Leading the Charge

Argonne's Work to Invent New Battery Materials

Did you know...

The battery in the Chevrolet Volt is based in part on a revolutionary cathode technology pioneered by Argonne National Laboratory. Argonne's discovery helps the Volt's battery—a lithium-ion design similar to those in your cell phone or laptop—last longer, run more safely and perform better than batteries currently on the market.

OPPORTUNITY

Lithium-ion is the battery chemistry of choice in today's electric vehicles, but there is still much room for improvement. Battery manufacturers are faced with challenges such as cost, safety, battery life and performance over a wide range of temperatures.

ARGONNE'S SOLUTION

Argonne's broad basic and applied energy storage research program, along with its many state-of-the-art research tools and facilities, puts the laboratory at the forefront of battery innovation.

Material Design and Synthesis

Argonne scientists design and develop new electrolytes and electrode materials that will increase the specific energy of advanced batteries, while simultaneously providing enhanced stability at a lower cost.

Center for Electrical Energy Storage (CEES) – Tailored Interfaces

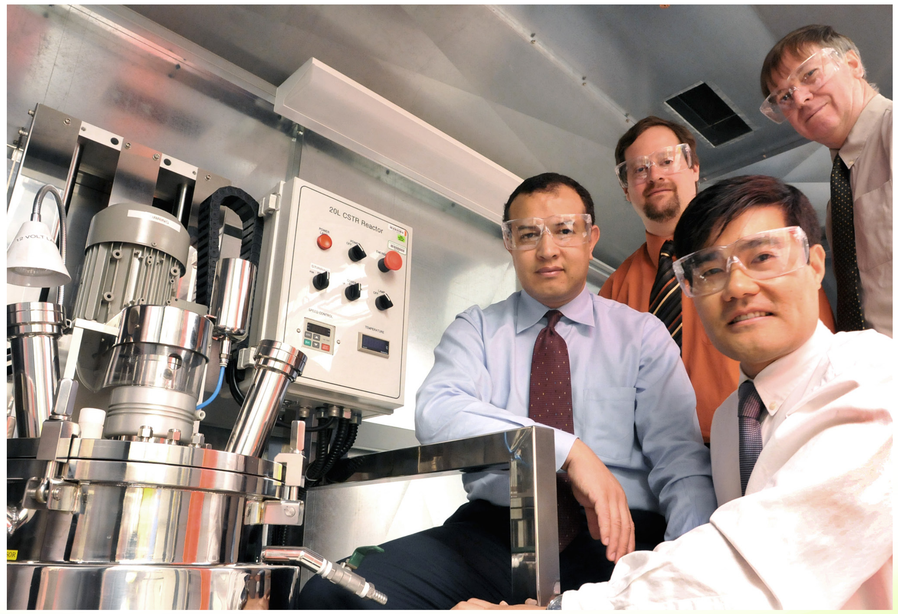
As one of the U.S. Department of Energy's Energy Frontier Research Centers, this center studies the interactions of materials that control electrochemical processes in batteries, and designs novel materials and interfacial structures to improve these devices.

Computational Theory

Argonne's IBM Blue Gene/P supercomputer and other supercomputing systems at the laboratory allow scientists to run complex theoretical models that help design new electrolyte and electrode structures and predict the performance, energy density and safety of new battery materials at the molecular level.

Characterization

At Argonne's Advanced Photon Source and Center for Nanoscale Materials, scientists are able to peer deep inside the atomic arrangements and crystal structures of novel battery materials to see how they operate, providing a fundamental understanding of these substances.



Argonne battery researchers (from left) Khalil Amine, Chris Johnson, Sun-Ho Kang and Mike Thackeray flank a continuously-stirred tank reactor used to produce a cathode material that was licensed for use in the battery that powers GM's Chevrolet Volt.

Argonne researcher Swati Pol loads an in situ lithium-ion battery into the low-energy resolution inelastic X-ray (LERIX) system at the Advanced Photon Source. This multi-element X-ray scattering instrument is helping Argonne scientists to understand the fundamental mechanisms that limit the performance of batteries.

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Visit http://www.cse.anl.gov/electrochem_energy_storage/index.html to learn more!

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