



Nuclear Science Center

C. Corey Hines, Director | *WSU Spring 2021 Instrument Expo*

The collage consists of 12 hexagonal images arranged in a circular pattern. The images depict various scientific and technical activities:

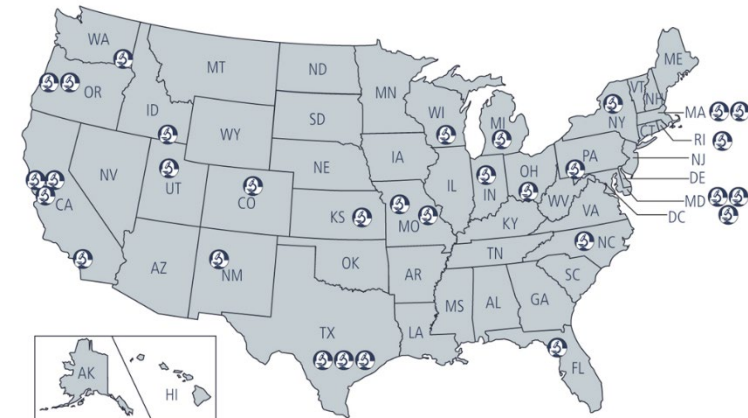
- Top Left:** A group of people, including students and faculty, standing in a laboratory or classroom setting.
- Top Center:** A close-up of a robotic arm labeled "APEX II" with a purple glove, performing a task.
- Top Right:** Two students in lab coats working with a pipette and a beaker in a laboratory.
- Middle Left:** A student operating a control panel with a large screen displaying a blue interface.
- Middle Center:** A student working on a control panel.
- Middle Right:** A student working on a control panel.
- Bottom Left:** A student working on a control panel.
- Bottom Center:** A student working on a control panel.
- Bottom Right:** A student working on a control panel.
- Bottom Center (Inset):** A gamma spectrum plot showing peaks for Br-82 and Br-80. The plot includes a table of data:

Isotope	Energy (keV)	Count
Br-82	554	619
Br-82	698	698
Br-82	777	828
Br-82	828	828
Br-80	104	104

The plot also shows a "Livetime: 296.3" value.

- Operational Excellence
- Innovative Research and Support
- Workforce Development

U.S. Nuclear Research and Test Reactors



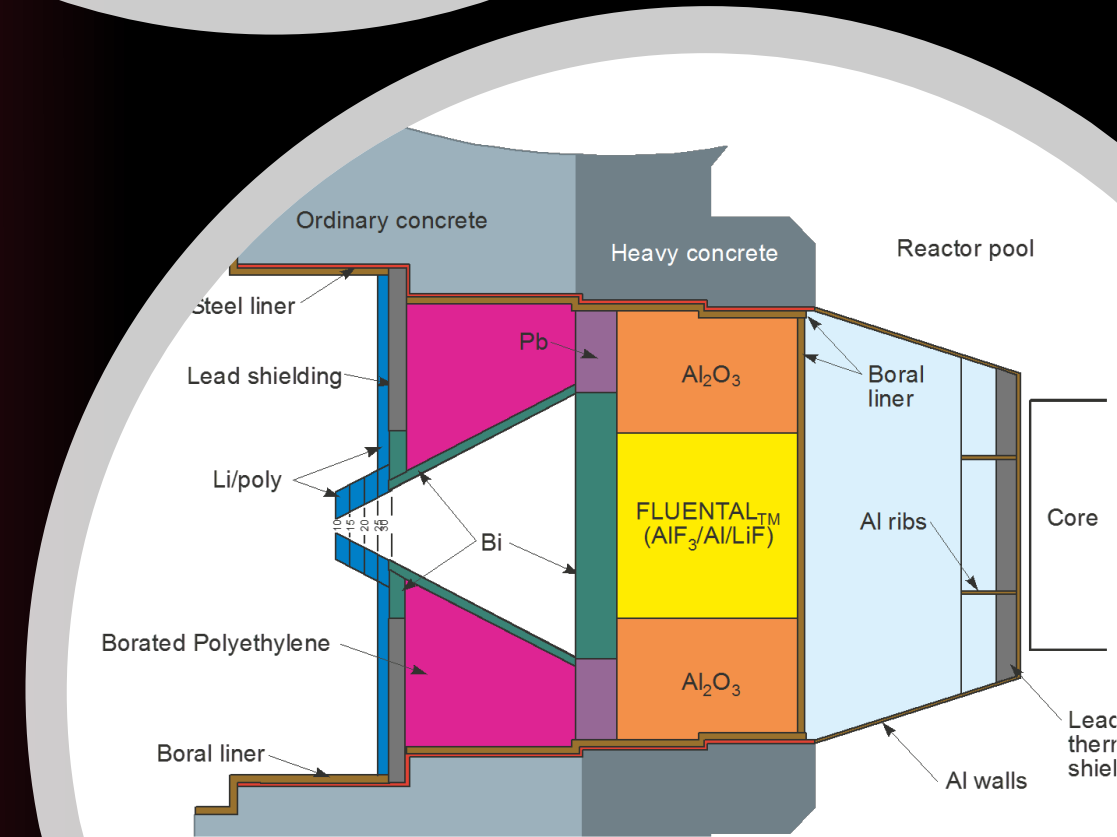
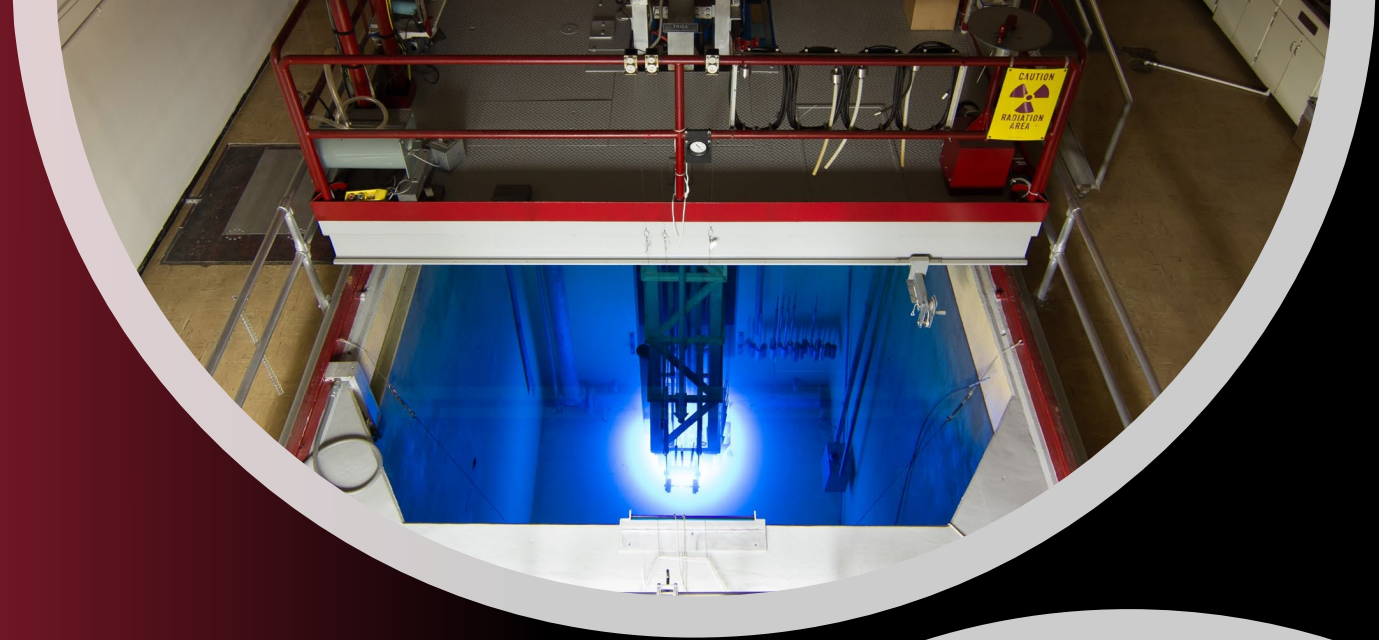
source | www.nrc.gov

 RTRs Licensed/Currently Operating (31)



1 MW TRIGA nuclear reactor facility

- short- and long-term irradiations
- thermal flux: 5.2×10^{12} n/cm²s
- epithermal flux: 1.0×10^{12} n/cm²s
- fast flux: 5×10^{11} n/cm²s
- epithermal beamline: 1.49×10^9 n/cm²sec
- also – Co-60 and Cs-137 gamma irradiators
- ALL ONLINE NOW!

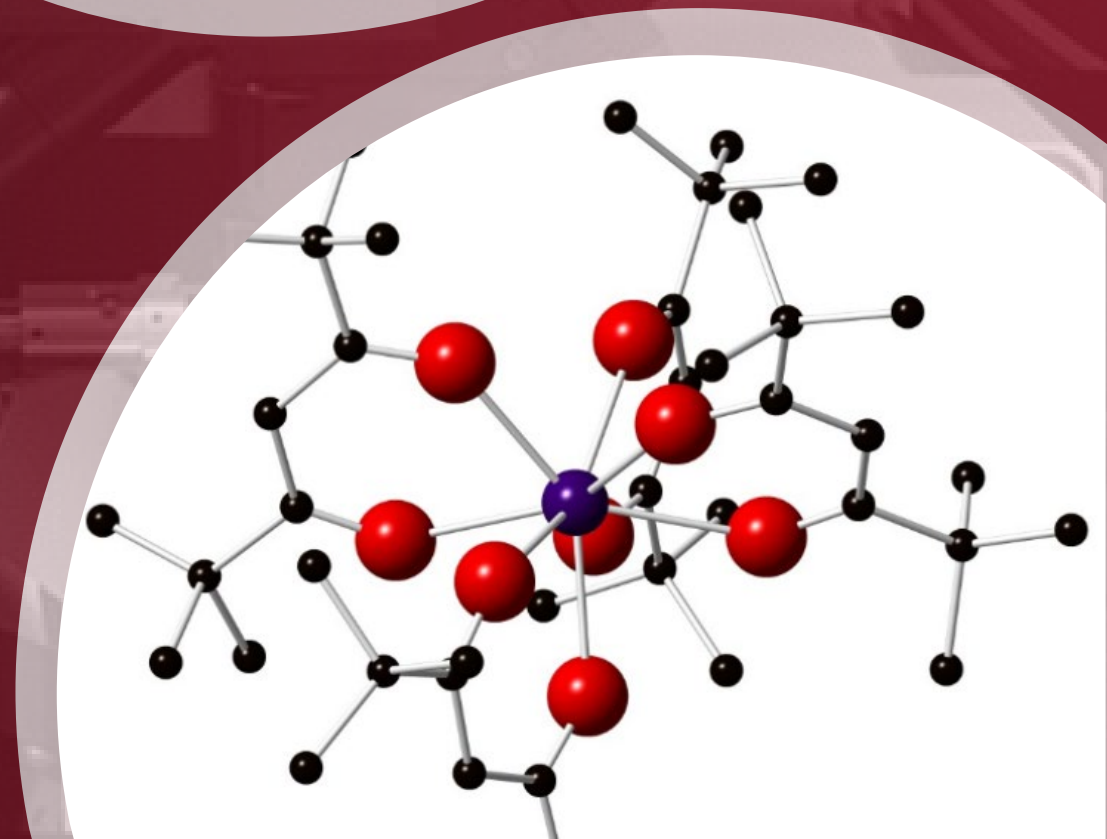
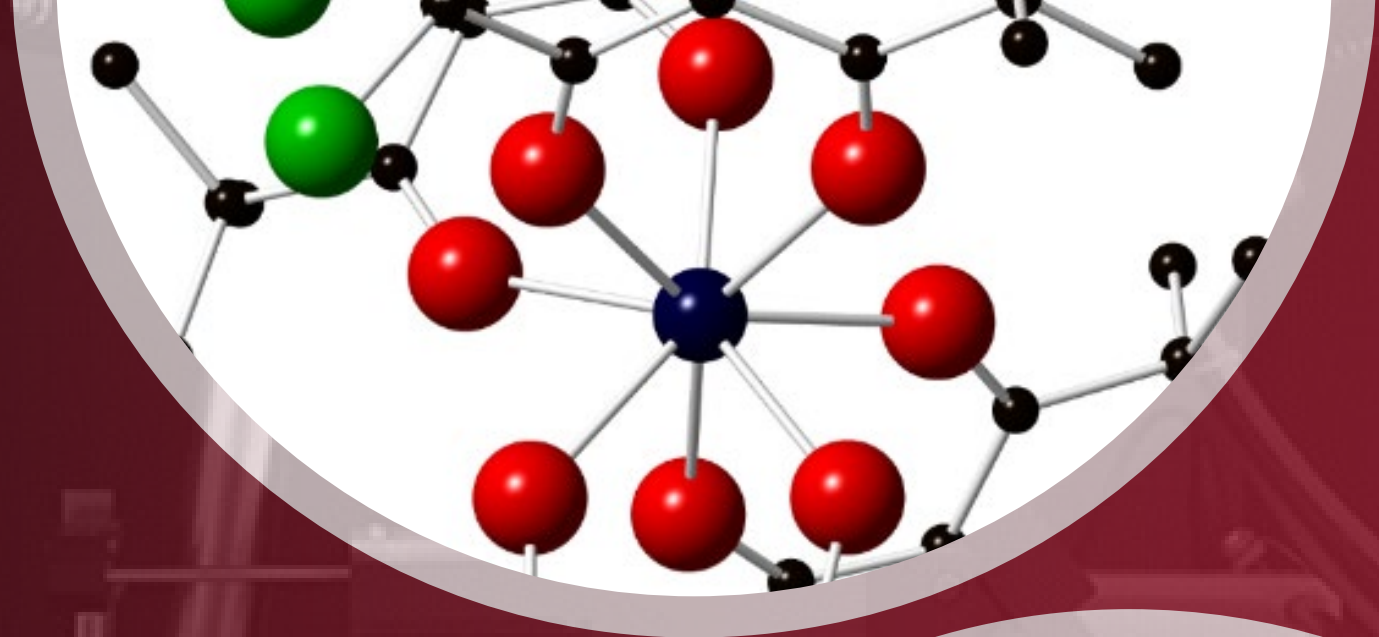




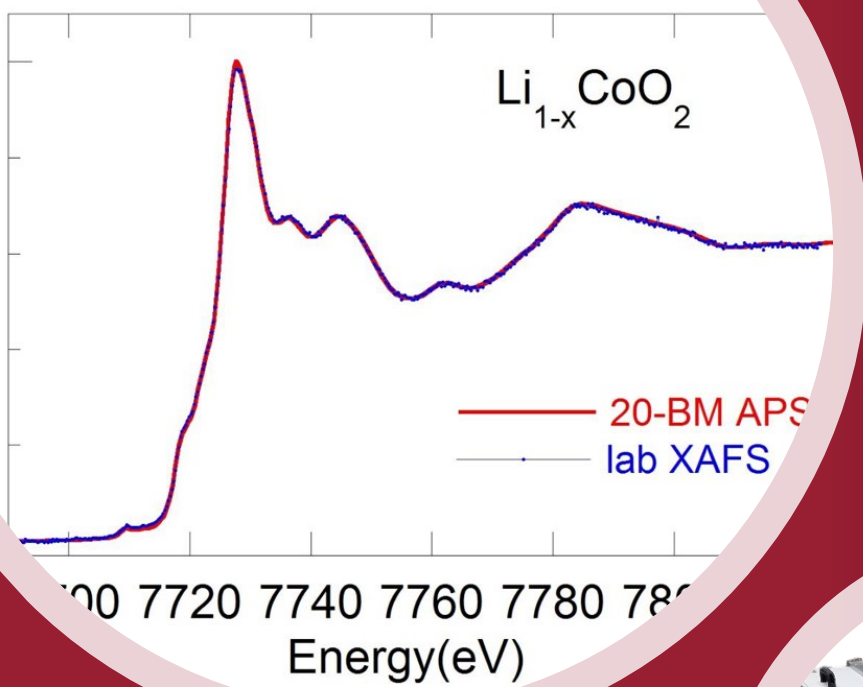
SC XRD

structure determination

- Radioactive samples can be done, including actinides, transuranics
- Online for external samples early June 2021



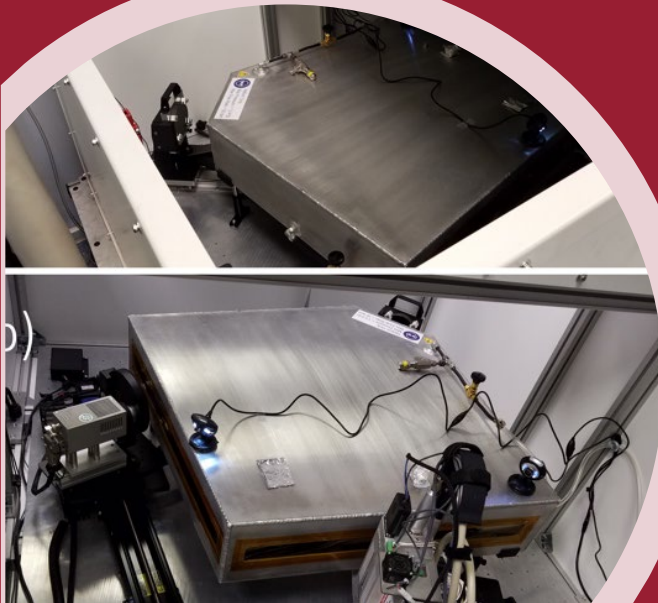
APEX II



*easy*XAFS

lab based light source

- Reasonable XANES/XAFS and great XES for transitional metals and actinides (Th, U, Np, and Pu) for chemical states and local structures.
- Will be coupled with a heating stage for in situ heating spectroscopy
- Online for samples in September 2021





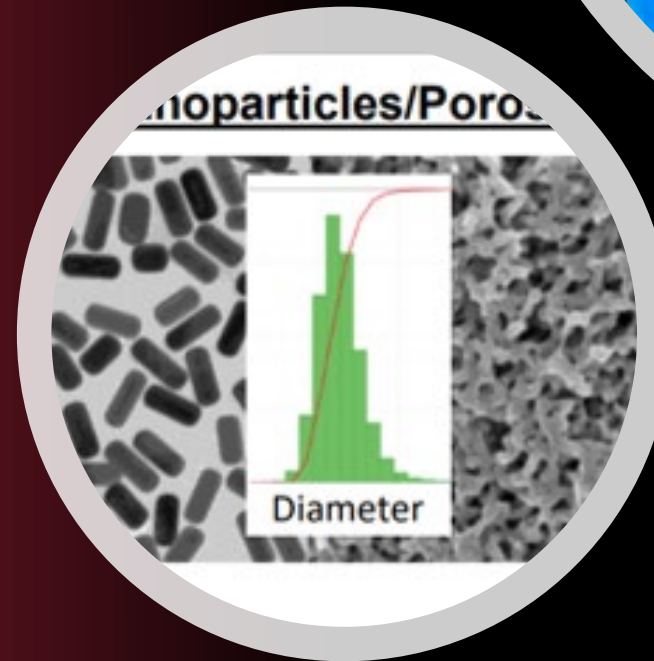
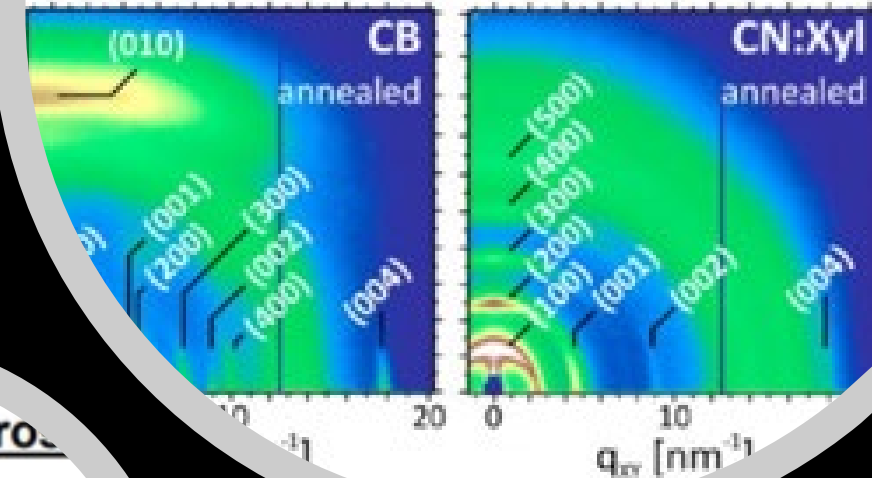
SAXS/WAX

in-house beamline instrumentation
(under review)

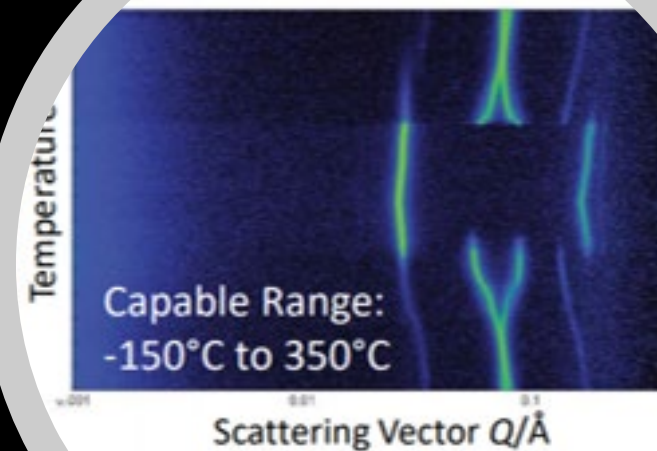
- Measurement of radiological samples
- Nanoparticle characterization
- Degradation scheme research in radiological materials/fuels/etc.

Thin Film Crystallinity

- Phase Identity
- Orientation (Pole Figures)



Phase Transitions

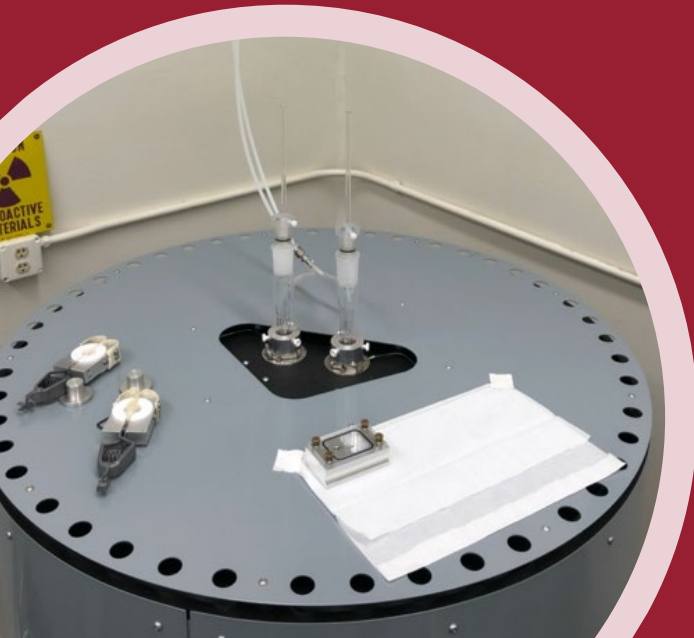




Calorimetry

actinide high-temp chemistry

- Temperature fluctuation $< 0.5\text{ }^{\circ}\text{C/hr}$
- Equipped with a rad glove-box for handling Pu (powder processing and pelletizing)





Student Reactor Operator Training

- Program started in 2011 for all fulltime WSU Students.
- 60% of all licensed operators came to the facility after 2008.
- Nuclear workforce development
- Duties Include:
 1. Reactor operations
 2. Performing routine and preventative maintenance
 3. Prepping, irradiating and shipping samples
 4. Research Opportunities
 5. Participation in Emergency Drills and Exercises
 6. Mentor and tutor incoming student trainees

