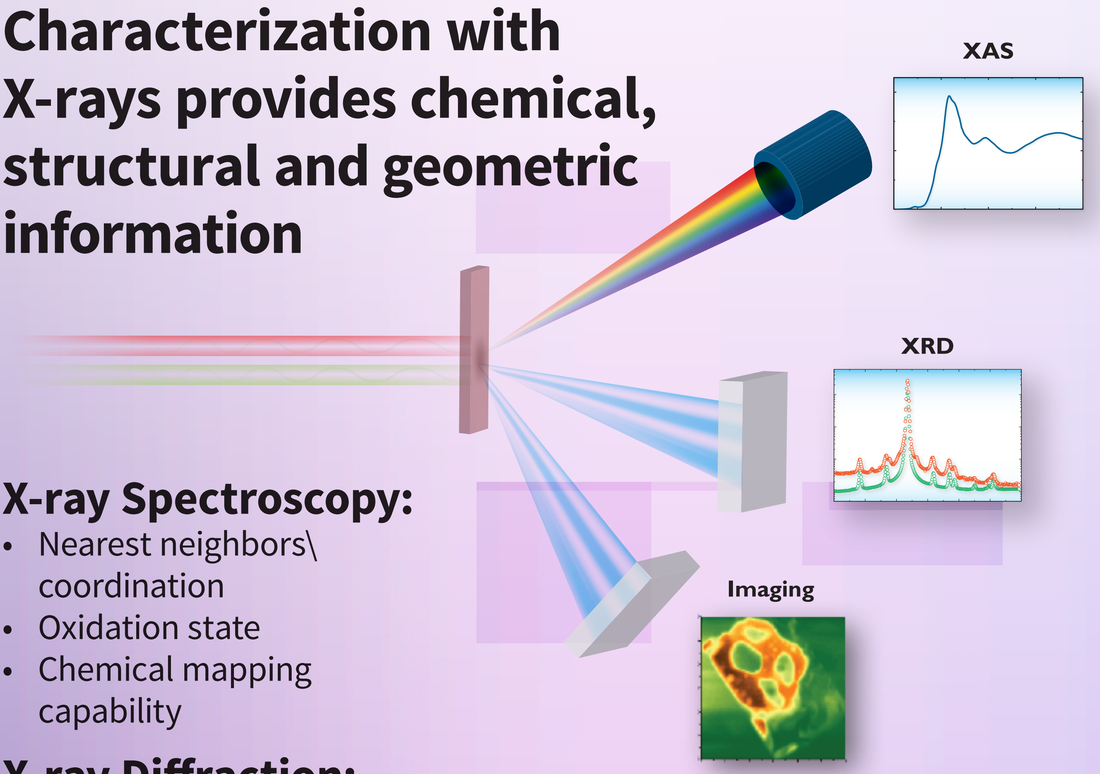
X-ray Diffraction Computed Tomography

TO STUDY RADIOACTIVE MATERIALS

National Synchrotron Light Source II (NSLS-II) & Nuclear Science User Facilities (NSUF)

Characterization with X-rays provides chemical, structural and geometric information



X-ray Spectroscopy:

- Nearest neighbors\ coordination
- Oxidation state
- Chemical mapping capability

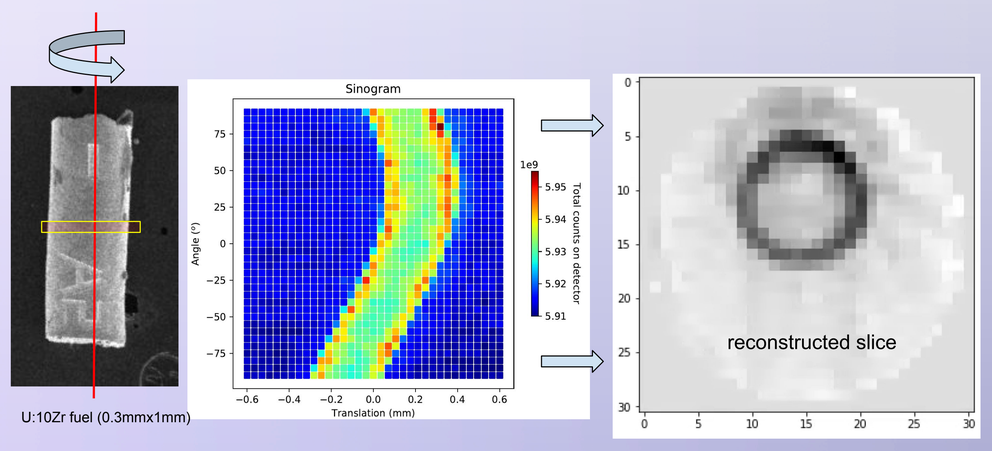
X-ray Diffraction:

- Crystal structure
- Lattice parameter
- Strain (isotropic/anisotropic)
- Grain or domain size
- Point defects and dislocations

Imaging:

- Morphology
- Mapping capability for information from absorption and diffraction

X-ray Diffraction Computed Tomography

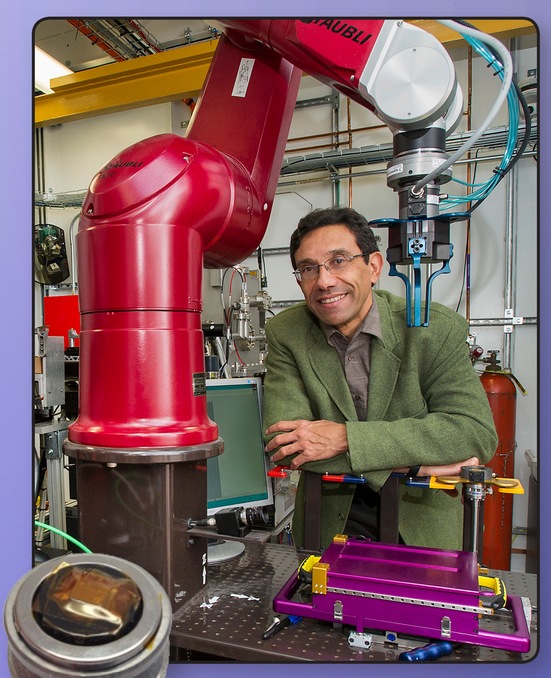


X-ray diffraction computed tomography (XRD-CT) provides multimodal imaging of morphology, crystal structure and chemistry simultaneously

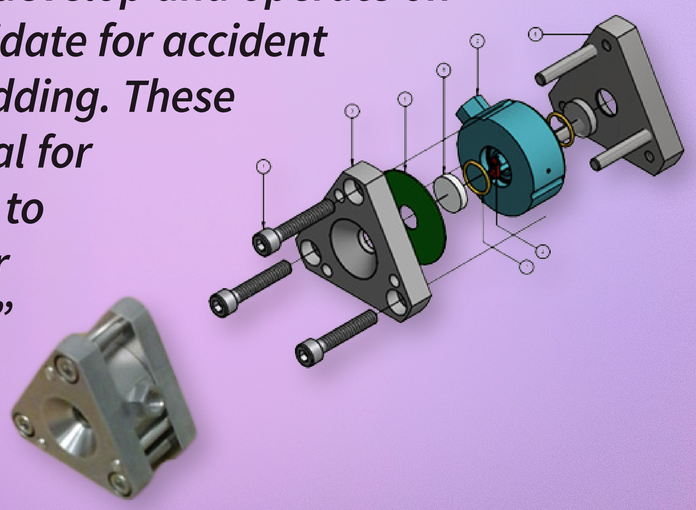
Guaranteed access to X-ray Powder Diffraction Beamline through NSUF

250 hours of beam time each year at the X-ray Powder Diffraction beamline for NSUF users

- NSLS-II is a DOE user facility with support infrastructure, guest center, training, accommodations, established proposal process
- Radiation handling and shipping and receiving for radioactive samples
- Scientific support for proposals, experiments, and data analysis



Eric Dooryhee with the XPD Beamline Robot



Radioactive Sample Holder

"Our collaborations with the National Synchrotron Light Source have helped in understanding how protective passive films develop and operate on engineering alloys candidate for accident tolerant nuclear fuel cladding. These advancements are crucial for designing safer reactors to produce clean energy for the community at large."

– Raul Rebak,
GE Global Research

Lynne E. Ecker, PhD
Nuclear Science & Technology Dept.
Brookhaven National Laboratory
Tel: (631) 344-2538
Email: Lecker@bnl.gov

BROOKHAVEN NATIONAL LABORATORY

NSUF Nuclear Science User Facilities

INL Idaho National Laboratory