Camcor

Center for Advanced Materials Characterization in Oregon

Microanalytical Fields of Application:

- Thin Film Characterization
- Trace Elements
- Diffusion Profiles
- Corrosion Studies
- Nanoscale Materials
- Microscale Materials
- Opto-Electronic Materials
- Igneous, Metamorphic and Sedimentary Petrology
- Ceramics and Glasses
- Metallic Alloys
- Organometallic Phases
- Art History and Archeological Materials

Microanalytical Facility
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CAMCOR
Microanalytical Facility
University of Oregon

EPMA
(Electron Probe Micro Analysis)
SEM
(Scanning Electron Microscopy)

Microanalytical Facility

The Microanalytical Facility is a component of the Center for Advanced Materials Characterization in Oregon (CAMCOR)

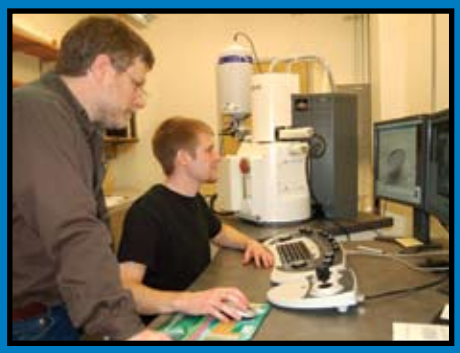
The CAMCOR facilities comprise a comprehensive suite of capital-intensive instrumentation for the characterization of novel nanoscale and microscale materials, operated by dedicated expert personnel. The facilities are available to academic researchers and industrial scientists.

Mission Statement

To provide state-of-the-art materials characterization facilities to researchers at regional academic institutions and companies

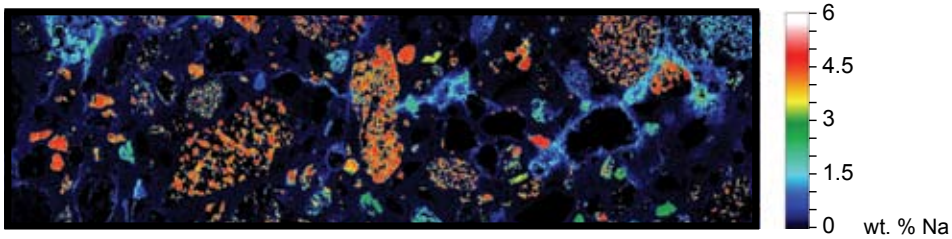
To foster collaborative interactions between faculty and researchers at academic institutions and industries in the Regional Northwest

To provide short courses, seminars and workshops on characterization techniques and provide hands-on training facilities for the participants



Electron Probe MicroAnalyzer (Cameca SX50 and SX100)

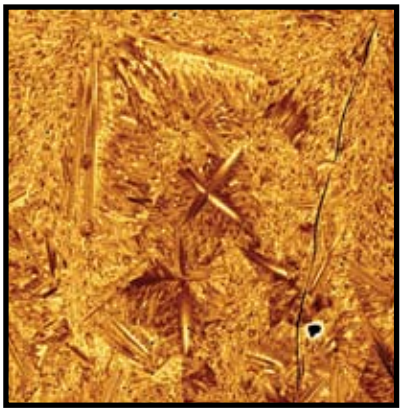
- Compositional analysis on the micrometer and submicrometer scale
- Elemental identification (qualitative analysis)
- Quantitative compositional analysis (Be-U), at 100% to ppm levels
- Thin film characterization (composition and thickness simultaneously)
- X-ray shift measurements for bond properties
- Element mapping (qualitative and quantitative)
- Secondary and backscatter imaging



Corrosion resistant concrete, quantitative x-ray map of sodium concentration

Scanning Electron Microscope (Zeiss Ultra High Vacuum and Variable Pressure SEM)

- High resolution backscatter and secondary electron imaging
- Cathodo-luminescence imaging of non-conductors and semi-conductors
- Qualitative and Quantitative element composition
- Elemental x-ray mapping of 16 elements simultaneously
- Quantitative spatial characterization of surfaces using 3-D reconstruction
- Electron beam lithography of novel devices at the nanometer scale
- 2 nm spatial resolution
- High sensitivity in-lens detection
- Imaging of uncoated insulators/artifacts

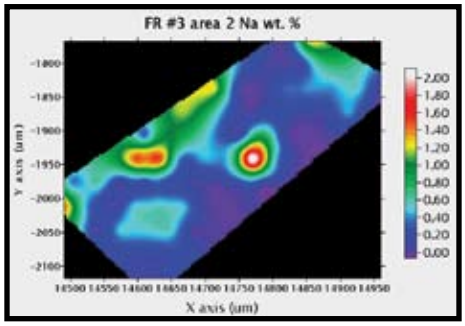


Thermo-electric thin film material (precursor), electron backscatter image

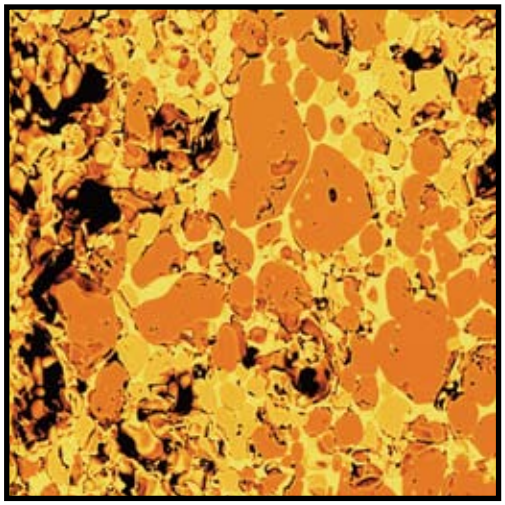
Reconstructed digital elevation model (DEM) of wrinkled glass surface at 500 x, using stereo imaging in the SEM

EPMA instrument/software features:

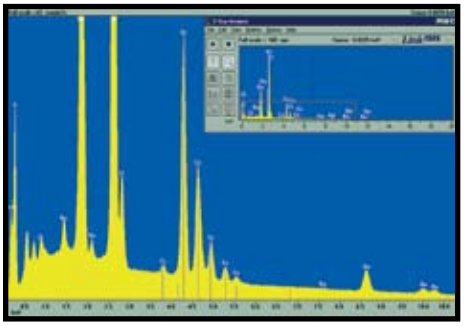
- Dynamic correction for beam sensitive materials allows quantitatve compensation of elemental intensity changes over time
- Quantitative correction for spectral interferences and wavelength dispersive spectrometers allow quantification of previously difficult analyses such as Na in the presence of Zn, or Si in the presence of Ta
- Peak shape and shift characterization allows studies of valence-induced peak artifacts
- Complete stage, spectrometer and column automation for unattended operation provides round the clock operation for rapid turn around
- High speed modeling for background corrections allows faster data acquisition of major and minor elements
- Detailed homogeneity, sensitivity and detection level statistics provide t-test statistics on analytical sensitivity and error analysis
- Remote Access for instrument operation



High strength cement mortar, quantitative x-ray map of sodium concentration



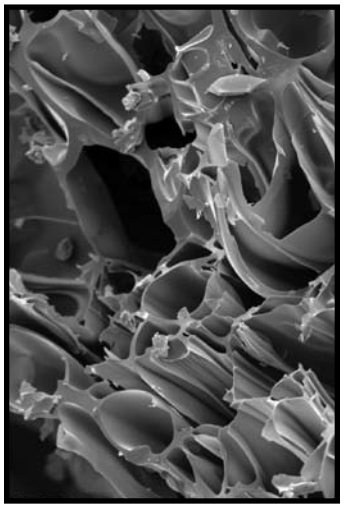
Tin-tungsten oxide sputter target, electron backscatter image



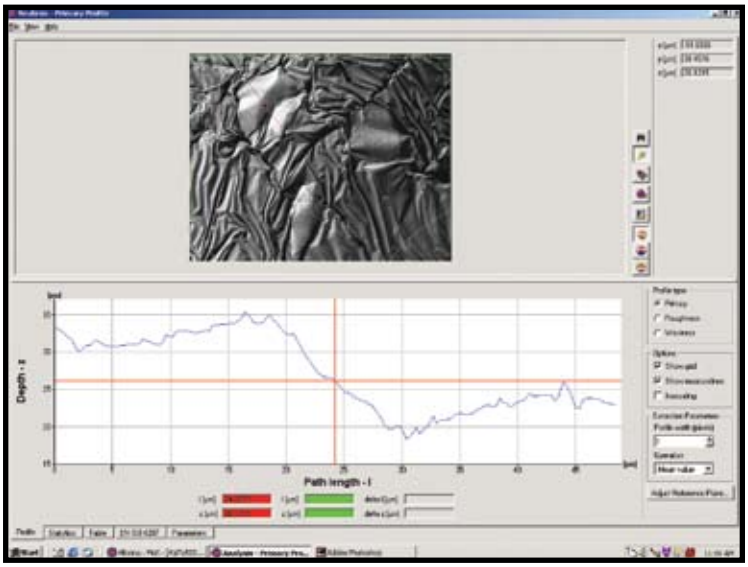
Fast high resolution spectrum acquisition and qualitative analysis of unknown materials

SEM instrument/software features:

- Quantitative image analysis allows determination of image composition and size and/or shape features using metrification and modal analysis processing software
- Ability to characterize spatial information, surface texture, topography, porosity, etc., quantitatively using stereo reconstruction in 3 dimensions
- Automated beam and stage for nano-lithography allows for rapid and automated creation of prototype nano-patterns down to nm scales
- Remote Access for instrument operation



Natural and synthetic porous materials, secondary electron image



Sub micron scale quantitive profile of wrinkled glass surface

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Location

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Other CAMCOR Facilities

(TEM, NMR, XRD, SIMS, XPS)
Lucy Biggs
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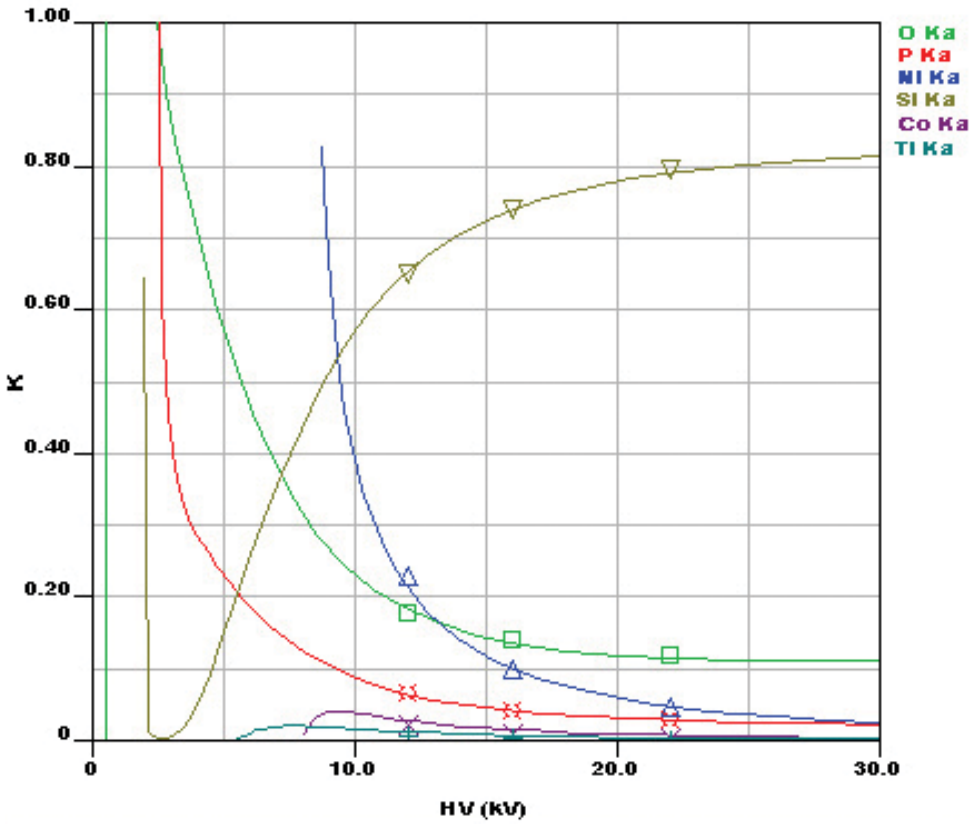
MicroAnalytical Facility provides numerous analysis tools and expertise for data interpretation



Ni-P oxide thin film on Si substrate. Multiple voltage EPMA analysis of thin film materials provides fast and accurate characterization over a wide range of composition and thickness.

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