



www.aimlab.umd.edu

*Cutting-edge instrumentation for
nanocharacterization and microscopy*

*Supporting research, education, and
technology development*

*A regional facility open to and serving the
University of Maryland, industry, government labs,
and external academic and nonprofit organizations*

Seeing things at the nanoscale and determining how they behave is essential for nanoscience and nanotechnology to progress. Nanoscale imaging, spectroscopy, and properties identified in the AIMLab tell that story with amazing clarity.

The AIMLab is part of the Maryland NanoCenter, a partnership of the A. James Clark School of Engineering and the College of Computer, Mathematical and Natural Sciences at the University of Maryland. It is part of a full range of state-of-the-art research facilities at the University of Maryland including X-ray diffraction, NMR spectroscopy, and X-ray and ultraviolet photoelectron spectroscopy.

The AIMLab supports the University of Maryland's mission of performing cutting-edge research and providing technologies and services for engineering and science researchers in academia, industry and government; developing future professionals who have hands-on experience in advanced microscopy and composition analysis; and promoting a vibrant technological economy in the state of Maryland through interactions with established and emerging companies.

The AIMLab is supported by the Maryland NanoCenter and the University of Maryland NSF Materials Research Science and Engineering Center (MRSEC).

A textile made of Si-CNT composite yarn with a Li-storage capacity five times higher than graphite electrodes, viewed with a SU-70 SEM.

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UNIVERSITY OF
MARYLAND

CAPABILITIES

TRANSMISSION ELECTRON MICROSCOPY (TEM)

Field emission TEM with EDS and EELS chemical analysis

Energy-filtered TEM (GIF) and holography

LaB₆ TEM with EDS

Heating and cryo capability

Tilt and rotation capability

Tomography

Lorentz microscopy

SCANNING ELECTRON MICROSCOPY (SEM)

Electron microprobe with WDS and EDS analysis

Field emission SEM with EDS analysis

FEG SEM with ultrafast stages

Scanning probe microscopy

FOCUSED ION BEAM (Dual beam)

Micromanipulator system

ATOMIC FORCE MICROSCOPY

SAMPLE PREPARATION

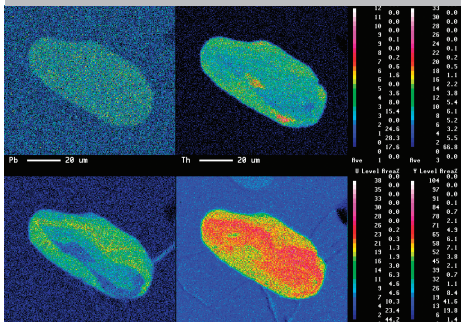
Cutting, polishing, thinning, electro-polishing

Cryo-ultramicrotomy, ion beam thinning

Plasma cleaning

OTHER

FTIR and optical microscopy



THE AIMLAB IS PART OF THE MARYLAND NANOCENTER, A PARTNERSHIP OF:



A. JAMES CLARK
SCHOOL OF ENGINEERING



COLLEGE OF
COMPUTER, MATHEMATICAL,
& NATURAL SCIENCES



APPLICATIONS

CHARACTERIZING MATERIALS AND STRUCTURES

Nanowires and nanotubes

Particles and composites

Ultrathin and multilayer films

Biological systems (cells, viruses, tissues)

Nanoscale devices

IMAGING AT ATOMIC AND NANO SCALES

Atomic resolution

Lattice and defect imaging

Tomography, 3-D reconstruction

ANALYTICAL COMPOSITION AND IMAGING

Compositional analysis

Local chemical bonding

Elemental mapping

IN-SITU ELECTRON MICROSCOPY EXPERIMENTATION AND TESTING

Ultra-fast heating

Thermal response from cryogenic to high temperature

Mechanical, magnetic, and other properties of nano and micro structures

Lorentz microscopy

IMAGE CAPTURE AND ANALYSIS

High resolution digital images and video

3-D imaging, tomography

SCANNING NANOPROBES

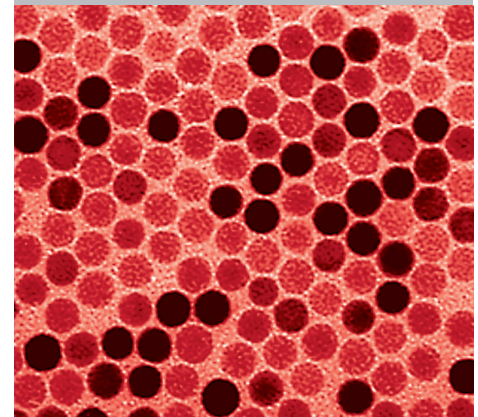
Structure, composition

Materials properties for applications

SURFACE ANALYSIS

High resolution surface topography

Chemical and compositional analysis



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SUPPORTED IN PART BY:

