

BEAMLINE 11-BM AT THE ADVANCED PHOTON SOURCE; HIGH-RESOLUTION SYNCHROTRON POWDER DIFFRACTION SIMPLIFIED

Matthew R. Suchomel, Lynn Ribaud, Robert B. Von Dreele and Brian H. Toby
Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 60439

Synchrotrons have revolutionized powder diffraction. They enable the rapid collection of high quality powder diffraction patterns with tremendous resolution and superb signal to noise. The high penetration and exceptional data sensitivity possible at high-energy light sources allows synchrotrons to explore trace containment levels, extreme sample environments and crystallographic site occupancies. Despite these advantages, relatively few scientists today consider using a synchrotron for routine powder diffraction studies.

To help address this, the new synchrotron powder diffraction beamline 11-BM at Argonne's Advanced Photon Source (APS) now offers rapid and convenient mail-in access for routine structural analyses with truly world-class quality data. This instrument affords users the highest resolution powder XRD available in North America, and is a free service for all non-proprietary users. Using both vertical and horizontal focusing and a detection system based on twelve perfect crystal analyzers, the diffractometer can collect a superb pattern suitable for Rietveld analysis in less than an hour. The instrument is equipped with a robotic arm for automated sample changes, and features variable temperature sample environments. Users of the rapid access mail-in program can expect to receive their high-resolution data within three weeks of sample receipt. Approximately 50% of 11-BM user beamtime is also available for on-site experiments requiring more specialized sample environments or unique data collection protocols.

Our poster will describe the instrument, highlight its capabilities and features, and discuss plans to improve access and sample environment availability. We are particularly interested in seeking input from the ICDD community regarding how high-resolution synchrotron powder diffraction could be used as an additional tool for researchers submitting patterns to the ICDD's PDF databases.

More information about the 11-BM diffractometer and its associated mail-in program can be found at our website: <http://11bm.xor.aps.anl.gov>.