			14832 – *24647*	2 – 2	Y II	BO55
9892.9	10105.5			13883 – *23776*	0 – 1	Y II	BO55

Y Reference

BO55 Bovey, L. F. H., Proc. Phys. Soc. (London). **68A**, 79–80 (1955).
Source: D.C. arc
Instrument: 3 m Eagle spectrograph
Detector: Photographic
Uncertainty in σ: Not given

Zinc

Zn, Z = 30

Zn I Normal state of valence electrons $3d^{10}4s^2\ {}^1S_0$ I.P. = 75768 cm^{-1}

Zn II Normal state of valence electrons $3d^{10}4s\ {}^2S_{1/2}$ I.P. = 144893 cm^{-1}

Zn

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
4101.442	24375.02	0.02		*61330* – 65432	2 – 1	Zn I	JO68
4157.880	24044.16	0.02		*61274* – 65432	1 – 1	Zn I	JO68
4184.426	23891.62	0.02		*61247* – 65432	0 – 1	Zn I	JO68
6057.031	16505.23	0.02		62776 – *68834*	3 – 4	Zn I	JO68
6061.897	16491.98	0.02		62772 – *68833*	2 – 3	Zn I	JO68
6065.034	16483.45	0.02		62768 – *68833*	1 – 2	Zn I	JO68
6375.27	15681.3	0.02		62458 – *68833*	2 –	Zn I	JO68
6375.43	15680.92	0.02		62458 – *68833*	2 – 3	Zn I	JO68
7121.220	14038.70	0.02		55789 – *62910*	0 – 1	Zn I	JO68
7248.39	13792.4	0.02		*61330* – 68579	2 – 1	Zn I	JO68
7249.855	13789.61	0.02		*61330* – 68580	2 – 2	Zn I	JO68
7252.231	13785.09	0.02		*61330* – 68583	2 – 3	Zn I	JO68
7304.750	13685.98	0.02		*61274* – 68579	1 – 1	Zn I	JO68
7306.266	13683.14	0.02		*61274* – 68580	1 – 2	Zn I	JO68
7331.266	13636.48	0.02		*61247* – 68579	0 – 1	Zn I	JO68
7575.632	13196.61	0.02		53672 – *61247*	1 – 0	Zn I	JO68
7602.142	13150.59	0.02		53672 – *61274*	1 – 1	Zn I	JO68
7658.610	13053.63	0.02		53672 – *61330*	1 – 2	Zn I	JO68
8877.593	11261.234	0.01		62458 – *71336*	2 – 3	Zn I	JO68
9043.818	11054.249	0.01		*46745* – 55789	1 – 0	Zn I	JO68
9882.131	10116.505	0.01		*61330* – 71213	2 – 2	Zn I	JO68
9883.401	10115.202	0.01		*61330* – 71214	2 – 3	Zn I	JO68
9937.713	10059.920	0.01		*61274* – 71212	1 – 1	Zn I	JO68
9938.560	10059.062	0.01		*61274* – 71213	1 – 2	Zn I	JO68
9964.276	10033.102	0.01		*61247* – 71212	0 – 1	Zn I	JO68

Zn Reference

JO68 Johansson, I., and Contreras, R., Ark. Fys. **37**, 513–520 (1968).

Source: Hollow cathode

Instrument: a) 1 m Pfund spectrometer for wavelengths above 13000 Å
b) 5.5 m Czerny-Turner spectrograph for wavelengths below 12000 Å

Detector: a) PbS
b) Photographic

Note: No intensity figures given

Additional References

Fisher, R. A., Knoff, W. C., and Kinney, F. E., Astrophys. J. **130**, 683 (1959).

Zirconium

Zr, Z = 40

Zr I Normal state of valence electrons $4d^2 5s^2\ ^3F_2$ I.P. = 55145 cm^{-1}

Zr II Normal state of valence electrons $4d^2 5s\ ^4F_{3/2}$ I.P. = 105900 cm^{-1}

Zr

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
3685.34	27127.12	0.05	4 U			Zr	TA76
3793.26	26355.34	0.02	43			Zr	TA76
3888.52	25709.69	0.20	3 H			Zr	TA76
3894.73	25668.70	0.20	3 H			Zr	TA76
3944.74	25343.28	0.02	15			Zr	TA76
3980.08	25118.25	0.05	38			Zr	TA76
4083.38	24482.82	0.02	42	12760 – *16843*	4 – 3	Zr I	TA76
4121.04	24259.08	0.02	32	*18276* – 22398	5 – 4	Zr I	TA76
4289.27	23307.61	0.05	2	*17511* – 21801	2 – 1	Zr I	TA76
4301.93	23239.02	0.05	6			Zr	TA76
4312.13	23184.05	0.10	3			Zr	TA76
4312.52	23181.96	0.02	25	*17832* – 22145	4 – 3	Zr I	TA76
4340.34	23033.37	0.05	14	12503 – *16843*	3 – 3	Zr I	TA76
4500.70	22212.69	0.02	22			Zr	TA76
4501.68	22207.85	0.05	4	12342 – *16843*	4 – 3	Zr I	TA76
4507.73	22178.05	0.02	10			Zr	TA76
4521.52	22110.41	0.02	25	*17422* – 21943	3 – 2	Zr I	TA76
4534.94	22044.98	0.02	19	15932 – *20466*	2 – 2	Zr I	TA76
4549.25	21975.63	0.05	3			Zr	TA76
4564.67	21901.40	0.05	4			Zr	TA76
4565.21	21898.81	0.02	10	*17832* – 22398	4 – 4	Zr I	TA76
4587.17	21793.97	0.02	15	15932 – *20519*	2 – 1	Zr I	TA76
4650.58	21496.81	0.10	2 H			Zr	TA76
4655.97	21471.93	0.02	170	11640 – *16296*	2 – 2	Zr I	TA76
4723.10	21166.74	0.02	20	*17422* – 22145	3 – 3	Zr I	TA76
4741.35	21085.27	0.02	17	*17059* – 21801	2 – 1	Zr I	TA76
4783.37	20900.05	0.02	9	12772 – *17556*	5 – 4	Zr I	TA76
4795.64	20846.57	0.02	100	12760 – *17556*	4 – 4	Zr I	TA76
4796.64	20842.23	0.10	2			Zr	TA76
4827.01	20711.09	0.10	3			Zr	TA76
4831.63	20691.29	0.02	28	17142 – *21974*	2 – 1	Zr I	TA76
4836.76	20669.34	0.10	2			Zr	TA76
4841.46	20649.28	0.10	2	*17556* – 22398	4 – 4	Zr I	TA76
4884.04	20469.25	0.02	18	*17059* – 21943	2 – 2	Zr I	TA76
4887.74	20453.76	0.02	200	11956 – *16843*	3 – 3	Zr I	TA76
4894.80	20424.26	0.02	80	*36173* – 41068	6 – 5	Zr I	TA76
4914.50	20342.39	0.05	28	17059 – *21974*	1 – 1	Zr I	TA76
4918.87	20324.31	0.05	6	12503 – *17422*	3 – 3	Zr I	TA76
4928.69	20283.82	0.05	4	14697 – *19625*	3 – 3	Zr I	TA76
4946.55	20210.58	0.02	20			Zr	TA76
4981.46	20068.95	0.10	6			Zr	TA76
4993.74	20019.60	0.10	3			Zr	TA76
5004.75	19975.55	0.10	2	37701 – *42706*	3 – 2	Zr I	TA76
5008.38	19961.08	0.05	8 W	12503 – *17511*	3 – 2	Zr I	TA76
5014.06	19938.46	0.02	14	*16786* – 21801	1 – 1	Zr I	TA76
5016.27	19929.68	0.02	12 U			Zr	TA76
5035.86	19852.15	0.10	5			Zr	TA76
5052.90	19785.20	0.05	3	12503 – *17556*	3 – 4	Zr I	TA76
5069.97	19718.59	0.10	4			Zr	TA76
5072.11	19710.27	0.05	2 W	12760 – *17832*	4 – 4	Zr I	TA76
5079.89	19680.08	0.02	20	12342 – *17422*	4 – 3	Zr I	TA76
5097.97	19610.29	0.10	5	37701 – *42799*	3 – 3	Zr I	TA76
5103.42	19589.34	0.05	40	11956 – *17059*	3 – 2	Zr I	TA76
5105.85	19580.02	0.05	3			Zr	TA76
5146.32	19426.05	0.02	75	11640 – *16786*	2 – 1	Zr I	TA76
5152.29	19403.54	0.10	3			Zr	TA76

Zr—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
5156.69	19386.98	0.10	3	*16786* – 21943	1 – 2	Zr I	TA76
5174.27	19321.11	0.10	5			Zr	TA76
5203.33	19213.21	0.02	40	11640 – *16843*	2 – 3	Zr I	TA76
5213.96	19174.04	0.02	240	12342 – *17556*	4 – 4	Zr I	TA76
5220.67	19149.39	0.05	4			Zr	TA76
5224.46	19135.50	0.20	4			Zr	TA76
5267.33	18979.76	0.02	5	18738 – *24006*	5 – 4	Zr I	TA76
5310.31	18826.14	0.05	24	12503 – *17813*	3 – 2	Zr I	TA76
5316.45	18804.40	0.02	8			Zr	TA76
5331.68	18750.69	0.20	3			Zr	TA76
5339.91	18721.79	0.10	4			Zr	TA76
5383.59	18569.89	0.02	4			Zr	TA76
5419.01	18448.51	0.02	70			Zr	TA76
5450.13	18343.17	0.02	75			Zr	TA76
5452.03	18336.78	0.02	120	*40346* – 45798	3 – 2	Zr I	TA76
5461.72	18304.24	0.05	5			Zr	TA76
5465.91	18290.21	0.05	9			Zr	TA76
5477.63	18251.08	0.05	3			Zr	TA76
5482.89	18233.57	0.02	75	12760 – *18243*	4 – 3	Zr I	TA76
5490.43	18208.53	0.05	4	12342 – *17832*	4 – 4	Zr I	TA76
5519.26	18113.42	0.10	15			Zr	TA76
5526.62	18089.29	0.05	4			Zr	TA76
5539.27	18047.98	0.02	6			Zr	TA76
5548.63	18017.54	0.02	18			Zr	TA76
5555.49	17995.29	0.02	7	11956 – *17511*	3 – 2	Zr I	TA76
5561.25	17976.65	0.02	30			Zr	TA76
5562.79	17971.67	0.02	20	*35090* – 40653	3 – 3	Zr I	TA76
5570.71	17946.12	0.02	23			Zr	TA76
5585.61	17898.25	0.05	3	11258 – *16843*	3 – 3	Zr I	TA76
5593.98	17871.47	0.02	6			Zr	TA76
5600.00	17852.26	0.02	50	11956 – *17556*	3 – 4	Zr I	TA76
5607.89	17827.14	0.02	28	17142 – *22750*	2 – 2	Zr I	TA76
5608.73	17824.47	0.05	9	*31850* – 37459	1 – 2	Zr I	TA76
5617.05	17798.07	0.02	10			Zr	TA76
5620.54	17787.02	0.10	6 W			Zr	TA76
5643.73	17713.93	0.02	23			Zr	TA76
5657.02	17672.32	0.02	5 W			Zr	TA76
5670.49	17630.34	0.05	15 U			Zr	TA76
5684.38	17587.26	0.05	3			Zr	TA76
5686.32	17581.26	0.02	11			Zr	TA76
5688.06	17575.88	0.05	14 U			Zr	TA76
5701.81	17533.49	0.02	12			Zr	TA76
5707.13	17517.15	0.02	8 W			Zr	TA76
5720.32	17476.76	0.02	7			Zr	TA76
5734.41	17433.82	0.05	4 W			Zr	TA76
5740.14	17416.41	0.02	11	12503 – *18243*	3 – 3	Zr I	TA76
5788.05	17272.25	0.05	2	*36152* – 41940	7 – 6	Zr I	TA76
5789.19	17268.85	0.02	120	11640 – *17429*	2 – 1	Zr I	TA76
5803.04	17227.63	0.02	13			Zr	TA76
5814.42	17193.92	0.02	90	17752 – *23567*	4 – 3	Zr I	TA76
5827.32	17155.85	0.02	14	11016 – *16843*	2 – 3	Zr I	TA76
5830.20	17147.38	0.02	9			Zr	TA76
5857.40	17067.75	0.02	160	11956 – *17813*	3 – 2	Zr I	TA76
5871.06	17028.04	0.02	150	11640 – *17511*	2 – 2	Zr I	TA76
5876.47	17012.37	0.02	9	11956 – *17832*	3 – 4	Zr I	TA76
5885.69	16985.72	0.02	15			Zr	TA76
5890.25	16972.57	0.02	66			Zr	TA76
5893.03	16964.56	0.02	35			Zr	TA76
5895.43	16957.65	0.02	12			Zr	TA76
5901.20	16941.07	0.02	190	12342 – *18243*	4 – 3	Zr I	TA76
5905.80	16927.88	0.05	4 U			Zr	TA76
5908.22	16920.94	0.02	33	17752 – *23660*	4 – 3	Zr I	TA76
5909.47	16917.36	0.02	12			Zr	TA76
5934.61	16845.70	0.02	8	12342 – *18276*	4 – 5	Zr I	TA76
5936.18	16841.24	0.02	12			Zr	TA76
5940.47	16829.08	0.02	5			Zr	TA76

Zr—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
5942.46	16823.45	0.05	3	17142 – *23085*	2 – 2	Zr I	TA76
5957.36	16781.37	0.02	7			Zr	TA76
5998.13	16667.30	0.05	3 U			Zr	TA76
6002.48	16655.22	0.05	3 U			Zr	TA76
6017.99	16612.30	0.05	2	17228 – *23246*	2 – 1	Zr I	TA76
6042.25	16545.60	0.02	60	15932 – *21974*	2 – 1	Zr I	TA76
6058.26	16501.88	0.02	9			Zr	TA76
6074.69	16457.24	0.05	3	21801 – *27876*	1 – 2	Zr I	TA76
6089.32	16417.70	0.05	2			Zr	TA76
6118.14	16340.37	0.02	31	14348 – *20466*	2 – 2	Zr I	TA76
6136.25	16292.14	0.02	15	17752 – *23889*	4 – 3	Zr I	TA76
6163.81	16219.30	0.02	8	11258 – *17422*	3 – 3	Zr I	TA76
6172.98	16195.20	0.02	31	11640 – *17813*	2 – 2	Zr I	TA76
6221.32	16069.36	0.02	17			Zr	TA76
6259.93	15970.25	0.05	3	17059 – *23319*	1 – 2	Zr I	TA76
6275.10	15931.64	0.05	5			Zr	TA76
6287.27	15900.80	0.02	125	11956 – *18243*	3 – 3	Zr I	TA76
6297.87	15874.04	0.02	30	11258 – *17556*	3 – 4	Zr I	TA76
6322.59	15811.98	0.02	40			Zr	TA76
6343.94	15758.76	0.02	3	14123 – *20466*	1 – 2	Zr I	TA76
6349.90	15743.97	0.02	15			Zr	TA76
6358.36	15723.02	0.02	95			Zr	TA76
6368.49	15698.02	0.05	2			Zr	TA76
6388.51	15648.82	0.05	5			Zr	TA76
6396.17	15630.08	0.02	7	14123 – *20519*	1 – 1	Zr I	TA76
6405.52	15607.27	0.02	5	11016 – *17422*	2 – 3	Zr I	TA76
6449.68	15500.41	0.05	3	22145 – *28595*	3 – 2	Zr I	TA76
6458.40	15479.48	0.05	2			Zr	TA76
6495.09	15392.04	0.05	6	11016 – *17511*	2 – 2	Zr I	TA76
6496.71	15388.20	0.05	4 W			Zr	TA76
6500.02	15380.36	0.02	5			Zr	TA76
6503.19	15372.86	0.05	3	21943 – *28446*	2 – 1	Zr I	TA76
6518.29	15337.25	0.05	7 U	17142 – *23660*	2 – 3	Zr I	TA76
6529.89	15310.01	0.02	7			Zr	TA76
6544.54	15275.73	0.10	8 U	10885 – *17429*	1 – 1	Zr I	TA76
6574.34	15206.49	0.02	8 U	11258 – *17832*	3 – 4	Zr I	TA76
6585.63	15180.42	0.05	2			Zr	TA76
6600.10	15147.14	0.05	2	*34287* – 40887	4 – 3	Zr I	TA76
6602.88	15140.76	0.02	13	11640 – *18243*	2 – 3	Zr I	TA76
6603.46	15139.43	0.05	7	22398 – *29001*	4 – 5	Zr I	TA76
6604.41	15137.26	0.05	1	22145 – *28749*	3 – 4	Zr I	TA76
6634.82	15067.88	0.02	140	17752 – *24387*	4 – 3	Zr I	TA76
6645.87	15042.82	0.02	20	21801 – *28446*	1 – 1	Zr I	TA76
6651.28	15030.59	0.02	30	21943 – *28595*	2 – 2	Zr I	TA76
6658.14	15015.10	0.05	3	*28818* – 35476	3 – 3	Zr I	TA76
6668.14	14992.58	0.05	4			Zr	TA76
6672.69	14982.36	0.02	30	22145 – *28818*	3 – 3	Zr I	TA76
6690.35	14942.81	0.02	23			Zr	TA76
6720.68	14875.38	0.02	23	21726 – *28446*	0 – 1	Zr I	TA76
6724.63	14866.64	0.02	20	22398 – *29122*	4 – 4	Zr I	TA76
6729.07	14856.83	0.05	5			Zr	TA76
6730.47	14853.74	0.05	1			Zr	TA76
6738.36	14836.35	0.05	5			Zr	TA76
6785.12	14734.10	0.02	7			Zr	TA76
6793.95	14714.95	0.02	47	21801 – *28595*	1 – 2	Zr I	TA76
6797.42	14707.44	0.10	40 U			Zr	TA76
6810.09	14680.08	0.02	3			Zr	TA76
6817.15	14664.88	0.02	7			Zr	TA76
6824.76	14648.52	0.02	5	*29535* – 36360	5 – 5	Zr I	TA76
6854.54	14584.88	0.02	13			Zr	TA76
6856.02	14581.73	0.02	28			Zr	TA76
6863.04	14566.82	0.02	33			Zr	TA76
6865.00	14562.66	0.02	15	12760 – *19625*	4 – 3	Zr I	TA76
6874.27	14543.02	0.02	65	21943 – *28818*	2 – 3	Zr I	TA76
6928.30	14429.61	0.02	18	10885 – *17813*	1 – 2	Zr I	TA76
6949.70	14385.18	0.05	4			Zr	TA76

Zr—Continued

σ (cm^{-1})	λ (Å)	Δσ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
6977.29	14328.29	0.02	92	22145 – *29122*	3 – 4	Zr I	TA76
6985.13	14312.21	0.02	30	11258 – *18243*	3 – 3	Zr I	TA76
7029.65	14221.57	0.02	5			Zr	TA76
7044.90	14190.78	0.02	8			Zr	TA76
7058.08	14164.28	0.02	270	14791 – *21849*	4 – 3	Zr I	TA76
7075.22	14129.97	0.05	20			Zr	TA76
7079.76	14120.91	0.05	5			Zr	TA76
7086.92	14106.64	0.02	55	15932 – *23018*	2 – 1	Zr I	TA76
7126.94	14027.43	0.02	7 W			Zr	TA76
7137.50	14006.68	0.02	82	22398 – *29535*	4 – 5	Zr I	TA76
7138.66	14004.40	0.02	80			Zr	TA76
7155.57	13971.31	0.20	275	14988 – *22144*	5 – 4	Zr I	TA76
7226.84	13833.52	0.02	58	11016 – *18243*	2 – 3	Zr I	TA76
7272.53	13746.61	0.02	15	18738 – *26011*	5 – 4	Zr I	TA76
7273.66	13744.48	0.05	2			Zr	TA76
7283.31	13726.27	0.02	16	12342 – *19625*	4 – 3	Zr I	TA76
7352.79	13596.56	0.02	32	14791 – *22144*	4 – 4	Zr I	TA76
7366.74	13570.81	0.05	25			Zr	TA76
7367.64	13569.16	0.05	9	11956 – *19323*	3 – 2	Zr I	TA76
7387.74	13532.24	0.05	75	15932 – *23319*	2 – 2	Zr I	TA76
7394.61	13519.67	0.02	75			Zr	TA76
7406.95	13497.14	0.02	10			Zr	TA76
7444.24	13429.53	0.02	310	15119 – *22563*	6 – 5	Zr I	TA76
7455.99	13408.37	0.10	5	11640 – *19096*	2 – 1	Zr I	TA76
7456.53	13407.40	0.05	30 U	*28404* – 35860	3 – 4	Zr I	TA76
7575.36	13197.08	0.02	50	14988 – *22563*	5 – 5	Zr I	TA76
7585.92	13178.71	0.02	12			Zr	TA76
7586.94	13176.94	0.02	15			Zr	TA76
7602.66	13149.69	0.02	85			Zr	TA76
7603.13	13148.88	0.05	125 U			Zr	TA76
7618.48	13122.39	0.05	5 U			Zr	TA76
7665.41	13042.05	0.02	54	15932 – *23597*	2 – 2	Zr I	TA76
7669.35	13035.35	0.05	10 U	11956 – *19625*	3 – 3	Zr I	TA76
7683.22	13011.82	0.05	10 W	11640 – *19323*	2 – 2	Zr I	TA76
7689.32	13001.49	0.02	38	22398 – *30087*	4 – 3	Zr I	TA76
7702.20	12979.75	0.02	46	22145 – *29847*	3 – 2	Zr I	TA76
7707.29	12971.18	0.05	15			Zr	TA76
7715.81	12956.86	0.02	15	15146 – *22862*	2 – 3	Zr I	TA76
7733.44	12927.32	0.05	70	21943 – *29677*	2 – 1	Zr I	TA76
7735.61	12923.69	0.20	4 W			Zr	TA76
7754.43	12892.33	0.10	6 U			Zr	TA76
7754.76	12891.78	0.10	5			Zr	TA76
7787.01	12838.39	0.02	42	21801 – *29588*	1 – 0	Zr I	TA76
7807.62	12804.50	0.10	9			Zr	TA76
7827.06	12772.70	0.50	3 W			Zr	TA76
7828.23	12770.79	0.02	11			Zr	TA76
7865.27	12710.64	0.05	100			Zr	TA76
7876.10	12693.17	0.02	8	21801 – *29677*	1 – 1	Zr I	TA76
7903.77	12648.73	0.05	55	21943 – *29847*	2 – 2	Zr I	TA76
7925.52	12614.02	0.05	5			Zr	TA76
7942.00	12587.84	0.02	77	22145 – *30087*	3 – 3	Zr I	TA76
7950.93	12573.71	0.02	34	21726 – *29677*	0 – 1	Zr I	TA76
7974.17	12537.06	0.02	5			Zr	TA76
7977.27	12532.19	0.02	8	17752 – *25729*	4 – 3	Zr I	TA76
7986.52	12517.67	0.02	185	22398 – *30384*	4 – 4	Zr I	TA76
7988.64	12514.35	0.02	17			Zr	TA76
8036.12	12440.41	0.05	8			Zr	TA76
8046.47	12424.41	0.02	54	21801 – *29847*	1 – 2	Zr I	TA76
8065.50	12395.10	0.02	70	11258 – *19323*	3 – 2	Zr I	TA76
8069.95	12388.26	0.05	6			Zr	TA76
8079.97	12372.90	0.05	200	11016 – *19096*	2 – 1	Zr I	TA76
8082.00	12369.79	0.10	2			Zr	TA76
8084.50	12365.97	0.05	4			Zr	TA76
8091.00	12356.03	0.02	290	10885 – *18976*	1 – 0	Zr I	TA76
8130.60	12295.85	0.05	5			Zr	TA76
8135.76	12288.05	0.05	5 W	35046 – *43182*	1 – 1	Zr I	TA76

Zr—Continued

σ (cm^{-1})	λ (Å)	$\Delta\sigma$ (cm^{-1})	Intensity and character	Energy levels (cm^{-1})	J	Spectrum	Reference
8138.92	12283.28	0.05	5 W			Zr	TA76
8143.56	12276.28	0.02	60	21943 – *30087*	2 – 3	Zr I	TA76
8145.53	12273.31	0.05	6	17752 – *25898*	4 – 3	Zr I	TA76
8148.15	12269.37	0.05	6	*28211* – 36360	5 – 5	Zr I	TA76
8188.54	12208.85	0.02	6			Zr	TA76
8189.90	12206.82	0.05	6			Zr	TA76
8192.48	12202.98	0.02	310	18738 – *26931*	5 – 4	Zr I	TA76
8199.51	12192.52	0.02	77	18738 – *26938*	5 – 4	Zr I	TA76
8211.28	12175.04	0.05	540	10885 – *19096*	1 – 1	Zr I	TA76
8233.81	12141.72	0.05	23			Zr	TA76
8235.46	12139.29	0.02	20			Zr	TA76
8239.19	12133.80	0.02	35	22145 – *30384*	3 – 4	Zr I	TA76
8282.95	12069.69	0.10	12 U			Zr	TA76
8307.26	12034.37	0.05	770	11016 – *19323*	2 – 2	Zr I	TA76
8309.25	12031.49	0.10	5			Zr	TA76
8350.04	11972.72	0.02	20			Zr	TA76
8351.50	11970.62	0.05	5			Zr	TA76
8360.91	11957.15	0.05	9			Zr	TA76
8367.25	11948.09	0.05	580	11258 – *19625*	3 – 3	Zr I	TA76
8373.68	11938.92	0.02	26			Zr	TA76
8375.12	11936.86	0.10	5			Zr	TA76
8389.74	11916.06	0.05	5 W			Zr	TA76
8397.16	11905.53	0.05	8			Zr	TA76
8407.01	11891.58	0.02	30			Zr	TA76
8430.39	11858.60	0.02	11			Zr	TA76
8436.65	11849.80	0.05	11 W			Zr	TA76
8438.56	11847.12	0.05	460	10885 – *19323*	1 – 2	Zr I	TA76
8452.93	11826.98	0.05	12			Zr	TA76
8474.30	11797.16	0.05	140	17752 – *26226*	4 – 3	Zr I	TA76
8505.00	11754.57	0.10	5			Zr	TA76
8506.71	11752.21	0.10	3			Zr	TA76
8530.20	11719.85	0.10	5			Zr	TA76
8539.70	11706.81	0.20	3			Zr	TA76
8557.07	11683.05	0.05	12			Zr	TA76
8575.40	11658.07	0.02	1500	11258 – *19833*	3 – 4	Zr I	TA76
8581.14	11650.28	0.20	7			Zr	TA76
8608.92	11612.68	0.02	900	11016 – *19625*	2 – 3	Zr I	TA76
8627.46	11587.73	0.05	28	14123 – *22750*	1 – 2	Zr I	TA76
8628.43	11586.42	0.20	11			Zr	TA76
8631.64	11582.12	0.02	43			Zr	TA76
8674.34	11525.10	0.05	28			Zr	TA76
8691.05	11502.94	0.20	3	17752 – *26443*	4 – 3	Zr I	TA76
8732.66	11448.13	0.10	6			Zr	TA76
8755.57	11418.18	0.20	6 U	17142 – *25898*	2 – 3	Zr I	TA76
8775.76	11391.91	0.05	23	14791 – *23567*	4 – 3	Zr I	TA76
8786.71	11377.71	0.02	51	8057 – *16843*	4 – 3	Zr I	TA76
8813.69	11342.88	0.05	5			Zr	TA76
8827.18	11325.55	0.05	5			Zr	TA76
8830.68	11321.06	0.05	12			Zr	TA76
8870.13	11270.71	0.02	29	14697 – *23567*	3 – 3	Zr I	TA76
8889.04	11246.73	0.02	8			Zr	TA76
8914.45	11214.67	0.05	11			Zr	TA76
8923.18	11203.70	0.05	9			Zr	TA76
8926.12	11200.01	0.05	28			Zr	TA76
8936.49	11187.02	0.05	70			Zr	TA76
8951.33	11168.47	0.05	9	*28749* – 37701	4 – 3	Zr I	TA76
8955.48	11163.29	0.05	20			Zr	TA76
8967.68	11148.11	0.05	5			Zr	TA76
8970.92	11144.08	0.02	17	14348 – *23319*	2 – 2	Zr I	TA76
8982.07	11130.25	0.05	14			Zr	TA76
8983.01	11129.08	0.20	3			Zr	TA76
9024.02	11078.51	0.05	3			Zr	TA76
9055.44	11040.07	0.05	9	*28404* – 37459	3 – 2	Zr I	TA76
9088.74	10999.62	0.02	70	12760 – *21849*	4 – 3	Zr I	TA76
9094.29	10992.90	0.05	3	17059 – *26154*	1 – 1	Zr I	TA76
9097.58	10988.93	0.02	2 H	14791 – *23889*	4 – 3	Zr I	TA76

Zr—Continued

σ (cm⁻¹)	λ (Å)	Δσ (cm⁻¹)	Intensity and character	Energy levels (cm⁻¹)	J	Spectrum	Reference
9099.66	10986.42	0.02	20	*29001* – 38101	5 – 4	Zr I	TA76
9123.84	10957.30	0.05	3			Zr	TA76
9140.65	10937.15	0.02	3	14348 – *23489*	2 – 2	Zr I	TA76
9153.40	10921.91	0.05	6			Zr	TA76
9169.41	10902.84	0.02	8	18738 – *27908*	5 – 4	Zr I	TA76
9172.83	10898.78	0.05	11	*28528* – 37701	4 – 3	Zr I	TA76
9178.66	10891.86	0.02	25	17752 – *26931*	4 – 4	Zr I	TA76
9185.70	10883.51	0.02	32	17752 – *26938*	4 – 4	Zr I	TA76
9196.70	10870.49	0.02	115	14123 – *23319*	1 – 2	Zr I	TA76
9199.31	10867.41	0.02	98			Zr	TA76
9208.53	10856.53	0.02	62	11258 – *20466*	3 – 2	Zr I	TA76
9218.30	10845.02	0.02	380	14348 – *23567*	2 – 3	Zr I	TA76
9248.65	10809.43	0.02	51	14348 – *23597*	2 – 2	Zr I	TA76
9302.29	10747.10	0.10	3	*28157* – 37459	3 – 2	Zr I	TA76
9309.25	10739.07	0.02	460	14697 – *24006*	3 – 4	Zr I	TA76
9315.23	10732.17	0.10	3			Zr	TA76
9337.66	10706.39	0.10	3			Zr	TA76
9346.00	10696.84	0.02	550	12503 – *21849*	3 – 3	Zr I	TA76
9348.59	10693.88	0.02	14	10885 – *20233*	1 – 0	Zr I	TA76
9358.46	10682.60	0.05	12	17752 – *27111*	4 – 3	Zr I	TA76
9366.44	10673.50	0.02	123	14123 – *23489*	1 – 2	Zr I	TA76
9371.31	10667.95	0.02	140	12772 – *22144*	5 – 4	Zr I	TA76
9376.01	10662.60	0.05	21			Zr	TA76
9383.44	10654.16	0.02	570	12760 – *22144*	4 – 4	Zr I	TA76
9414.62	10618.87	0.05	5 H	17142 – *26557*	2 – 2	Zr I	TA76
9474.44	10551.83	0.02	170	14123 – *23597*	1 – 2	Zr I	TA76
9497.48	10526.23	0.05	8	17059 – *26557*	1 – 2	Zr I	TA76
9502.49	10520.68	0.05	5	11016 – *20519*	2 – 1	Zr I	TA76
9507.07	10515.61	0.02	33	12342 – *21849*	4 – 3	Zr I	TA76
9540.12	10479.18	0.05	38	14348 – *23889*	2 – 3	Zr I	TA76
9581.58	10433.84	0.02	54	10885 – *20466*	1 – 2	Zr I	TA76
9596.15	10418.00	0.05	31	14791 – *24387*	4 – 3	Zr I	TA76
9624.75	10387.04	0.02	6			Zr	TA76
9633.79	10377.29	0.02	21	10885 – *20519*	1 – 1	Zr I	TA76
9640.63	10369.93	0.05	3	12503 – *22144*	3 – 4	Zr I	TA76
9642.43	10367.99	0.10	5			Zr	TA76
9655.62	10353.83	0.10	3			Zr	TA76
9679.26	10328.54	0.05	38	14697 – *24376*	3 – 4	Zr I	TA76
9684.44	10323.02	0.05	3			Zr	TA76
9690.53	10316.53	0.02	23	14697 – *24387*	3 – 3	Zr I	TA76
9760.25	10242.84	0.05	110	5023 – *14783*	2 – 2	Zr I	TA76
9785.49	10216.42	0.10	4			Zr	TA76
9791.09	10210.57	0.02	310	12772 – *22563*	5 – 5	Zr I	TA76
9801.70	10199.52	0.02	120	12342 – *22144*	4 – 4	Zr I	TA76
9803.21	10197.95	0.02	30	12760 – *22563*	4 – 5	Zr I	TA76
9842.80	10156.93	0.10	8	17059 – *26902*	1 – 1	Zr I	TA76
9878.46	10120.27	0.02	10			Zr	TA76
9904.26	10093.91	0.10	5			Zr	TA76
9913.15	10084.86	0.02	380	4870 – *14783*	1 – 2	Zr I	TA76
9921.57	10076.29	0.05	3			Zr	TA76
9952.25	10045.23	0.05	150	5249 – *15201*	3 – 3	Zr I	TA76
9968.56	10028.80	0.10	38 W	17142 – *27111*	2 – 3	Zr I	TA76
9979.99	10017.31	0.05	30			Zr	TA76
9998.46	9998.81	0.20	2			Zr	TA76

Zr Reference

TA76 Taklif, A. G., M. Phil. Thesis, University of London (1976).
Source: Electrodeless discharge tube (2.45 GHz)
Instrument: 1.5 m Ebert spectrometer
Detector: PbS cooled with a mixture of solid carbon dioxide and acetone

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