

## **Opportunities for Geosciences using High Pressure Neutron Scattering**

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Neutron scattering techniques, with the ability to study in detail of the location and dynamics of light elements, particularly hydrogen, or studies in silicate melts, can be particularly useful in the field of mineral physics. However, the low neutron flux and limited range in pressure - temperature available on older facilities, precluded the use of neutron scattering in the geosciences. Notwithstanding, this scenario is changing with the Spallation Neutron Source (SNS) at the Oak Ridge National Laboratory, delivering the highest neutron flux available for research to an almost complete suite of instruments. At this point, leveraging the existing neutron instrumentation with high pressure capabilities is a priority for ORNL. In fact, not only the SNS houses SNAP, the first and only dedicated high pressure diffractometer in the US, but there is a strong drive to make the neutron facilities at ORNL a leading research infrastructure in high pressure research. This combination of high neutron flux coupled with high pressure and temperature capabilities is bound to greatly expand the applicability of neutron scattering in mineral physics research by enabling measurements on significantly reduced sample sizes and higher pressures. Here will be presented selected examples of applications of neutron scattering in problems relevant to the geosciences. These include measurements both under in-situ high pressure conditions and on recovered samples. Emphasis will be given on research performed at SNAP, but results and capabilities of other instruments will also be highlighted.

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