

Poster Presentation

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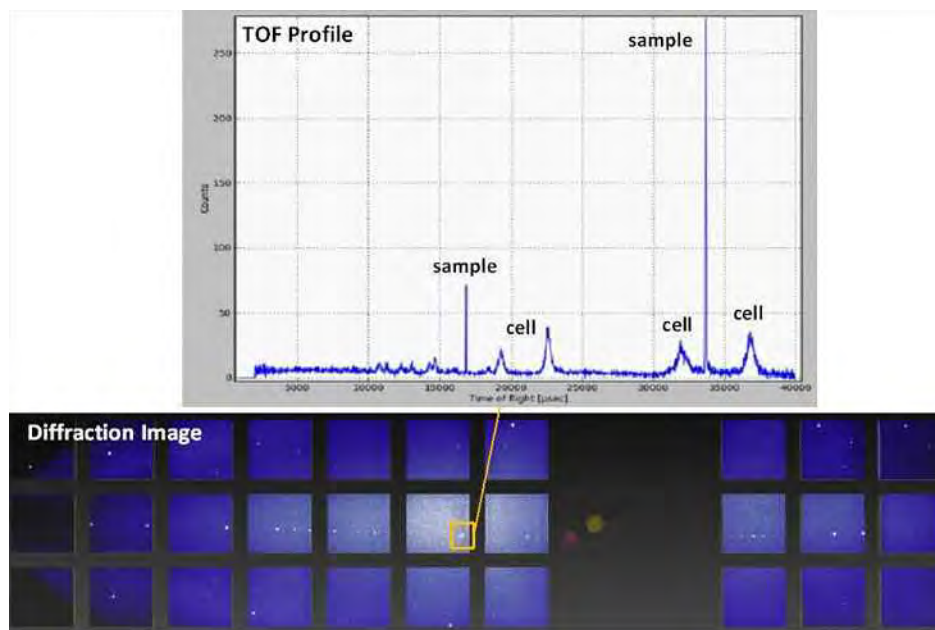
High-pressure environments of single crystal neutron diffractometer SENJU/J-PARC

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High-pressure technique is a powerful tool for physical property measurements and structural analyses as well as other external conditions, such as magnetic fields and temperatures. In the field of neutron experiments, measurements under high-pressure conditions are also useful and attractive; because pressure is one of important thermodynamic parameter that can be used to tune magnetic property, crystal field, and other parameters to obtain insight into the microscopic physics of many phenomena. SENJU have been constructed for a single crystal time-of-flight neutron Laue diffractometer at beamline 18 (BL18) of Materials and Life Science Experimental Facility (MLF) at Japan Proton Accelerator Research Complex (J-PARC) [1], designed in consideration of precise crystal and magnetic structure analyses for small size single crystals, 1 mm³ or less in volume: and also taking account of the neutron diffraction measurements under multiple extreme conditions. In this research we are planning to introduce high-pressure sample environments into SENJU. Two types of compact high-pressure cells have been prepared, one is clamp type piston-cylinder cell made of copper-beryllium alloy (< 2 GPa), and the other is clamp type opposite anvil cell, can be expected to reach maximum pressure of 10 GPa. A taurine single crystal (3 mm³) was enclosed in the piston-cylinder pressure cell together with deuterated glycerol (pressure transmitting medium) and pressurized up to 1 GPa. Accelerator power of J-PARC was 300 kW and the exposure time was 6 hours. We can observe many distinct Bragg reflections from the sample crystal (taurine) even through the pressure cell body, as shown in the figure. In this presentation, we will show more details and current status of high-pressure sample environments in SENJU.

[1] I. Tamura, K. Oikawa, T. Kawasaki, et al., *Journal of Physics: Conference Series*, 2012, 340, 012040.



Keywords: High-pressure neutron scattering, Single crystal structure analysis, Magnetic structure