GI-MS46-P08 | New tricks for an old dog: The Powder Diffraction and Total Scattering Beamline P02.1 at PETRA III, DESY

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Powder X-ray diffraction (PXRD) is widely used as an initial characterisation method or to study bulk behaviour of periodic solids under application of external stimuli. In many cases, local structural changes which occur are as interesting as the periodic behaviour; moreover, being able to probe partially or fully amorphous compounds, by Pair Distribution Function (PDF) analysis, allows the researcher to investigate a wider range of samples. Following a recent upgrade of the Powder Diffraction and Total Scattering Beamline (PETRA III, DESY, Hamburg), it is now possible to simultaneously collect PXRD and total scattering data (which can be processed into PDFs). With a fixed energy of 60keV the beamline provides total scattering data at Q_{Max} up to 30Å^{-1}. PXRD data suitable for Rietveld refinement can be collected with a resolution of 0.005° ($\Delta Q \sim 2.65 \times 10^{-3}$ Å^{-1}) over an angular range of 0-12° 2θ. New software to automatically process 2d diffraction data and a sample changing robot have recently been incorporated to automate beamline operation. Furthermore, a wide range of non-ambient sample environments are available for beamline users to investigate *in situ* or *operando* behaviour of their samples, including variable temperatures (hot-air blower: RT-1100K; cryostream: 90-500K; cryostat: 10-300K), gas sorption (up to 1bar pressure) and electrochemistry.

This poster provides an opportunity for current and future users to find out about the recent developments at P02.1, as well as future plans for automation. It is also a chance to discuss these and other user requirements for upcoming beamtime applications.