



SNL's  
Karl  
Gross



Science and Technology Highlights from the DOE National Laboratories

Number 139

August 18, 2003

## Research Highlights . . .

### The power of an uncommon protein

A researcher at DOE's **Los Alamos National Laboratory** and her colleagues have discovered that people with a less common type of proteins on their white blood cells seem to have a better immune response to HIV—the virus that causes AIDS—and tend to fight progression of the disease better than people with more common white blood cell proteins. The proteins, called human leukocyte antigens, perform key functions by helping the body fight infection and enable the T-cells that destroys virus infected cells to recognize infected cells. Destroying infected cells prevents pathogens from multiplying. The research could lead medical researchers toward a better understanding of the genetic factors related to HIV.

[James Rickman, 505/665-9203;  
jamesr@lanl.gov]

### NREL investigates ultracapacitors for fuel cell vehicles

Researchers at the DOE's **National Renewable Energy Laboratory** used ADVISOR, a hybrid electric vehicle simulation model, to simulate a fuel cell hybrid vehicle with an ultracapacitor energy storage system. Ultracapacitors, a type of energy storage device used in electric and hybrid-electric vehicles, can either replace or supplement conventional chemical batteries. Engineers from the Center for Transportation Technologies and Systems found the ultracapacitor is capable of capturing a sizeable amount of regenerative braking energy that would otherwise be lost, thus improving the fuel economy of the fuel cell vehicle. Industry representatives have requested more analysis of ultracapacitors in fuel cell hybrid vehicles.

[Sarah Holmes Barba, 303/275-3023;  
sarah\_barba@nrel.gov]

### NETL patent holds promise for lower cost mercury removal

Researchers at DOE's **National Energy Technology Laboratory (NETL)** were recently awarded a **patent** for a process that holds promise for more cost-effectively removing mercury from flue gas. The process, called the thief process, adsorbs mercury onto a thermally activated sorbent produced in-situ at a power plant. The sorbent is obtained by inserting a lance (thief) into the combustion chamber and extracting partially combusted coal. Because the sorbent is produced less expensively in-situ, the process becomes more cost effective than commonly used activated carbon injection. The researchers successfully demonstrated the technique at NETL's own **500-pound per hour coal combustion facility**.

[David Anna, 412/386-4646;  
David.Anna@netl.doe.gov]

### Cleaning up natural gas

Ridding natural gas of sulfur and other impurities means cleaner air and is the focus of a project using two technologies developed at DOE's **Oak Ridge National Laboratory**. The goal is to build and demonstrate a low-cost regenerative desulfurizer based on the carbon **fiber composite molecular sieve** and electrical swing adsorption. Researchers plan to optimize the carbon fiber composite molecular sieve material's structure for adsorption of hydrogen sulfide and organic sulfides found in natural gas. Next, researchers hope to conduct dynamic adsorption experiments to evaluate and minimize the extent to which the sieve co-adsorbs other impurities in the gas stream.

[Ron Walli, 865/576-0226;  
wallira@ornl.gov]

**DOE Pulse** highlights work being done at the **Department of Energy's** national laboratories. **DOE's** laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. **DOE Pulse** ([www.ornl.gov/news/pulse/](http://www.ornl.gov/news/pulse/)) is distributed every two weeks. For more information, please contact Jeff Sherwood ([jeff.sherwood@hq.doe.gov](mailto:jeff.sherwood@hq.doe.gov), 202-586-5806).

