

X-RAY SOURCE, OPTIC AND DETECTOR FOR TWO-DIMENSIONAL XRD

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The dramatic increase of the applications of two-dimensional x-ray diffraction has changed the landscape of the x-ray diffractometry. The most dramatic development happens in three critical devices, including x-ray sources, x-ray optics and detectors.

A brilliant x-ray source is always desired for microdiffraction and high-throughput screening. In addition to the conventional rotating anode generator, high brilliant micro-source tube provides another alternative to the choice of the x-ray source. Due to its light weight, the micro-source is extremely suitable for vertical θ - θ configuration which is the preferred configuration for high-throughput screening.

X-ray optics is another important part of the diffractometer, also with many choices among the conventional monochromator collimator combination, multilayer optics and capillary optics. The selection of the optics should be determined based on the demand and balance among the speed (x-ray flux), resolution (beam divergence and beam size), and form and amount of the specimens.

Recent developments in x-ray detectors have introduced more detector types, using a variety of different materials and technologies, and available in variety of sizes and dimensions. The best detector for a given application depends on many factors, including sensitivity, speed and resolution. The area detectors based on the patented MikroGap™ technology are particularly discussed in detail.

This presentation introduces some basics and recent developments in x-ray sources, optics and detectors. Comparisons and recommendations on the choice of these devices and system configurations are given for various applications of two-dimensional x-ray diffraction.

Reference:

Bob He, *Two-dimensional X-ray Diffraction*, John Wiley & Sons, 2009