Materials Characterization
October 29, 2012

Missouri University of Science and Technology

Founded 1870 | Rolla, Missouri | www.mst.edu
Graduate Center for Materials Research

$6.3M Renovation of Straumanis-James Hall
Completed Spring 2012
**MRC Background**

- Annually >$5M shared credit expenditures, ~30 faculty, ~75 grad students, ~2000 samples run, ~30 external users
  - Majority of campus patents and royalty income
- Maintains materials analytical equipment (AMCL)
Major Analytical Equipment

- FIB
- SEM
- TEM
- XRD
- XPS
- DTA/DSC
Advanced Materials Characterization Lab

http://amcl.mst.edu/
Helios Nanolab 600
Dual Beam FIB / HRSEM
Cross-sectional Analysis

As-deposited

5 µm

10 µm
With computer-controlled automatic milling, slicing and imaging, 3D microstructure reconstruction can be generated by using the Helios.

3D Structure Reconstruction

Grain Orientation Mapping by EBSD
TEM Sample Preparation
TEM Chemical Composition of Multiple Layers on Steel Surface
Precipitates in Steel and Diffraction Analysis
Selected area diffraction analysis identifies three types of precipitates in a nickel-based superalloy.
X-Ray Diffraction

Thin Film Diffractometer  Multi-Purpose Diffractometer (MPD)