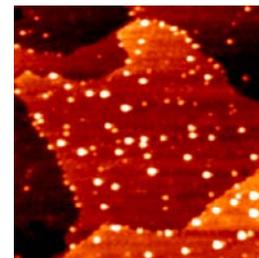
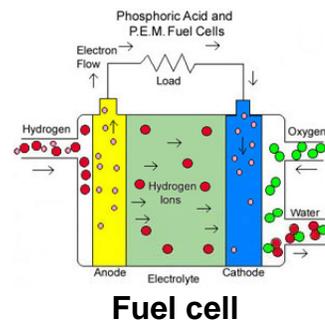


Chemical and Energy Sciences at the NSLS-II

Many scientific areas in chemical and energy sciences research

- catalysis
- electrochemistry
- battery development
- geochemistry
- environmental chemistry
- energy storage
- etc ..



Catalyst: Cu on TiO₂

need methods of analysis based on synchrotron radiation (XRD, XAFS, PDF, PE, LEEM, etc)

interested groups:

BNL:

- Chemistry Dept.
- Materials Science Dept
- NSLS
- CFN

SBU:

- Dept of Chemistry
- Dept of Materials science
- Dept of Geosciences

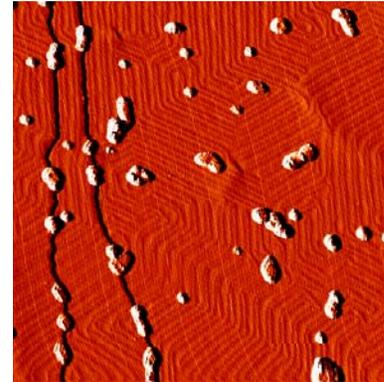
The key scientific drivers for chemical transformations identified at a series of strategic planning workshop for the Chemical and Energy Sciences community held at Brookhaven are:

- atomistic real-time understanding of the mechanism of chemical reactions
- characterization of the structural and electronic properties of functional materials.

Challenge: We need to characterize chemical transformations occurring in a wide range of materials and reaction times



macro-powder



200 nm x 200 nm

model single crystal

Multiple scales of spatial and temporal metrics

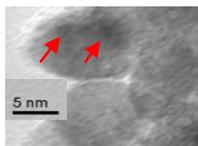
- Development of combined multi-technique methodologies and instrumentation for real time, *in-situ* studies
- Development of instrumentation that simulates laboratory and industrial conditions for energy release, storage, and generation

Proposals for beamlines at the NSLS-II with participation of the Chemical and Energy Sciences Community

INTRODUCTION		Chemical and Energy Sciences (CES) at the NSLS-II						
The Hard X-ray Nanoprobe (HXN)	The X-ray Powder Diffraction (XPD)	The Inner Shell (ISS) and Time-Resolved (TRS) Spectroscopies	The Photoemission - Microscopy Facility (ESM)	The Quick Absorption and Scattering (QAS)	The High Resolution Photoemission and Spectroscopy (SXS)	The Powder Diffraction Beamline (IXD) for in situ studies	The 40 KeV Powder Diffraction (ICT) beamline for in situ studies	The Tender X-ray Spectroscopy (TES)
		Letter of Intent	Letter of Intent	Letter of Intent	Letter of Intent	Letter of Intent	Letter of Intent	Letter of Intent
Design report	Design report	ISS proposal TRS proposal	ESM proposal	QAS proposal	SXS proposal	IXD proposal	ICT proposal	TES proposal

Objective:

-Development of combined, multi-technique methodologies and instrumentation for real time, *in situ* characterization of materials and processes relevant to catalysis, electrochemistry, batteries, energy storage, environmental science, etc



TEM: Au-CeO₂ catalyst

Powder-like materials

Beamlines:

ISS, QAS, IXD
TES, ICT

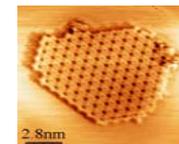
(XAFS, XRD, PDF)

Surfaces, films

Beamlines:

ESM, SXS

(PE, PEEM, NEXAFS)



STM: RuS₂ on Au(111)