

Powder X-ray diffraction in the range $2\Theta < 15^\circ$ ($\lambda = 0.154\text{nm}$)

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From time to time the transmission geometry with a focusing mirror on the incident beam side is used for scanning the low angle 2Θ range.

The main reason to change to transmission geometry is the overlapping of incident and diffracted intensities in the low 2Θ range in the standard BRAGG-BRENTANO geometry.

Due to the increasing complexity of substances with even large unit cell parameters it is necessary to cover the low 2Θ range too.

With the TWIN MIRROR ARRANGEMENT (TMA) its possible both to measure in reflection geometry and in the low 2Θ range. High intensities of more than 10^9 cps in the incident parallel beam, a well defined angular resolution ($\Delta\Phi < 0.03^\circ$) and the suppression of Cu $K\beta$ radiation and sample fluorescence are characteristic features of this experimental setup. Figure 1 shows a comparable resolution and peak intensity of the quartz triplet in TMA and in the BRAGG-BRENTANO (BB) geometry. In addition the parallel beam geometry of TMA also allows to measure irregular shaped samples and to compensate sample displacement errors during the measurement.

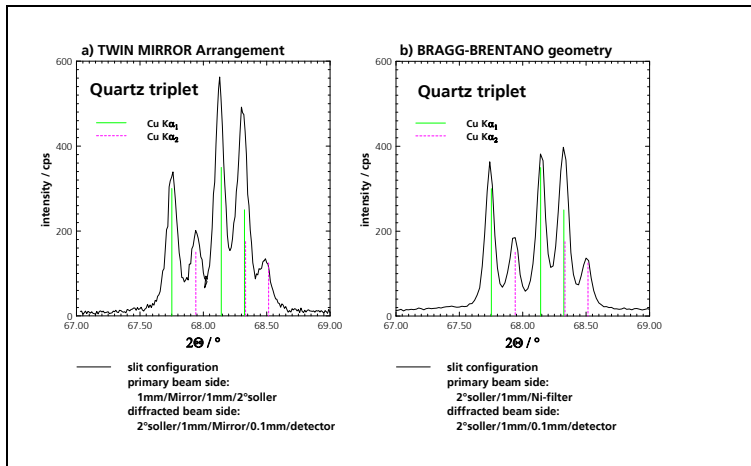


Fig.1 Comparison peak intensity and resolution of TMA and BB setup (quartz powder sample)

TMA is mostly used in X-ray reflectometry for thin film characterization. Here the excellent peak background ratio allows to cover 8 orders of magnitude in the measured reflected intensities.

Therefore it was obvious to apply this setup for PPXRD, too.

Selected organic samples will be measured both in BRAGG-BRENTANO geometry and with the TMA-setup in the low 2Θ range.