

Synchrotron Powder Diffraction Simplified: A New Mail-In Service for the 11-BM High-Resolution Diffractometer at the Advanced Photon Source

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Synchrotrons have revolutionized powder diffraction. They make possible data collection with tremendous resolution and superb signal to noise. Alternately, they allow for extremely rapid (<1 second) collection of entire, high quality, powder diffraction patterns. The high penetration and data sensitivity over the wide Q ranges possible at high energy light sources even allows synchrotrons to make inroads into territory that previously demanded neutrons: extreme sample environments and crystallographic site occupancy studies. Despite all these advances, relatively few researchers make the trek out to use a synchrotron for powder diffraction.

To address this, the 11-BM synchrotron powder diffractometer at Argonne's Advanced Photon Source now offers rapid and easy mail-in access for routine structural analyses with truly first-quality data. This instrument offers resolution unmatched in the U.S. ($\Delta Q/Q \sim 2 \times 10^{-4}$). With both vertical and horizontal focusing and a detection system with twelve perfect crystal analyzers, the diffractometer can collect a superb pattern suitable for Rietveld analysis in an hour or less. The instrument is equipped with a robotic arm for automated sample changes, and features a variable temperature sample environment. Users of the 11-BM rapid access program typically receive their high-resolution data within 20 days of sample receipt.

The poster will describe the instrument, explain the types of measurements that can currently be performed, and discuss how we hope to improve the capabilities and widen the access of 11-BM to a scientifically diverse user base. We are particularly interested in input from potential users on the features they would like to see implemented.

More information about the diffractometer and instructions on submitting your samples to 11-BM can be found at <http://11bm.xor.aps.anl.gov>.