

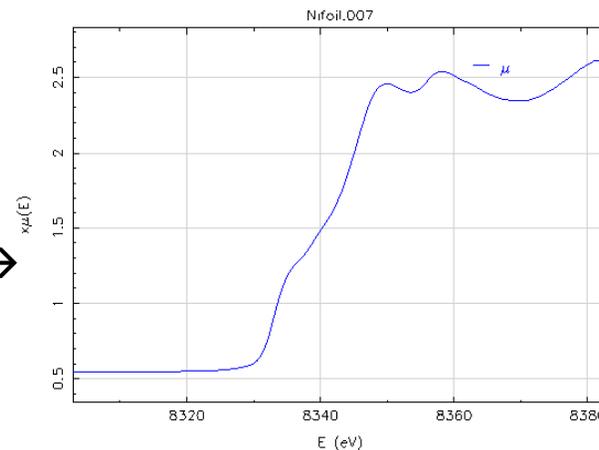
X-ray Absorption Near Edge Spectroscopy (XANES)

XANES:

- Element specific
- Highly sensitive to bond angles, bond lengths, and the presence of adsorbates

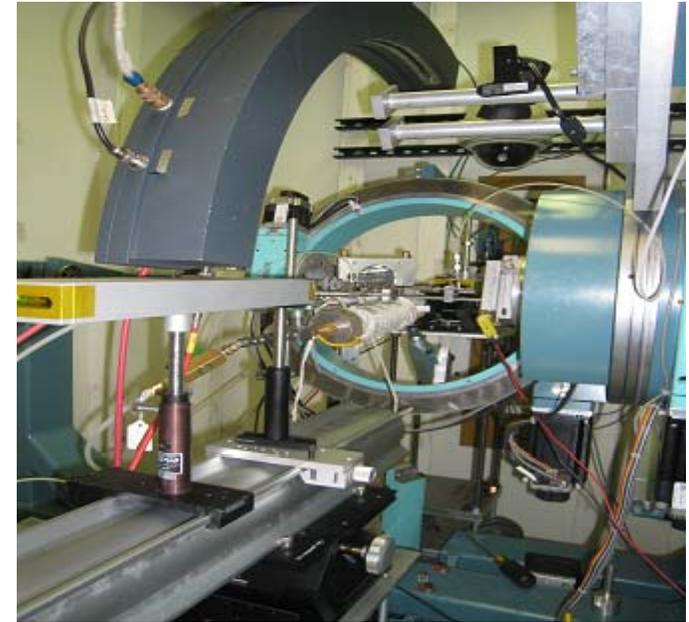
NEXAFS (Near Edge X-ray Absorption Fine Structure):

- Synonymous with XANES but soft x-ray spectroscopy (< 1keV)
- Fine structure within about 30 eV of the absorption edge



XANES features are dominated by multiple-scattering resonances of the photoelectrons ejected at low kinetic energy. Large scattering cross section.

INFORMATION WE GET: Atomic position of neighbors, inter-atomic distances, and bond angles



EXAFS-XANES / XRD Combination Spectroscopy

- XAFS-XANES and XRD techniques give complementary information about the structure of materials.
- XRD is effective in materials with medium- to long-range order while XAFS provides short-range information.
- The simultaneous collection of the XRD and XAFS-XANES data in situ will allow the measurement of changes in the actual structure (in the short-, medium- and long-range order), electronic properties and chemical activity of the materials.

The first dedicated combined XRD/XAS instrument was built at beamline X18A.