

W0042

Powder Diffraction at the Advanced Photon Source: Now and Future. Peter L. Lee, Yuegang Zhang, Robert B. VonDreele, Advanced Photon Source, Argonne National Laboratory, Argonne, IL 60439, USA.

The increasingly complex chemistry and physics of modern materials demand that this structural information be obtained in a routine fashion and with state-of-the-art precision. This is true for materials of interest to fundamental physics, chemistry, materials science, mineralogy, and biology. However, most of these materials only exist as polycrystalline solids instead of large single crystals; the definitive structural information relies on powder diffraction techniques. The Advance Photon Source (APS), a third-generation synchrotron radiation facility, provides a unique opportunity for x-ray powder diffraction experiments. Currently, there are instruments at APS supporting high-resolution powder diffraction and rapid powder measurements at both the regular x-ray energy range (~6 – 40 keV) and high-energy x-rays (> 50 keV). However, all of them are either nondedicated instruments or sharing beam time with other techniques. A dedicated powder diffraction beamline is needed for the increasing demand for powder experiments.

We present here some recent results and the future direction for powder diffraction at APS including a dedicated powder diffraction beamline that has been funded by DOE and is under construction right now.

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