![ESRF logo]	**Experiment title:** Local structural changes in MgSiO$_3$ glass at high pressure revealed by X-ray Raman scattering	**Experiment number**: HC-4282
Beamline: ID20	**Date of experiment**: from: 11. November 2020 to: 16. November 2022	**Date of report**: 03.03.2022
Shifts: 12	**Local contact(s)**: Christoph Sahle	*Received at ESRF:*

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Report:

This very successful beamtime HC-4282 was a continuation of prior beamtime HC-3182, during which we managed to collect high-quality XRS spectra from all elements in MgSiO$_3$, an important glass in high pressure geoscience. However, the data collected during HC-3182 went only to 57 GPa, which was a too limited pressure range, given that MgSiO$_3$ glass had received in recent years considerable attention, including XRS measurements to higher pressures.

Now, during the very successful beamtime HC-4282, we managed to extend the pressure range to 101 GPa, which reaches deep into the lower mantle.

Collected spectra continue to be of unprecedentedly high quality, thanks to the use of miniature diamonds of 0.5 mm thickness. The absorption edges that we measured were the Si L$_{2,3}$-edge, the Mg L$_{2,3}$-edge and the oxygen K-edge.

Figure 1 shows some spectra of the Mg L$_{2,3}$-edge, which is particularly difficult to measure due to its low energy and which highlights the extreme capabilities of beamline ID20, in combination with the ideal sample environment of miniature diamonds.

The spectra of the other absorption edges that we probed have similar quality, but are confidential.
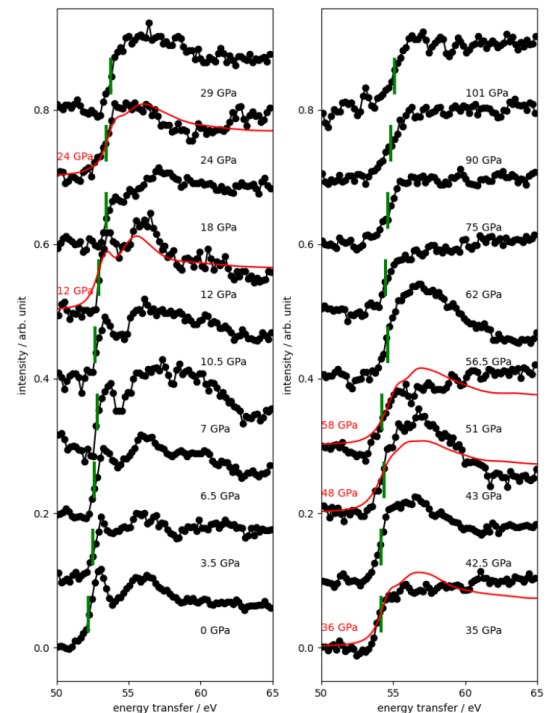

Figure 1: XRS spectra of the Mg L-edge up to 101 GPa, with shift of the edge onset indicated by green bars, and computed spectra shown in red.

Overall, the beamtime was a full success, due to general capabilities and high stability of beamline ID20 and the unrivaled expertise of the beamline staff.