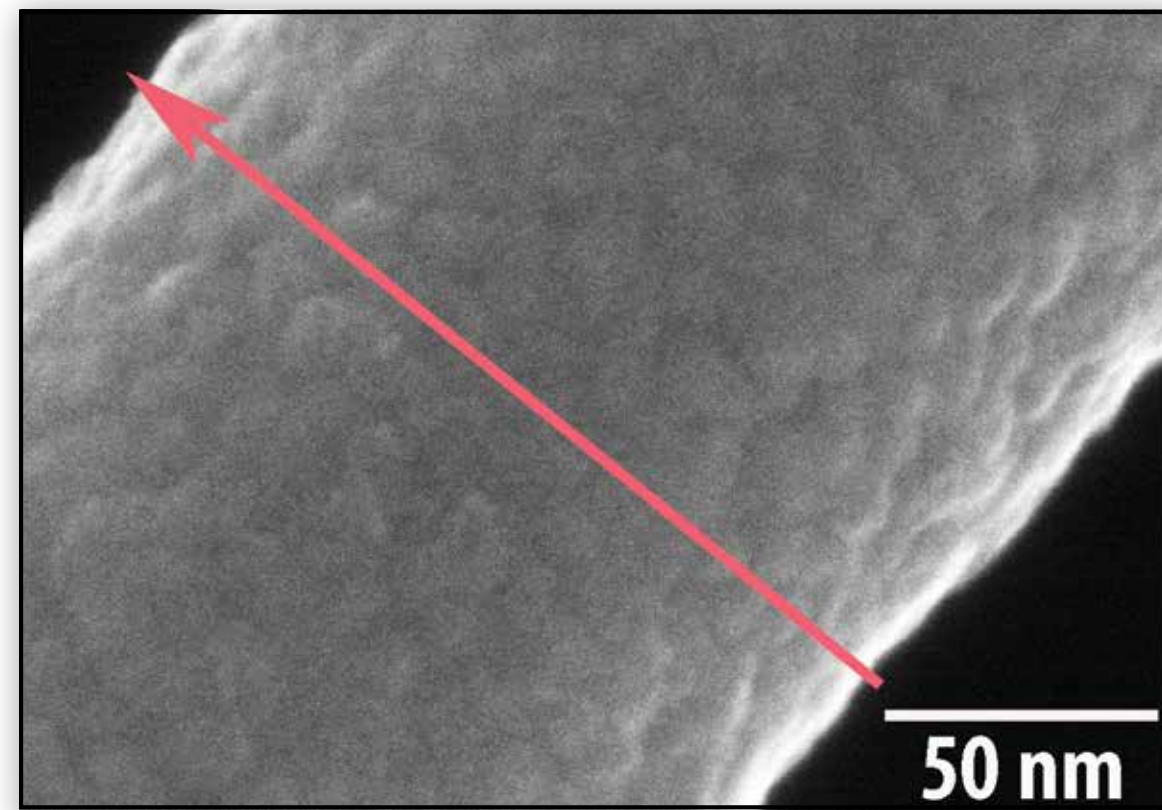


Research at the National User Facilities enables innovative approaches for new energy sources and improved energy technologies.

ENERGY SCIENCE at National User Facilities

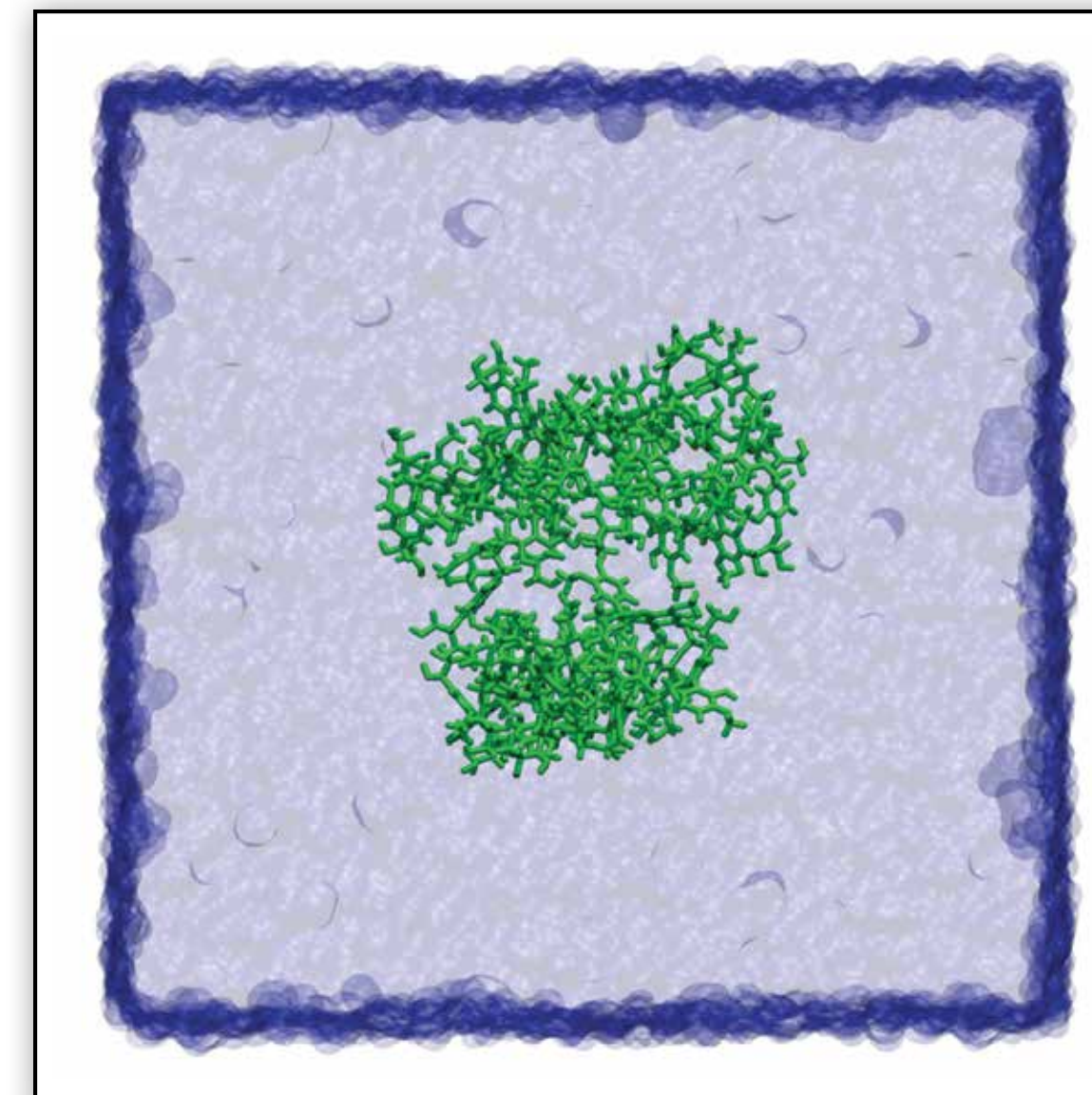
High Temperature Materials Laboratory



High-performance Anodes for Li-ion Batteries

Experiments performed under the HTML User program aided in improving the efficiency of Li-ion batteries. The high-performance anodes produced by Applied Sciences, Inc. (ASI) consist of low-cost carbon nanofibers coated with nanosized silicon-based materials. The anode materials have been assembled into battery cells at General Motors.

High Flux Isotope Reactor



Environmentally Friendly Biofuels

Biomass from plants offers a potentially abundant source of ethanol from the fermentation of sugars. Researchers at HFIR are studying how natural biomaterials such as grains break down, which is leading to better techniques for converting these materials to fuel. More cost-effective conversion methods for biofuels will be a big step in meeting the world's energy needs while protecting the environment.

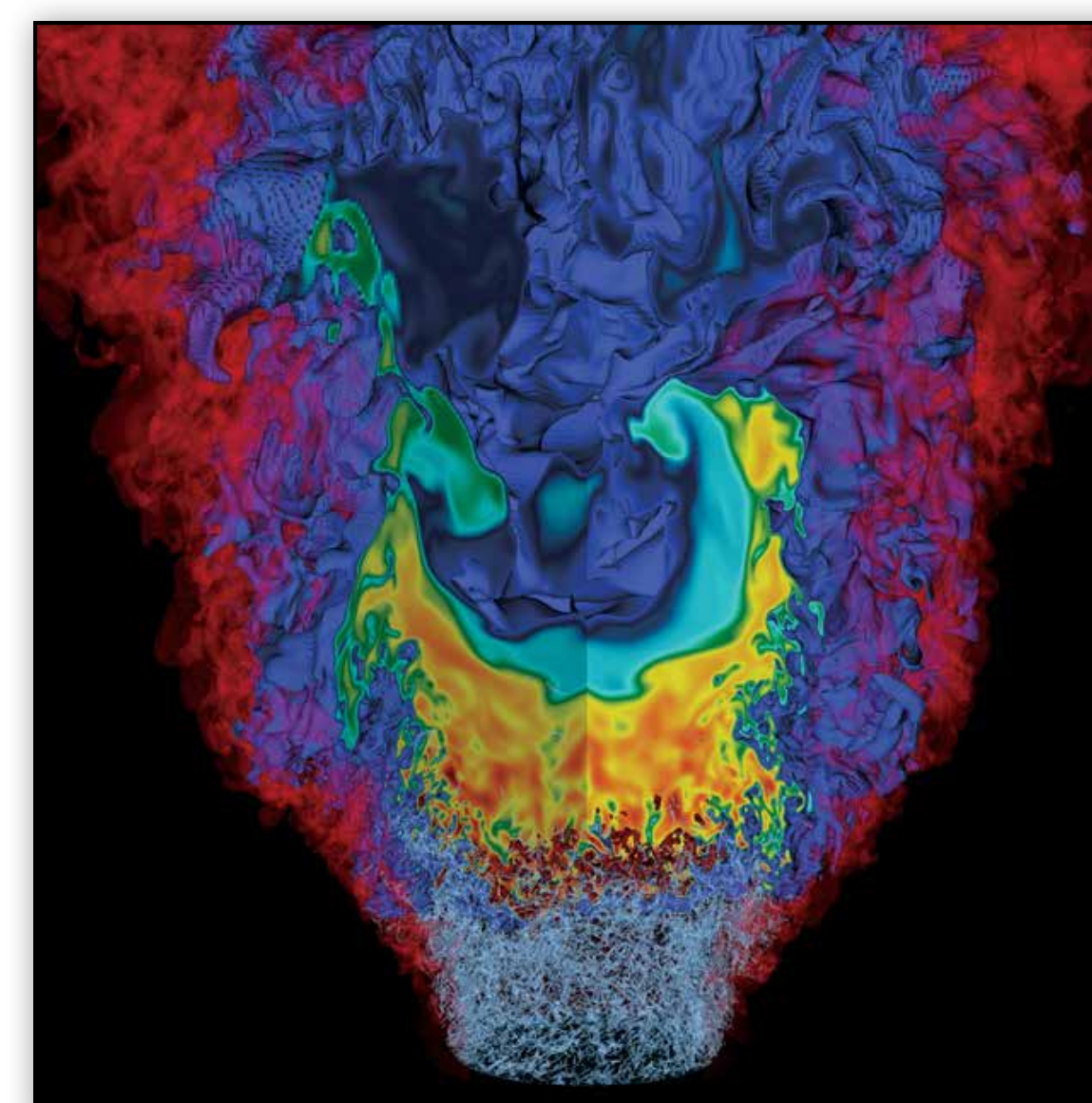
National Synchrotron Light Source



Greener, More Efficient Energy Storage

Researchers from Brookhaven National Laboratory, GE Global Research, Rutgers University and Stony Brook University are using NSLS to probe electrochemical processes in sodium metal halide batteries and develop hydrogen-storage materials for automotive fuel-cell applications.

National Energy Research Scientific Computing Center



Cleaner Combustion

One promising strategy for reducing U.S. dependence on petroleum is to develop new combustion technologies for burning hydrogen or hydrogen-rich syngas fuels obtained from the gasification of coal and biomass. At NERSC progress in simulation science is making one new technology, low-swirl combustion, a frontrunner for this application. Burners using this technology can range in size from home furnaces to industrial boilers and emit up to 100 times less smog-forming chemicals than current burners.

Environmental Molecular Sciences Laboratory



Real Conditions, Real Solutions

EMSL's unique suite of analytical instrumentation enables it to address questions necessary for developing more effective and efficient biofuels. EMSL scientists are studying enzymes found in a wide range of environments from tropical rainforests to the Arctic tundra to identify those most effective at breaking down cell walls in woody biomass plants. This knowledge will allow EMSL, the Joint BioEnergy Institute, and other scientific partner organizations to engineer enzymes that unlock the vast fuel potential in abundant and sustainable domestic feedstocks, such as switch grasses native to the U.S. prairielands.

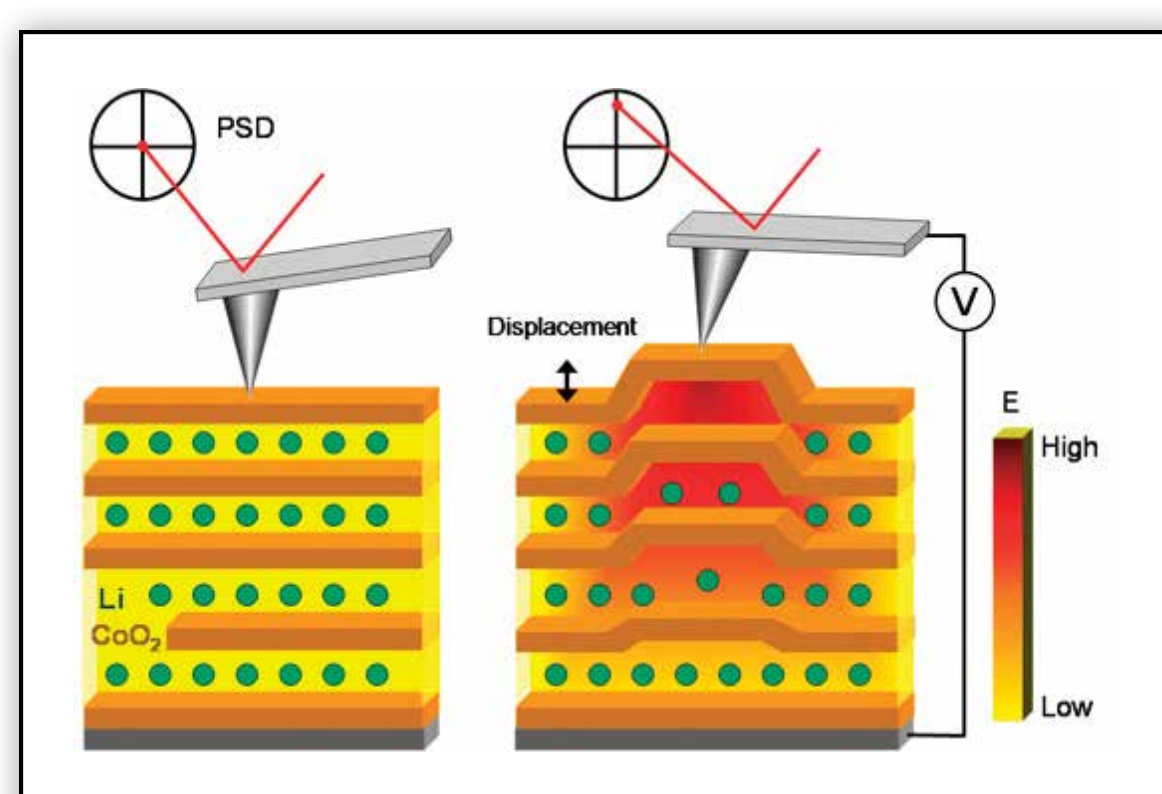
Advanced Light Source



Electricity from Sunlight

The cost-effective conversion of the sun's energy into electricity requires high-efficiency solar cells. The ALS provides tools to study existing and potential new solar cell materials. Recent experiments at the ALS showed that the degradation in performance of traditional solar-cells depends on the size, distribution and chemical state of metal impurities. This result suggests that manipulation of impurities can reduce their adverse impact, instead of requiring their complete removal. This approach may lead to cheaper solar cells made from inexpensive low-grade silicon.

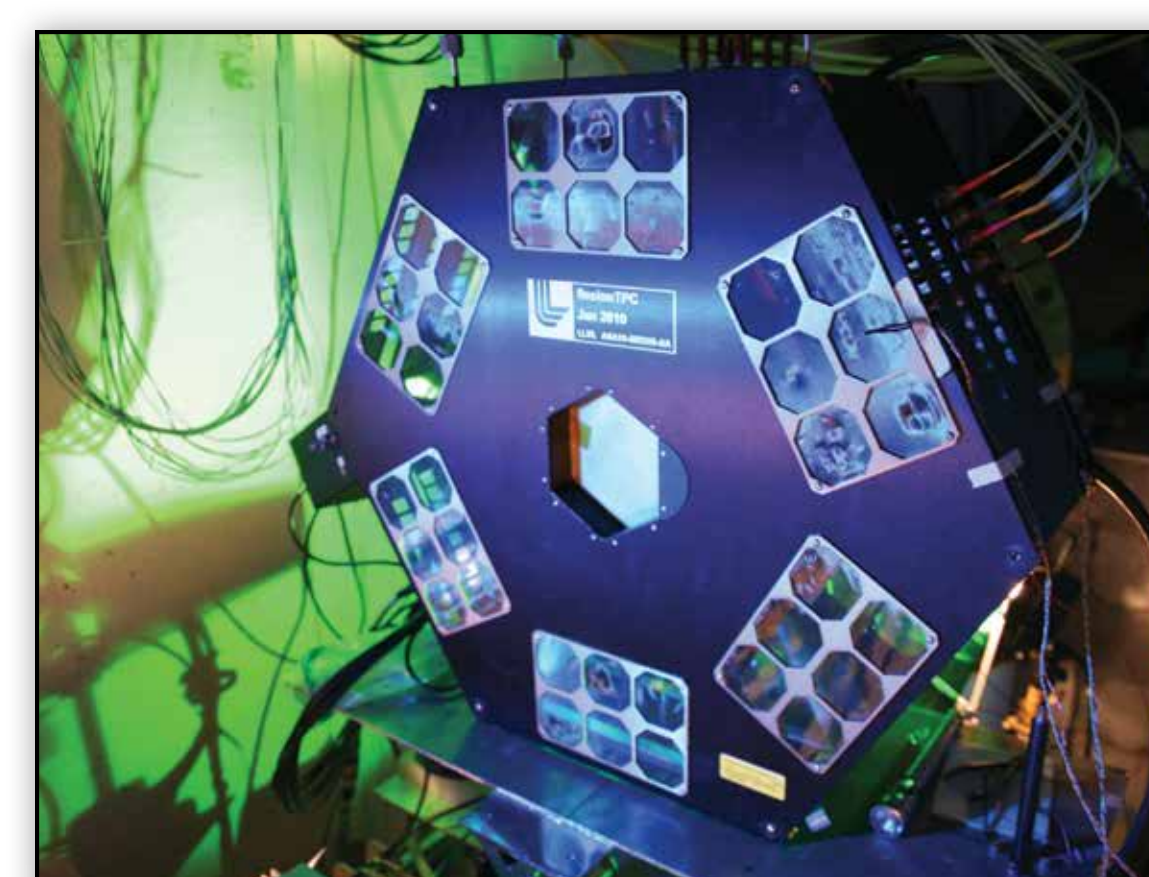
Center for Nanophase Materials Sciences



Development of a New Microscopy Technique To Advance Battery Performance

CNMS scientists have developed a new method to detect the motion of lithium-ions on the nano-scale, which could enhance the performance and lifetime of lithium-ion batteries.

Weapons Neutron Research Facility at LANSCE



Energy Security

Accurate nuclear reaction data are essential for modeling and designing the next generation of nuclear power reactors and for safely extending the life of operating nuclear power plants. The two neutron sources at LANSCE make possible necessary measurements over the entire energy range needed for reactor applications. LANSCE scientists have developed state-of-the-art instruments and techniques to produce the results needed.