

New Pressure Regimes for Neutron Science

04/2017

Scientific Achievement

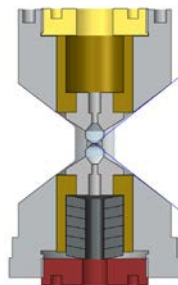
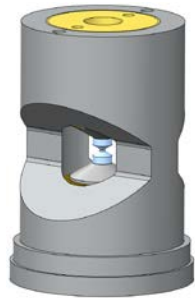
Neutron diffraction to megabar pressures / new pressure range for inelastic scattering (3+ publications, 1 submitted)

Significance and Impact

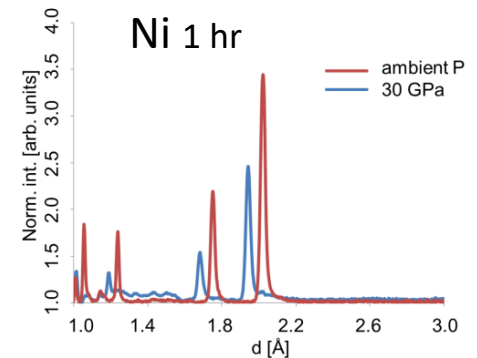
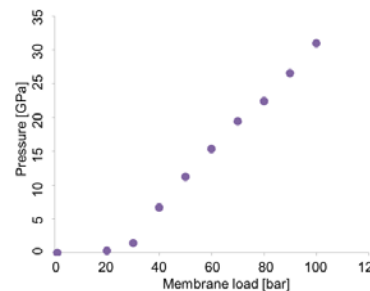
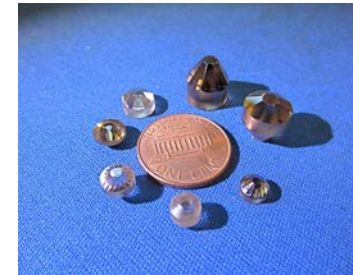
Expand scientific scope and user program at SNS for EFree

Research Details

- ◆ new, multi-carat CVD diamond anvils
- ◆ new Diamond cells for Neutrons



$$Q = 1.5 - 22 \text{ \AA}^{-1}$$



Guthrie, M., Pruteanu, C. G., Donnelly, M. E., Molaison, J. J., Santos, A. M. D., Loveday, J. S., et al. (2017). Radiation attenuation by single-crystal diamond windows. *J. Appl. Cryst* (2017).
Boehler, R., Guthrie, M., Molaison, J. J., Santos, dos, A. M., Sinogeikin, S., Machida, S., et al. (2013). Large-volume diamond cells for neutron diffraction above 90 GPa. *High Pressure Research*, 33(3), 546–554.
Guthrie, M., Boehler, R., Tulk, C. A., Molaison, J. J., Santos, dos, A. M., Li, K., & Hemley, R. J. (2013). Neutron diffraction observations of interstitial protons in dense ice. *Proceedings of the National Academy of Sciences*, 110(26)



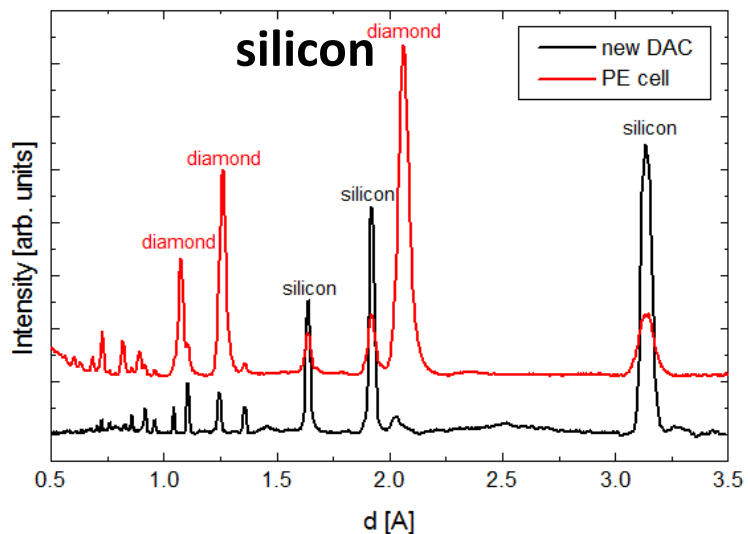
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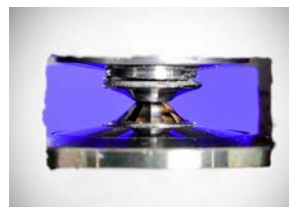


EFree
Energy Frontier Research Center

Advantage of ultra-large volume diamond anvil cells

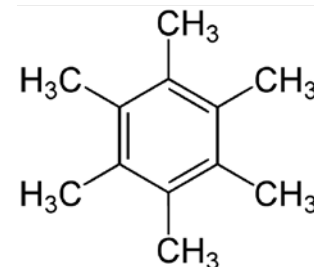
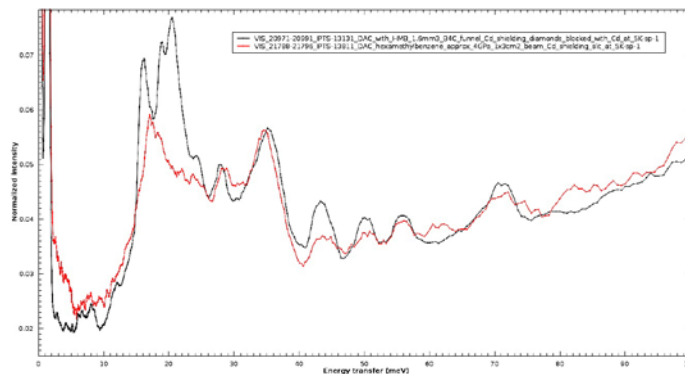


Exposed sample size ratio **1:90**



Paris-Edinburgh Cell: 4 hrs
DAC: 5 min

Inelastic Neutron Scattering



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