X-ray Diffraction (XRD) 101
Fundamentals and Practical Guides to XRD Data Analysis
Wednesday, February 07, 2024, 10 am EST

Abstract:

X-ray diffraction (XRD) is a versatile and powerful technique used for the characterization of crystalline materials, offering insights into their crystallographic structure, chemical composition, and physical properties at the atomic or molecular level. Utilized extensively in the fields of material science, chemistry, and physics, XRD is a key tool in the WVU Shared Facilities, equipped with advanced powder/thin film X-ray diffractometers. In this 2-hour webinar, I will:

1. Discuss the basic principles of X-Ray diffraction.
2. Review instrumentation and operational procedures of the PANalytical X'Pert Pro XRD and the Bruker D8 Discovery XRD.
3. Demonstrate XRD data analysis using the HighScore Plus software, covering the following topics:
   - Pattern treatment
   - Search-match and identification
   - Pattern fitting and basic quantitative analysis.
4. Brief overview of related thin film techniques, including X-ray Reflectivity (XRR), High-Resolution XRD (HRXRD) and Reciprocal Space Mapping (RSM).

This webinar aims to provide a thorough introduction to XRD, equipping participants with the knowledge to understand and leverage this technique in their research. It will combine theoretical concepts with practical data analysis skills, making it ideal for new users and researchers at WVU looking to deepen their understanding of material characterization through XRD.

Audience:

Current SRF XRD users are strongly suggested to attend this webinar, and researchers who are using or interested in XRD technique are also welcome.

Registration:

- ilab users please submit a request within iLab under the "**services and supplies**" tab and choose "**XRD webinar registration**" option or use the following link directly:
  https://wvu.corefacilities.org/service_item/new/4281?spt_id=32578
- Non-ilab participants please email Qiang.Wang@mail.wvu.edu to register for the webinar.

Instructor:

Dr. Qiang Wang currently serves as the Senior Scientist for the Materials Characterization Facilities at WVU Shared Research Facilities, where he is responsible for a host of characterization techniques including X-ray Photoelectron Spectroscopy, powder/thin film X-ray Diffraction, Atomic Force Microscopy and Raman Spectroscopy. He earned his bachelor's degree in physics from the University of Science and Technology of China (USTC) in 2003, and subsequently received his M.S. in 2008 and Ph.D. in 2011, both in Physics, from the University of Colorado, Boulder. Subsequently, Dr. Wang engaged in postdoctoral research at the Los Alamos Neutron Science Center (LANSCE/LANL) from 2012 to 2015 and then at the Material Science Division at Argonne National Laboratory (ANL) until 2016. Since joining the WVU Shared Research Facilities in 2016, Dr. Wang has been an integral part of the Shared Research Facilities, contributing his extensive knowledge and experience in physics and materials science to research activities.