

X-RAY SOURCE, OPTICS AND DETECTOR FOR PHARMACEUTICAL XRD

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The dramatic increase of the applications of x-ray diffraction in pharmaceutical research and discovery has changed the landscape of the x-ray powder diffractometry. The most developments happen in three critical technologies, including x-ray sources, x-ray optics and detectors.

A brilliant x-ray source is always desired for high-throughput. However, the conventional rotating anode generator is not a practical choice since most diffractometers for pharmaceutical high-throughput screening are in vertical configuration. Answering to this demand, a compact rotating anode generator or micro-source x-ray tube can be used for the vertical configuration while provide brilliant x-rays.

X-ray optics is another important part of the diffractometer, also with many choices among the conventional monochromator collimator (or slit) 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 from point detectors, linear detectors to area detectors. The best detector for a given application depends on many factors, including sensitivity, speed and resolution.

This presentation introduces some basics and recent developments in x-ray sources, optics and detectors. Comparisons and recommendations for pharmaceutical powder x-ray diffraction are also covered.