

LABNOTE

STOE STADI P

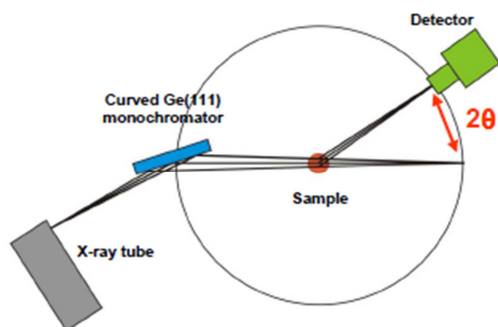
Best Data Quality using Transmission-/Debye-Scherrer-Geometry

1 | 2

T. Hartmann, Stoe & Cie GmbH, Darmstadt, 2013

Though still less common in the crystallographers' community, the Transmission geometry is the method of choice for the investigation of powder samples.

Using a Stoe Stadi P powder diffractometer the focusing Ge(111) monochromator yields pure $K_{\alpha 1}$ -radiation for the highest resolution in 2θ (FWHM < 0.03° !). Furthermore the Transmission geometry provides reliable intensities over the full 2θ scale.



Picture 1: Sketch of a Stoe Stadi P in Transmission / Debye-Scherrer geometry

Transmission geometry data never suffers from height displacement, samples measured in a capillary are nearly unaffected by the distracting effects of preferred orientation.

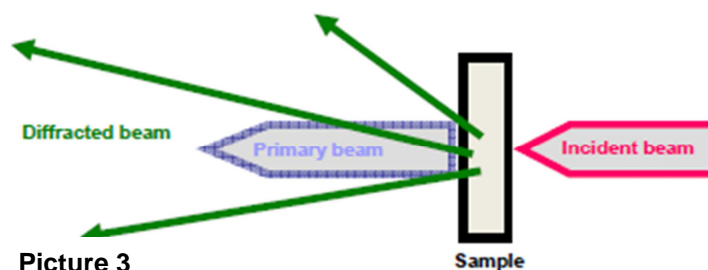
Even the smallest amount of samples can be evaluated when prepared between two foils.

Besides this micro sampling Transmission geometry enables diffraction measurements at the lowest 2θ angles.



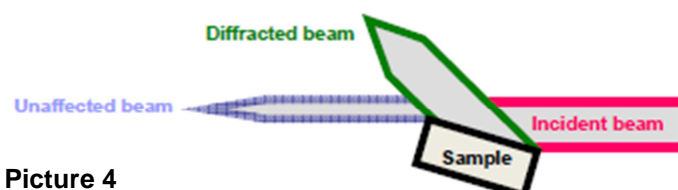
Picture 2: Transmission sample holder

Picture 3 & 4: Comparison of the beam path in Transmission (above) and reflection geometry (below):



Picture 3

The unaffected beam in the reflection setup yields to false intensities up to $10^\circ 2\theta$!



Picture 4

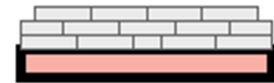


Picture 5

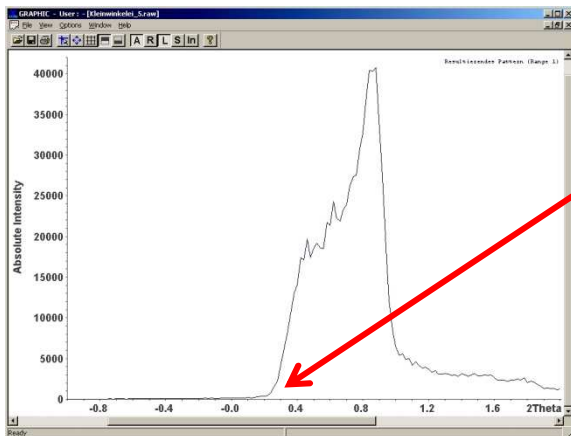
Preferred Orientation

Pictures 5 & 6: Plane crystallites in a capillary and the same particles pressed in a reflection sample holder.

The statistic deviation of the particles in the capillary yields a pattern less effected by the effects of preferred orientation than the periodic stacking sequence of the planes in reflection mode does.

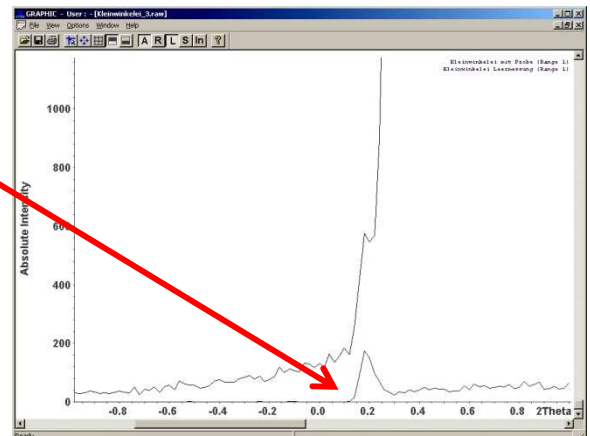


Picture 6



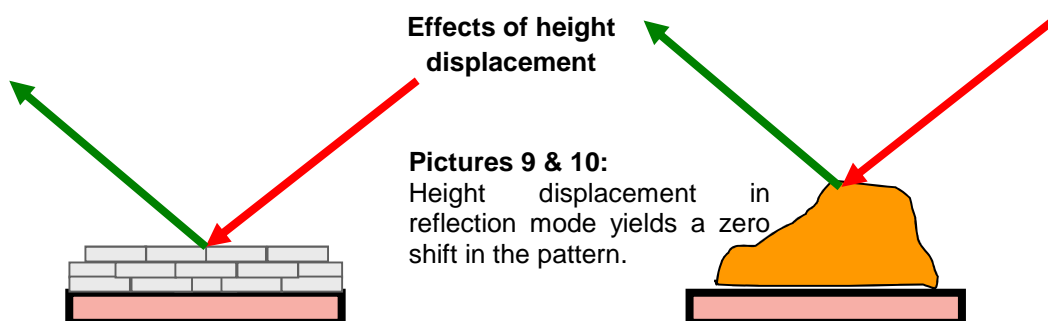
Small angle XRD

$< 0,2^\circ 2\theta$



Picture 7: First two degrees of a low angle measurement of a Zeolite using a Stadi P with Cu $K_{\alpha 1}$ - radiation in Transmission geometry

Picture 8: Magnification of picture 7 showing the remaining hump of the primary beam from an added measurement with an empty sample holder



Effects of height displacement

Pictures 9 & 10: Height displacement in reflection mode yields a zero shift in the pattern.