

Project: 60096

Title: Rational Synthesis of Imprinted Organofunctional Sol-Gel Materials for Toxic Metal Separation

PI: Dr. Ziling Benjamin Xue

Institution: University of Tennessee at Knoxville

Publication Type: Journal

Dai, S., et. al. (1999). Imprint coating: Novel synthesis of selective functionalized ordered mesoporous sorbents. *Angew. Chem. Int. Ed.* 38, 1235-1239.

Dai, S., et. al. (1999, Oct. 1). A new methodology to functionalize surfaces of ordered mesoporous materials based on ion exchange reactions. *Adv. Mater.* 11(14), 1226-1230.

Shin, Y. S., Burleigh, M. C., Dai, S., Barnes, C. E., & Xue, Z. L. (1999). Investigation of uranyl adsorption on mesoporous titanium-based sorbents. *Radiochim. Acta.* 84, 37-42.

NUCLEAR MATERIALS

Actinide (Heavy Element) Chemistry

Project: 59967

Title: Aqueous Electrochemical Mechanisms in Actinide Residue Processing

PI: Dr. David E. Morris

Institution: Los Alamos National Laboratory

Publication Type: Presentation

Morris, D. E. (1998, Jul. 27-30). Aqueous electrochemical mechanisms in actinide residue processing. DOE Environmental Management Science Program Workshop. Chicago, IL.

Morris, D. E. (1999, Apr. 21-25). Trends in actinyl electrochemistry: Voltammetry and theory. Presentation at the 217th National Meeting of the American Chemical Society. Anaheim, CA.

Morris, D. E. (1999, Aug. 22-26). Aqueous electrochemical mechanisms in mediated dissolution of actinide residues. First Accomplishments of Environmental Management Science Program. National Meeting of the American Chemical Society. New Orleans, LA.

Morris, D. E. (1999, Aug. 22-26). Aqueous electrochemical mechanisms in actinide residue processing results. Presentation at the National Meeting of the American Chemical Society. New Orleans, LA.

Engineering Science

Project: 60077

Title: Development of Nuclear Analysis Capabilities for DOE Waste Management Activities

PI: Dr. Cecil V. Parks

Institution: Oak Ridge National Laboratory

Publication Type: Journal

DeHart, M. D. (1998, Jun.). An advanced deterministic method for spent-fuel criticality safety analysis. *Trans. Am. Nucl. Soc.*, 78, 170-172.

DeHart, M. D. (1999). A deterministic study of deficiencies in the Wigner-Seitz cell approximation. *Trans. Am. Nucl. Soc.*, 80, 149-151.

Publication Type: Paper

Rearden, B. T. (2000, May 7-12). SAMS: A sensitivity analysis module for critically safety analysis using Monte Carlo techniques. *Proceeds of PHYSOR 2000, ANS Int. Topical Meeting on Advances in Reactor Physics and Mathematics and Computation into the Next Millenium*, CD-ROM, Pittsburgh, PA.

Publication Type: Presentation

Rearden, B. T. & Childs, R. L. (2000, Nov. 12-16). Prototypic sensitivity and uncertainty analysis codes for criticality safety with the SCALE code system. *ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*. Washington, D. C. *Trans. Am. Nucl. Soc.* 83, 98-99.

Rearden, B. T., Hopper, C. M., Elam, K. R., Broadhead, B. L., & Fox, P. B. (2000, Nov. 12-16). Prototypic sensitivity and uncertainty analysis for experiment needs. *ANS/ENS 2000 International Winter Meeting and Embedded Topical Meetings*. Washington, D. C. *Trans. Am. Nucl. Soc.*, 83, 103-106.

Rearden, B. T., Petrie, L. M., & Hollenbach, D. F. (2000, Oct. 23-26). Sensitivity and uncertainty analysis for nuclear criticality safety using keno in the scale code system. *MC2000, International Conference on Advanced Monte Carlo for Radiation Physics, Particle Transport Simulation and Applications*.

Publication Type: Proceeding

Broadhead, B. L., Childs, R. L., & Rearden, B. T. (1999, Sept. 20-24). Computational methods for sensitivity and uncertainty analysis in criticality safety. *Proceedings of ICNC'99, Sixth International Conference on Nuclear Criticality Safety*. Palais des Congres, Versailles, France. I, 57-65.

DeHart, M. D. (1999, Sept. 27-30). A deterministic study of the deficiency of the Wigner-Seitz approximation for Pu/MOX fuel pins. Proceedings of M&C '99 - Madrid, Mathematics and Computations Meeting, 689-699. Madrid, Spain.

Publication Type: Report

Parks, C. V., DeHart, M. D., Broadhead, B. L., Hopper, C. M., & Petrie, L. M. (1998, Jun.). Development of nuclear analysis capabilities for DOE waste management activities. Annual EMSP Summary Progress Report. ORNL/M-6549.

Parks, C. V., et. al. (1999, Jun.). Development of nuclear analysis capabilities for DOE waste management activities. Annual EMSP Summary Progress Report. ORNL/TM-1999/101.

Parks, C. V., et. al. (2000, Feb.). Development of nuclear analysis capabilities for DOE waste management activities. Annual EMSP Project Summary Report. ORNL/TM-2000/65.

Publication Type: Theses/Dissertations

Rearden, B. T. (1999). Development of SAMS: A three-dimensional sensitivity analysis module for the SCALE code system. PhD dissertation at Texas A&M University.

Materials Science

Project: 55094

Title: Chemical and Ceramic Methods Toward Safe Storage of Actinides Using Monazite

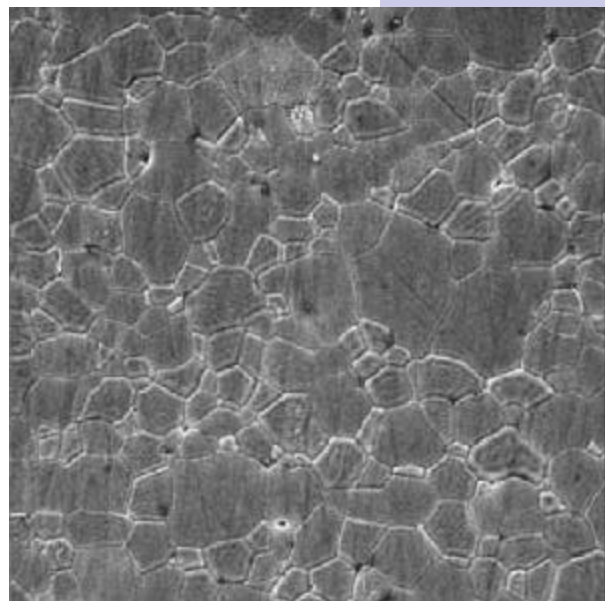
PI: Dr. P. E. D. Morgan

Institution: Rockwell International Corporation

Publication Type: Journal

Liu, G. K., Beitz, J. V., Huang, J., Abraham, M. M., & Boatner, L. A. (1997). Characterization of crystal field and nuclear quadrupole interactions in the 5D1 state of $^{243}\text{Am}^{3+}$ in LaCl_3 and CaWO_4 . *Journal of Alloys and Compounds*. 250, 347-351.

Liu, G. K., et. al. (1998). Crystal-field splitting, magnetic interaction, and vibronic excitations of $^{244}\text{Cm}^{3+}$ in YPO_4 and LuPO_4 . *Journal of Chemical Phys.* 109, 6800-6808.



Fully Dense, Stoichiometric La-Monazite, LaPO_4 , ceramic, sintered to 1400°C - grain size ~2 μm . [see Project #55094]

- Meldrum, A., Boatner, L. A., & Ewing, R. C. (1997). Electron-irradiation-induced nucleation and growth in amorphous LaPO₄ and ScPO₄, and zircon. *Journal of Materials Research*. 12, 1816.
- Meldrum, A., Boatner, L. A., & Ewing, R. C. (1997). Displacive radiation effects in the monazite- and zircon-structure orthophosphates. *Phys. Rev. B*. 56, 13805.
- Meldrum, A., Boatner, L. A., & Ewing, R. C. (1998). Effects of ionizing and displacive irradiation on several perovskite-structure oxides. *Nuclear Instruments & Methods in Physics Research, Section B: Beam Interactions with Materials and Atoms*. Elsevier Sci B. 141(347-352), 0168-583X.
- Meldrum, A., Boatner, L. A., & Ewing, R. C. (1998). Phase transitions during ion-beam irradiation of the Perovskite-structure oxides. Ma, E., Bellon, P., Atmon, M., & Trivedi, R. (Eds.). *Phase Transformation and Systems Driven far from Equilibrium*. Materials Research Symposium Proceedings. 481, 401-406. Boston, MA.
- Meldrum, A., Boatner, L. A., & Ewing, R. C. (2000, Apr.). A comparison of radiation effects in crystalline ABO sub-4-type phosphates and silicates. *Mineral. Mag.* 64(2), 185-194.
- Meldrum, A., Boatner, L. A., & Zinkle, S. J. (1999). Effects of dose rate and temperature on the crystalline-to-metamict transformation in the ABO sub-4 Orthosilicates. *Canadian Mineralogist*. 37, 207-221.
- Meldrum, A., Boatner, L. A., Wang, L. M., & Ewing, R. C. (1997). Ion-beam-induced amorphization of LaPO₄ and ScPO₄. *Nuclear Instrum. Methods Phys. Res. B*. 127/128, 160.
- Meldrum, A., Boatner, L. A., Weber, W. J., & Ewing, R. C. (1998). Radiation damage in zircon and monazite. *Geochim. Cosmochim. Acta*. 62, 2509-2520.
- Meldrum, A., Zinkle, S. J., Boatner, L. A., & Ewing, R. C. (1999). Heavy-ion irradiation effects in the ABO₄ orthosilicates: Decomposition, amorphization, and recrystallization. *Physical Review B*. 59, 3981-3992.
- Meldrum, A., Zinkle, S. J., Boatner, L. A., & Ewing, R. C. (1998). A transient liquid-like phase in the displacement cascades of zircon, hafnon, and thorite. *Nature*. 395, 56-58.
- Nipko, J. C., et. al. (1997). Lattice dynamics of LuPO₄. *Journal of Alloys and Compounds*. 250, 573.
- Nipko, J. C., et. al. (1997). Lattice dynamics of xenotime: The phonon dispersion relations and density of states of LuPO₄. *Phys. Rev. B*. 56, 11584.
- Rapaport, A., David, V., Bass, M., Deka, C., & Boatner, L. A. (1999, Dec.). Optical spectroscopy of erbium-doped lutetium orthophosphate. *J. Lumin.* 85(1-3), 155-161.

Rapaport, A., Moteau, O., Bass, M., Boatner, L. A., & Deka, C. (1999). Optical spectroscopy and lasing properties of neodymium-doped lutetium orthophosphate. *Journal of Optical Soc. Am. B.* 16, 911-916.

Publication Type: Presentation

Boatner, L. A. (1998, Mar. 5). Living in a materials world. Invited presentation for the induction seminar at the Academy of Sciences of Mexico. Mexico City, Mexico.

Boatner, L. A., Meldrum, A., Chakoumakos, B. C., & Mitchell, M. J. (1998, Sept. 11-12). The lanthanide orthophosphates: Chemically durable, radiation-resistant, high-temperature ceramics. Invited presentation at the Workshop on Advanced Materials for Extreme Environments: New Experimental Opportunities in Neutron Scattering. Argonne, IL.

Hanchar, J. M., Boatner, L. A., & Townsend, P. D. (1999, Apr. 25-28). Cathodoluminescence spectroscopy of the trivalent rare Earth elements in synthetic REEPO₄, YPO₄, and ScPO₄. Presented at the American Ceramic Society 101st Annual Meeting. Indianapolis, IN.

Liu, G. K., et. al. (1997, Sep. 28 - Oct. 3). Self-radiation induced anisotropic structure damage in ²⁴⁴Cm-doped orthophosphate LuPO₄. Presented at the 21st International Symposium on the Scientific Basis for Nuclear Waste Management, Davos Congress Center. Davos, Switzerland.

Loong, C. -K., Boatner, L. A., & Wang, J. Y. (1999, Jun. 20-23). Magnetic and thermodynamic properties of rare-Earth orthophosphates and pentaphosphates. Presentation at the 15th University Conference on Glass Science, University of Missouri. Rolla, MO.

Meldrum, A., Boatner, L. A., & Ewing, R. C. (1997, Dec. 1-5). Heavy-ion-irradiation of barium and strontium titanate: The effects of thermally-induced phase transitions and irradiation temperature. Presented at the Fall Meeting of the Materials Research Society, Symposium B: Phase Transformations and Systems Driven Far From Equilibrium. Boston, MA.

Meldrum, A., Boatner, L. A., & Ewing, R. C. (1999, Apr. 25-28). Radiation effects in Lanthanide-bearing AB₄ compounds proposed for nuclear waste disposal. Presentation at a special focused session on Lanthanide-Containing Materials and Applications at the American Ceramic Society 101st Annual Meeting. Indianapolis, IN.

Meldrum, A., Boatner, L. A., Zinkle, S. J., & Ewing, R. C. (1999, Mar. 28 - Apr. 1). Ion irradiation effects in the zircon-structure orthosilicates. Presented at the 10th European Union of Geosciences. Strasbourg, France.

Meldrum, A., et. al. (1998, Nov. 30 - Dec. 4). Radiation effects in nonmetals: Amorphization, phase decomposition, and nanoparticles. Invited presentation at the 1998 Fall Materials Research Society Meeting. Boston, MA.

Meldrum, A., Ewing, R. C., & Boatner, L. A. (1997, Sep. 14-19). Effects of displacive and ionizing radiation on several perovskite-structure compounds. Presented at Radiation Effects in Insulators-9 (REI-9). Knoxville, TN.

Meldrum, A., Zinkle, S. J., Boatner, L. A., & Ewing, R. C. (1998, Aug. 31 - Sep. 4). Evidence for thermal spikes and cascade quenching in the zircon-structure orthosilicates. Presented at the Ion Beam Modification of Materials-98. Amsterdam, Netherlands.

Sales, B. C., Boatner, L. A., & Ramey, J. O. (1999, Jun. 20-23). Chromatographic studies of the structures of amorphous phosphates: A review. Presentation at the 15th University Conference on Glass Science, University of Missouri. Rolla, MO.

Trukhin, A. N. & Boatner, L. A. (1999, Aug. 16-20). Luminescence properties of ScPO₄ single crystals. The 5th International Conference on Inorganic Scintillators and Their Applications, SCINT99, Moscow, Russia.

Weber, W. J., et. al. (1998, Nov. 30 - Dec. 4). The effect of temperature and recoil spectra on amorphization in zircon. Presented at the Fall Meeting of the Materials Research Society, Symposium N: Microstructural Processes in Irradiated Materials. Boston, MA.

Weber, W. J., et. al. (1999, Aug. 23-25). Ion-beam-induced defects and defect interactions in perovskite-structure titanates. Defects and Surface-Induced Effects in Advanced Perovskites. NATO Advanced Research Workshop. Jurmala, Latvia.

Publication Type: Proceeding

Devanathan, R., Weber, W. J., & Boatner, L. A. (1998). Response of zircon to electron and Ne⁺ irradiation. Ma, E., Bellon, P., Atmon, M., & Trivedi, R. (Eds.). Phase Transformation and Systems Driven far from Equilibrium. Materials Research Symposium Proceedings. 481, 419-424. Boston, MA.

Meldrum, A., Boatner, L. A., & Ewing, R. C. (1997). Electron-irradiation-induced crystallization of amorphous orthophosphates. Diaz de la Rubia, T., Was, G. S., Robertson, I. M., & Hobbs, L. W. (Eds.). Microstructure Evolution During Irradiation. Materials Research Society Symposium Proceedings. 439, 697-702.

Meldrum, A., Boatner, L. A., White, C. W., & Henderson, D. O. (1999). Radiation effects in nonmetals: Amorphization, phase decomposition, and nanoparticles. Ewing, R. C., Lucas, G., Williams, J., & Zinkle, S. (Eds.). Microstructural Processes in Irradiated Materials. Materials Research Symposium Proceedings. 540, 135. Boston, MA.

Meldrum, A., et. al. (1999). Radiation effects in zircon, hafnon, and thorite: Implications for Pu disposal. Ewing, R. C., Lucas, G., Williams, J., & Zinkle, S. (Eds.). Microstructural Processes in Irradiated Materials. Materials Research Symposium Proceedings. 540, 395. Boston, MA.

Weber, W. J., et. al. (1999). The effect of temperature and damage energy on amorphization in zircon. Ewing, R. C., Lucas, G., Williams, J., & Zinkle, S. (Eds.). Microstructural Processes in Irradiated Materials. Materials Research Symposium Proceedings. 540,367. Boston, MA.

Publication Type: Theses/Dissertations

Meldrum, A. (1999). Radiation effects in the orthophosphates. PhD dissertation at the Department of Earth Sciences, University of New Mexico. Albuquerque, NM.

Project: 55382

Title: Determination of Transmutation Effects in Crystalline Waste Forms

PI: Dr. Don Reed

Institution: Argonne National Laboratory

Publication Type: Journal

Fortner, J. A., Buck, E. C., Strachan, D. M., & Hess, N. J. (1998). Extended electron loss fine structure analysis of silicon-K edges using an imaging filter. *Microscopy & Microanalysis*. 4 (Suppl. 2: Proceedings):706-707.

Hess, N. J., Balmer, M. L., Conradson, S. D., & Bunker, B. C. (1997). Ti XAS of a novel Cs-silicotitanate. *Journal of Solid State Chemistry*, 129:206-213.

Publication Type: Proceeding

Hess, N. J., et. al. (1997). Characterization of electroactive Cs ion-exchange materials using XAS. *Materials Research Society Proceedings*. 456:813-818.

Project: 60118

Title: Fundamental Thermodynamics of Actinide-Bearing Mineral Waste Forms

PI: Dr. Mark A. Williamson

Institution: Argonne National Laboratory

Publication Type: Journal

Putnam, R. L., Navrotsky, A., Cordfunke, E. H. P., Huntelaar, M. E., & Woodfield, B. F. (1999, Feb.). Thermodynamics of formation for zirconolite ($\text{CaZrTi}_2\text{O}_7$) from $T=298.15\text{K}$ to $T=1500\text{K}$. *J. Chem. Thermodyn.* 31(2), 229-243.



High temperature solution calorimeter at Los Alamos National Laboratory. This calorimeter is the same type used in studies of non-radioactive materials but has been installed in a section of the laboratory to allow the use of Pu-bearing samples to measure the formation energetics of Pu-bearing materials. A 1997 DOE EMSP grant helped establish the facility and will support the measurement of Pu-bearing waste ceramics being synthesized at LLNL. [see Project #60118]

Putnam, R. L., Navrotsky, A., Woodfield, B. F., & Boerio-Goates, J. (1999). Heat capacity, third law entropy, and formation energetics of zirconolite, $\text{CaZrTi}_2\text{O}_7$. *Environmental Issues and Waste Management Technologies in the Ceramic and Nuclear Industries IV*, Ceramic Transactions. 93, 339.

Putnam, R. L., Navrotsky, A., Woodfield, B. F., Boerio-Goates, J., & Shapiro, J. L. (1999). Thermodynamics of formation of zirconolite ($\text{CaZrTi}_2\text{O}_7$) from $T = 298.15 \text{ K}$ to $T = 1500 \text{ K}$. *J. Chem. Thermo.* 31(3), 229-243.

Putnam, R. L., Navrotsky, A., Woodfield, B. F., Shapiro, J. L., & Boerio-Goates, J. (1999). Heat capacity, third law entropy, and formation energetics of zirconolite, $\text{CaZrTi}_2\text{O}_7$. Marra, J. C. & Chandler, G. T. (Eds.), *Environmental Issues and Waste Management Technologies in the Ceramic and Nuclear Industries IV*, Ceramic Transactions, 93. The American Ceramic Society. Westerville, OH.

Woodfield, B. F., Boerio-Goates, J., Shapiro, J. L., Putnam, R. L., & Navrotsky, A. (1999). Molar heat capacity and thermodynamic functions of zirconolite, $\text{CaZrTi}_2\text{O}_7$. *J. Chem. Thermo.* 31(3), 245-253.

Woodfield, B. F., et. al. (1999, Dec.). Molar heat capacity and thermodynamic functions for CaTiO_3 . *J. Chem. Thermodyn.* 31(12), 1573-1583.

Publication Type: Other

Putnam, R. L., Ph.D. Dissertation. (1999, Nov.). Department of Geosciences, Princeton University, NJ.

Publication Type: Presentation

Putnam, R. L., et. al., (1998, Dec.). Thermochemistry of Hf-zirconolite, $\text{CaHfTi}_2\text{O}_7$. Scientific Basis for Nuclear Waste Management, Materials Research Society.

Publication Type: Proceeding

Putnam, R. L., et. al. (1999, in press). Thermochemistry of Hf-zirconolite, $\text{CaHfTi}_2\text{O}_7$. MRS Proceedings.

Project: 60387

Title: Distribution & Solubility of Radionuclides & Neutron Absorbers in Waste Forms for Disposition of Plutonium Ash & Scraps, Excess Plutonium, and Misc. Spent Nuclear Fuels

PI: Dr. Denis M. Strachan

Institution: Pacific Northwest National Laboratory

Publication Type: Journal

Gu, B. X., Wang, L. M., & Ewing, R. C. (2000, Mar.). The effect of amorphization on the Cs ion exchange and retention capacity of zeolite-NaY. *J. Nucl. Mater.* 278(1), 64-72.

Li, L. Y., et. al. (2000, Jul.). Crystallization of gadolinium- and lanthanum-containing phases from sodium alumino-borosilicate glasses. *J. Non-Cryst. Solids*. 272(1), 46-56.

Li, L., Strachan, D. M., Li, H., Davis, L. L., & Qian, M. (1999, in press). Peraluminous and peralkaline effects on Gd₂O₃ and La₂O₃ solubilities in sodium-alumino-borosilicate glasses. *Ceramic Transactions*. American Ceramic Society, Westerville, OH.

Zhao, D., et. al. (1999, in press). Electron microprobe and electron microscopy characterization of precipitated gadolinium crystals in borosilicate glasses. *Journal of Non-Crystalline Solids*.

Publication Type: Other

Feng, X., et. al. (1999). Distribution and solubility of radionuclides in waste forms for disposition of plutonium and spent nuclear fuels: Preliminary results. Marra, J. C. & Chandler, G. T. (Eds.), *Ceramic Transactions*. 93, 409-419. American Ceramic Society, Westerville, OH.

Publication Type: Presentation

Davis, L. L., et. al. (1998, Dec.). The effects of Na₂O, Al₂O₃, and B₂O₃ on HfO₂ solubility in borosilicate glass. *Materials Research Society*, Boston, MA.

Feng, X. (1998, Mar. 17). A plasma arc-vitreous ceramic process for stabilizing EBR-II spent nuclear fuels. *National Academy of Science*.

Feng, X., et. al. (1998, May). Distribution and solubility of radionuclides in waste forms for disposition of plutonium and spent nuclear fuels: Preliminary results. *Symposium of Waste Management Science and Technology in the Ceramic and Nuclear Industries*. 100th Am. Cer. Soc. Annual Meeting. Cincinnati, OH.

Li, L., Strachan, D. M., Davis, L. L., Li, H., & Qian, M. (1998, Dec.). Gadolinium solubility limits in sodium-alumino-borosilicate glasses. *Materials Research Society Meeting*. Boston, MA.

Li, L., Strachan, D. M., Li, H., Davis, L. L., & Qian, M. (1999, Apr. 24-29). Peraluminous and peralkaline effects on Gd₂O₃ and La₂O₃ solubilities in sodium-alumino-borosilicate glasses. *American Ceramic Society Meeting*. Indianapolis, IN.

Shuh, D. K., et. al. (1998, Jul. 28). Distribution and solubility of radionuclides and neutron absorbers in forms for disposition of plutonium ash and scraps, excess plutonium, and miscellaneous spent nuclear fuels. *Environmental Management Science Program Workshop Plenary Address*. Chicago, IL.

Shuh, D. K., et. al. (1998, Jul. 9). Investigations of actinide materials chemistry utilizing synchrotron radiation methods. Chemical and Analytical Sciences Division, Oak Ridge National Laboratory. Oak Ridge, TN.

Stachan, D. M. (1999, Jun. 1). The Yucca Mountain repository: What has changed? American Geophysical Union, Spring Meeting. Boston, MA.

Strachan, D. M. (1999, Apr. 22). Radiation effects in ABO₄ orthophosphates and orthosilicates. Invited presentation at the HLW and Pu Immobilization Workshop. CEA, Saclay, France.

Strachan, D. M. (1999, Apr. 5). Performance assessments: The design, selection and importance of nuclear waste forms. Invited presentation at Ch Performance Assessments: The Design, Selection and Importance of Nuclear Waste Forms.

Strachan, D. M. (1999, Jul. 12). Ageing studies of nuclear waste forms: The evaluation of long-term behaviour. Plenary lecture for International Conference on Ageing Studies & Lifetime Extension of Materials, St. Catherine's College. Oxford, United Kingdom.

Strachan, D. M. (1999, Oct. 20). Natural systems: Applications to nuclear waste management. Invited presentation at workshop sponsored by the Russian Academy of Sciences and the U.S. Department of Energy. Moscow, Russia.

Strachan, D. M. (1999, Sept. 10). Radiation effects in zircon. Invited seminar at the Université Henri Poincaré. Nancy, France.

Vance, E. R., et. al. (1999, Apr. 28). Crystal chemistry, radiation effects and aqueous leaching of brannerite, UTi₂O₆. S-I-059-99, Materials Division, ANSTO, Menai, NSW 2234, Australia.

Publication Type: Proceeding

Davis, L. L., et. al. (1998). The effects of Na₂O, Al₂O₃, and B₂O₃ on HfO₂ solubility in borosilicate glass. In Scientific Basis for Nuclear Waste Management XXII. Materials Research Society. Pittsburgh, PA.

Ewing, R. C. (1999, in press). Ageing studies of nuclear waste forms: The evaluation of long-term behaviour. Proceedings of International Conference on Ageing Studies & Lifetime Extension of Materials.

Li, L., Strachan, D. M., Davis, L. L., Li, H., & Qian, M. (1998). Gadolinium solubility limits in sodium-alumino-borosilicate glasses. In Scientific Basis for Nuclear Waste Management XXII, Materials Research Society. Pittsburgh, PA.

Strachan, D. M. (1999, Nov. 13). Mineralogy: Applications to nuclear waste disposal. Plenary presentation at the Twentieth Annual New Mexico Mineral Symposium, New Mexico Institute of Mining and Technology. Socorro, NM.

Wang, S. X., Wang, L. M., & Ewing, R. C. (1999). Electron irradiation of zeolites. In Zinkle, S. J., Lucas, G. E., Ewing, R. C., & Williams, J. S. (Eds.), *Microstructural Processes in Irradiated Materials*. Symposium Proceedings of the Materials Research Society. 540, 361-366.

SPENT NUCLEAR FUEL

Engineering Science

Project: 60144

Title: Flow Visualization of Forced and Natural Convection in Internal Cavities

PI: Dr. John C. Crepeau

Institution: University of Idaho

Publication Type: Journal

Condie, K. G., Stoots, C. M., McEligot, D. M., Becker, S., & Durst, F. (1998). Measurements of induced boundary layer transition in the new INEEL Matched-Index-of-Refractive flow system. American Physical Society Fluid Dynamics Meeting. Bulletin APS. 43, 2092.

Nishimura, M., Fujii, S., Shehata, A. M., Kunugi, T., & McEligot, D. M. (1997). Prediction of forced gas flows in circular tubes at high heat fluxes. NuReTH-8, Kyoto.

Shehata, A. M. & McEligot, D. M. (1998). Mean structure in the viscous layer of strongly-heated internal gas flows. International Journal of Heat Mass Transfer. 41, 4297-4313.

Publication Type: Presentation

Crepeau, J. C. (2000, Sep. 13). Drying of spent nuclear fuel. Presentation for the Mechanical Engineering Department of the University of Idaho Extension, Idaho Falls, ID.

Ezato, K., Shehata, A. M., Kunugi, T., & McEligot, D. M. (1997). Numerical predictions of transitional features of turbulent forced gas flows in circular tubes with strong heating. ASME Fluids Engineering Conference. Vancouver, British Columbia, Canada.

McEligot, D. M. (1997). Maximum allowable heat flux for a submerged tube bundle. Engineering Conference on Convective Flow and Pool Boiling. Irsee, Germany.

McEligot, D. M., Shehata, A. M., & Kunugi, T. (1998). Prediction of strongly-heated gas flows. Invited presentation at the Engineering Foundation Conference on Turbulent Heat Transfer II, I. 33-47. Manchester, U. K.