

### *Fabrication and Testing for Materials, Batteries, and Fuel Cells*

Development of greener transportation technologies requires new materials as well as the tools to test them. Argonne National Laboratory's award-winning fabrication, testing, and evaluation capabilities can support development efforts for a wide range of cutting-edge vehicular technologies.

#### **Advanced Materials Fabrication Facility**

Argonne's broad expertise with unusual materials and advanced manufacturing processes has led to commercialization of many innovative materials, numerous U.S. patents, a Federal Laboratory Consortium Special Award for Excellence in Technology Transfer, and a prestigious R&D 100 Award. Facilities are available to support specialty welding and foil applications, as well as specialty metals and targets for irradiation testing. Equipment includes rolling mills, draw benches, tubing reducers, welding equipment (including controlled-atmosphere gloveboxes), induction heat-treating equipment, swaging machines, straightening equipment, hydraulic presses, vacuum and controlled-atmosphere furnaces, hot isostatic press, high-energy impact mill, mechanical testing equipment, and metallographic facilities with which to study microstructures of processed materials.

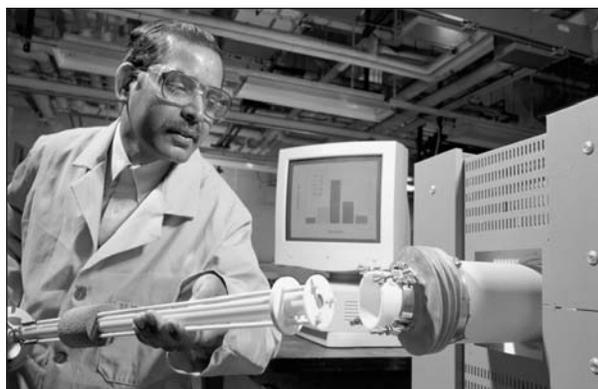
*For more information, go to [www.transportation.anl.gov/ttrdc/facilities/fabrication.html](http://www.transportation.anl.gov/ttrdc/facilities/fabrication.html) or contact Thomas Wiencek at (630) 252-5020.*

#### **Ceramics and Composites Processing Laboratory**

Argonne offers sophisticated fabrication facilities for ceramic and ceramic-composite materials and components. Fabrication facilities support powder preparation and classification (including milling and spray drying), fiber winding, tape casting, extrusion, slip coating, cold pressing, hot pressing, hot isostatic pressing, coating application, and programmed sintering and heat-treating in controlled-atmosphere furnaces. These fabrication facilities are complemented by characterization capabilities that include hardness indentation, mechanical testing at room and elevated temperatures, fiber strength testing, fiber/matrix interface characterization, cryogenic electrical conductivity under applied magnetic fields, optical and scanning electron microscopy, energy-dispersive X-ray analysis, differential thermal analysis, thermogravimetric

analysis, dilatometry, particle-size and surface-area analysis, density measurement, and mass spectroscopy.

*For more information, go to [www.transportation.anl.gov/ttrdc/facilities/ceramics.html](http://www.transportation.anl.gov/ttrdc/facilities/ceramics.html) or contact Balu Balachandran at (630) 252-4250.*



An Argonne researcher prepares to insert a ceramic membrane sample into a high-temperature furnace for performance testing.

#### **Electrochemical Analysis and Diagnostics Laboratory (EADL)**

The EADL provides battery and fuel cell developers with reliable, independent, and unbiased performance evaluations of their cells, modules, and battery packs. Argonne's flexible facilities are equipped to conduct up to 120 concurrent advanced-battery studies under operating conditions that simulate electric-vehicle, hybrid-electric vehicle, utility load-leveling during peak demand periods, and standby/uninterruptible power source applications. Automated test laboratories conduct experimental evaluations to identify existing and potential failure mechanisms and assess component reliability. Environmental chambers are also available for performance characterization and life evaluations at different temperatures. Since 1976, EADL has evaluated thousands of multicell modules and full-size batteries for developers within and outside Argonne.

*For more information, go to [www.cmt.anl.gov/facilities/btf.shtml](http://www.cmt.anl.gov/facilities/btf.shtml) or contact Ira Bloom at (630) 252-4516.*