

MS17 Total scattering studies and disorder

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Neutron total scattering measurements under hydrostatic high pressure

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Abstract

Total scattering measurements have proved invaluable for in situ studies on numerous materials, providing structural information over short-range length scales. Though it is now common to explore crystalline samples as, e.g., a function of temperature, flow gas, chemical composition, or electric current, it remains challenging to perform local structure studies under pressure. Amorphous substances comprise the majority of total scattering studies under pressure [1] because crystalline materials necessitate the inclusion of a pressure transmitting medium (PTM) in order to avoid sample strain. The PTM has its own local structure scattering signature, and untangling its contribution from that of the sample is non-trivial. This is particularly severe for neutron measurements, where common PTM materials are deuterated, making them significantly more powerful scatterers than in the analogous diffraction experiment with X-rays, using their hydrogenous counterparts.

This talk describes some of the recent efforts on the PEARL instrument at the ISIS Neutron and Muon Facility toward developing approaches for obtaining pair distribution function data from samples under hydrostatic pressure, as well as some early science studies. [2-4]

References

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