

Overview of Two-dimensional X-ray Powder Diffraction

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This presentation gives an overview to the twenty years development and current status of two-dimensional X-ray powder diffraction. Two-dimensional X-ray diffraction is the ideal non-destructive, analytical method for characterizing many types of materials, such as metals, polymers, ceramics, semiconductors, thin films, coatings, paints, biomaterials and composites. It has been widely used for material science and engineering, drug discovery and processing control, forensic analysis, archaeology analysis, and many emerging applications. In the past twenty years, usage of two-dimensional detectors has dramatically increased due to the advances in detector technology, X-ray source and optics, and software for data collection, integration and evaluation for various applications.

The geometry convention and basic concept of two-dimensional X-ray diffraction (XRD²) were presented 20 years ago at the 48th Denver X-ray Conference [1]. The publication has been one of the most downloaded AXA papers, an indication of high interests in the XRD community. More development in fundamentals and applications are published in Powder Diffraction magazine a few years later [2]. A book covering the theory, detailed instrumentations and various applications of two-dimensional X-ray diffraction was published 10 years ago [3]. Recent advances in two-dimensional powder X-ray diffraction covered in two new publications are also given in this presentation [4,5].

References:

- [1]. Fundamentals of two-dimensional X-ray diffraction, B. B. He, U. Preckwinkel and K. L. Smith, *Advances in X-ray Analysis, Vol. 43, the 48th Annual Denver X-ray Conference*, Steamboat Springs, Colorado, USA, 1999.
- [2]. Introduction to two-dimensional X-ray diffraction, B.B. He, *Powder Diffraction, Vol. 18, No 2*, June 2003.
- [3]. *Two-dimensional X-ray Diffraction*, Bob He, John Wiley & Sons, 2009
- [4]. *Two-dimensional X-ray Diffraction, 2nd edition*, Bob He, John Wiley & Sons, 2018.
- [5]. Two-dimensional powder diffraction, B. B. He, *International Tables for Crystallography, Vol. H*, edited by Chris Gilmore, Henk Schenk and Jim Kaduk, IUCr/Wiley, to be published in June 2019.