INDUSTRY at National User Facilities

Highlights in Energy

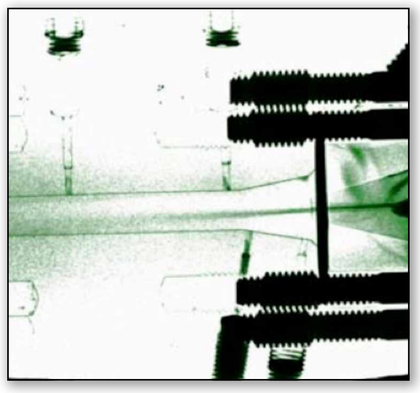
Spallation Neutron Source

Large-format prototype battery for electric vehicles during diffraction experiments at the VULCAN diffractometer of the Spallation Neutron Source.

GM

At the Spallation Neutron Source, GM scientists examine prototype battery cells for electric vehicles. The high-intensity neutron beams are used to observe the charge and discharge of batteries in real time. The experiments track conditions in different sections of the battery's cells as charge and discharge progress.

High Flux Isotope Reactor



Neutron radiograph of jet flow in a functioning ejector spray.

United Technologies

United Technologies, in collaboration with scientists at the High Flux Isotope Reactor, is examining air flow in ejectors that are used for heating, ventilation, and air-conditioning. The images taken using the neutrons from HFIR are used to validate the physical models used to design new ejectors.

Highlights in Health

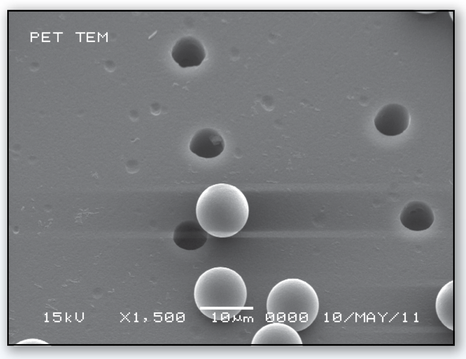
Joint Genomics Institute

Extremophiles, which live in high heat conditions, are harvested from hot pools at Yellowstone National Park and sequenced at JGI.

Lucigen®
Simplifying Genomics

Lucigen uses the genomics database at the Joint Genome Institute to search for heat-stable enzymes for the amplification of DNA, currently a $2 billion per year biotech industry. The focus is on enzymes from organisms that live at elevated temperatures. These enzymes are expected to have increased stability for use in the amplification process.

Tandem Van De Graaff Facility



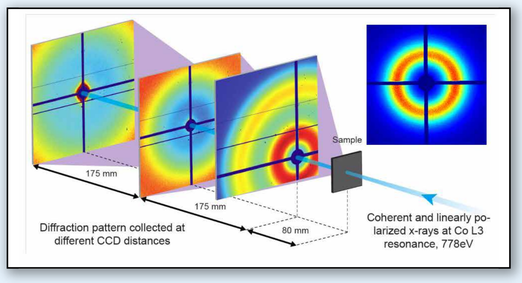
Electron micrograph of a track etched membrane with polymer beads on the surface.

Maine Manufacturing

Maine Manufacturing and GE Healthcare used TANDEM to create "track etch membranes". By exposing plastic films to heavy ions from the accelerator, membranes with specific pore densities and pore sizes are created. These membranes can be used for filtration of cancer cells. Track etch membranes can also detect abnormal white cells (erythrocytes) that no longer have the ability to change shape. These cells cannot pass through the membrane, while healthy ones can.

Highlights in Innovation

Stanford Synchrotron Radiation Lightsource

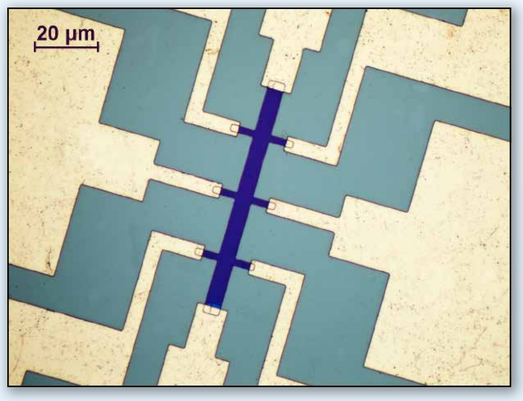


Small angle x-ray scattering pattern at the L3 absorption edge of Cobalt from perpendicular magnetic recording media. The scattering patterns yield information on the size of individual grains in the sample and the size of magnetic clusters.

HGST
a Western Digital company

HGST uses x-ray scattering and imaging techniques at the Stanford Synchrotron Radiation Lightsource to characterize materials and control hardware for next-generation magnetic recording. The measurements provide information about magnetic structure and interactions in recording media. The results from these experiments will provide insights to guide how to improve the capacity of hard disks in the future.

Center for Functional Nanomaterials



Transistor fabricated using graphene

Graphene Laboratories

Graphene Laboratories collaborates with Brookhaven National Laboratory's Center for Functional Nanomaterials to develop new synthesis techniques for graphene, a 2-dimensional form of carbon. In addition to characterization of the materials at CFN, Graphene Laboratories is working with scientists from Stony Brook University to develop chemical sensors based on graphene. Other uses for graphene include use as transparent conductors, solar cells and electronics.