



MARYLAND NANOCENTER
NISPLAB
NANOSCALE IMAGING, SPECTROSCOPY AND
PROPERTIES LABORATORY

www.nisplab.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 NISPLab tell that story with amazing clarity.

The NISPLab is part of the Maryland NanoCenter, a partnership among the A. James Clark School of Engineering, the College of Chemical and Life Sciences, and the College of Computer, Math and Physical 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 NISPLab supports 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 NISPLab is supported by the Maryland NanoCenter and the University of Maryland NSF Materials Research Science and Engineering Center (MRSEC).

Atomic resolution image of the interface between BaTiO₃-CoFe₂O₄ multiferroic nanocomposite. Image taken with a JEOL 2100 F field emission TEM.

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UNIVERSITY OF
MARYLAND

CAPABILITIES

TRANSMISSION ELECTRON MICROSCOPY (TEM)

Field emission TEM with EDS and EELS chemical analysis*

LaB₆ TEM with EDS*

Heating and cryo capability*

Tilt and rotation capability*

400 keV TEM imaging

SCANNING ELECTRON MICROSCOPY (SEM)

Electron microprobe with WDS and EDS analysis

Field emission SEM with EDS analysis*

Environmental SEM with hot and cold stages and straining capability

Scanning Auger and small spot x-ray photoemission analysis*

SCANNING PROBE MICROSCOPY

Low temp scanning microwave*

ATOMIC FORCE MICROSCOPY

SAMPLE PREPARATION

Cutting, polishing, thinning

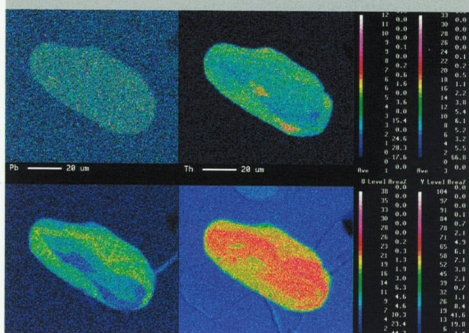
Cryo-ultramicrotomy

Plasma cleaning*

OTHER

FTIR and optical microscopy

** Major, new or newly-enhanced capability*



THE NISPLAB IS PART OF THE MARYLAND NANOCENTER, A PARTNERSHIP AMONG:



A. JAMES CLARK
SCHOOL OF ENGINEERING

COLLEGE of CHEMICAL AND LIFE SCIENCES

cmPS

at the edge of discovery ...

College of Computer, Mathematical and Physical 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

ANALYTICAL COMPOSITION AND IMAGING

Compositional analysis

Local chemical bonding

Elemental mapping

IN-MICROSCOPE EXPERIMENTATION AND TESTING

Thermal response from cryogenic to high temperature

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

IMAGE CAPTURE AND ANALYSIS

High resolution digital images and video

Image analysis, tomography

SCANNING NANOPROBES

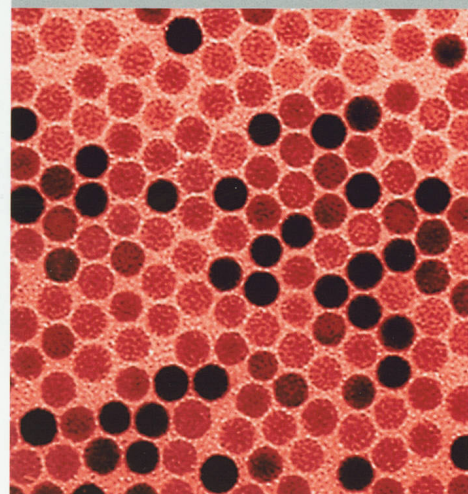
Structure, composition

Materials properties for applications

SURFACE ANALYSIS

High resolution surface topography

Chemical and compositional analysis



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SUPPORTED IN PART BY:

