



Electron Microscopy Laboratory

Post-irradiation Examination

The Electron Microscopy Laboratory (EML) is a user facility dedicated to materials characterization, using primarily electron and optical microscopy tools. Sample preparation capabilities for radioactive materials ensure that high-quality samples are available for characterization.

BASIC CAPABILITIES:

- Scanning electron microscopy (SEM) with microchemical analysis and grain-orientation imaging
- Dual-beam focused ion beam (FIB) with microchemical analysis and orientation imaging
- Transmission electron microscopy (TEM) with microchemical analysis
- Optical microscopy
- Microhardness testing

- Precision ion polishing and coating systems
- Sample preparation of irradiated metals, ceramics, and small quantities of irradiated fuel for examination in gloveboxes and chemical hoods

KEY INSTRUMENTS:

- JEOL JSM-7000f SEM with energy dispersive X-ray spectroscopy (EDS), wavelength dispersive spectroscopy (WDS) and electron backscatter diffraction (EBSD) detectors
- Gatan precision ion polishing systems (PIPS-2)
- Gatan precision etching and coating system (PECS)
- LYRA 3GM is a FIB/SEM workstation from TESCAN. The system is equipped with Aztec Oxford Instruments suite for EDS/EBSD characterization, LEICA cryo-stage, and

Alemnis nanomechanical testing. The microscope has the Omniprobe200 manipulator for in-situ sample lift out, and two gas injection systems for carbon and platinum deposition. The integration of complementary analytical tools will allow researchers to characterize complex samples and rapidly solve analytical problems.

- FEI Talos F200x S/TEM equipped with Super-X EDS, Gatan Quantum electron energy loss spectroscopy (EELS) and ASTAR/TOPSPIN systems, enabling high-resolution/high-speed imaging and chemical analysis and grain orientation and strain mapping

Researchers at the Electron Microscopy Laboratory use electron and optical microscopes to characterize materials as well as prepare high quality samples from radioactive materials.

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