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High-throughput Diffractometer with Automated Reflection-Transmission Conversion. Bob B. He, Lutz Bruegemann, Uwe Preckwinkel, Kingsley L. Smith, Bruker Advanced X-ray Solutions, Madison, WI 53711, USA.

An x-ray diffractometer capable of automated conversion between transmission and reflection modes (patent pending) is introduced. In high-throughput XRD screening, the choice between reflection and transmission modes depends mostly on the design of the multi sample plate (material library) and the way samples were prepared. In cases that the samples are suitable to both modes, the screening is preferably performed in the mode that delivers a better data quality. For example, the defocusing effect and cross contamination can be eliminated at transmission mode for diffractions at low two-theta angles. Most existing x-ray diffractometers for screening are dedicated for either reflection mode or transmission mode. The configuration is typically optimized for one mode and the other mode can be done with compromised performance. During the screening process the sample plate preferably moves only in horizontal direction. This is necessary for holding powder or liquid samples. The new design makes the conversion between transmission mode and reflection mode easy and automatic. The system can run at optimum performance for both reflection and transmission modes with the sample plate kept in horizontal position.