

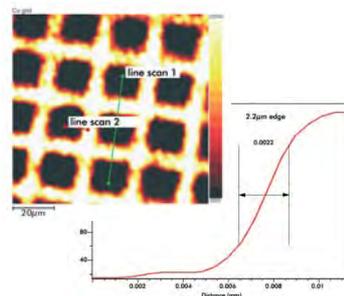
X-ray Photoelectron Spectroscopy Capability for Chemical Imaging

Capability/Need

- First EMSL instrument using X-ray photo-electron (XPS) spectroscopy for chemical imaging
- Combined with *in-situ* temperature programmed desorption and ultraviolet photoelectron spectroscopy (UPS), this instrument is **unique** in providing chemical, electronic structural, and morphological information before/after reactions
- Includes delay-line detector for XPS and UPS, reactor cell, and low-temperature setup for liquids

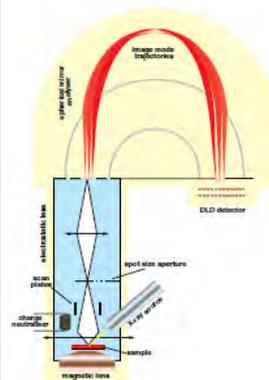
Science/Users

- Provides local composition and chemical-state information with micron resolution
- Provides information about catalyst structure and effects of processing and aging on catalysts
- Ability to verify structures of advanced materials designed for sensors, fuel cells, and energy storage.
- Determines the local composition and chemical state of contaminants on mineral surfaces



Resolution ~ 1-2 µm

KRATOS Axis Ultra^{DLD}



Photoelectron Spectrometer

EMSL Strategy Alignment; Specifics

- Science themes: Biological Interactions/Dynamics; Geochemistry/Biogeochemistry and Subsurface Science; Science of Interfacial Phenomena
- Cross-cutting challenges: Static-Dynamics; Unprecedented Resolution; Design/Synthesis of Complex Materials; Bridging Scales
- EMSL capability area: Spectroscopy and Diffraction
- Anticipated availability: September 2010
- Technical POCs: Ponnusamy Nachimuthu, Mark Engelhard