	Experiment title: Tracking the speciation of Br in magmas at depth.	**Experiment number**: **HD563**
Beamline: BM23	**Date of experiment**: from: November.10 2011 to: November.15 2011	**Date of report**: 13/02/2012
Shifts: 15	**Local contact(s)**: I. Kantor	*Received at ESRF:*

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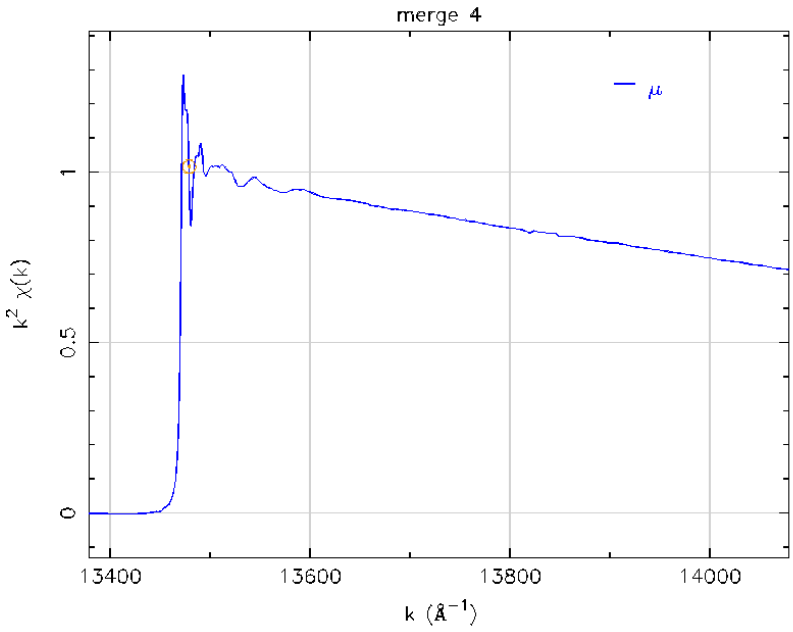
Report:

Magmas, or silicate melts, are efficient agents of element transfers through the different envelopes of the Earth, past and present. Cl content in hydrous magmas control element partitioning between aqueous fluids and molten silicates[1,2] and especially the transfer of metals from the magma towards the Cl-rich fluid. This project aimed at studying Br speciation, used a Cl proxy, in magmas at high P and T conditions by recording EXAFS spectra at the Br K-edge on a synthetic hydrous granitic composition (Si-Al-Na-Fe-O system). This composition is relevant for arc magmas and is largely documented by experimental petrology works.

During thus run, high P-T conditions of 5 GPa-2000 K, have been generated by the Paris-Edinburgh press. We have recorded energy scans in transmission mode first. However, the sample had to be contained in a diamond capsule to minimize chemical reactions with sample surroundings, and even though the capsule was made of polycristalline diamond, the EXAFS spectrum was largely dominated by diamond glitches and could therefore not be processed (Fig.1 bottom). We then switched to the fluorescence mode. Scans were then not perturbed by diamond glitches but the counting time was limited by gasket extrusion at our very high working T, and not long enough to obtain sufficient statistics. Nonetheless, the EXAFS scan obtained on our starting material, a hydrous granitic glass doped with 4% Br and synthesized under pressure, is very promising. The Fourier transform of the signal gives a first Br-X distance much shorter than expected (1.7-1.9 Å), and points out to the formation of Br-O bonds in the magma instead of Br salts. Br oxides indeed play a very important role in the atmospheric chemistry of Br, by enhancing ozone dissociation.



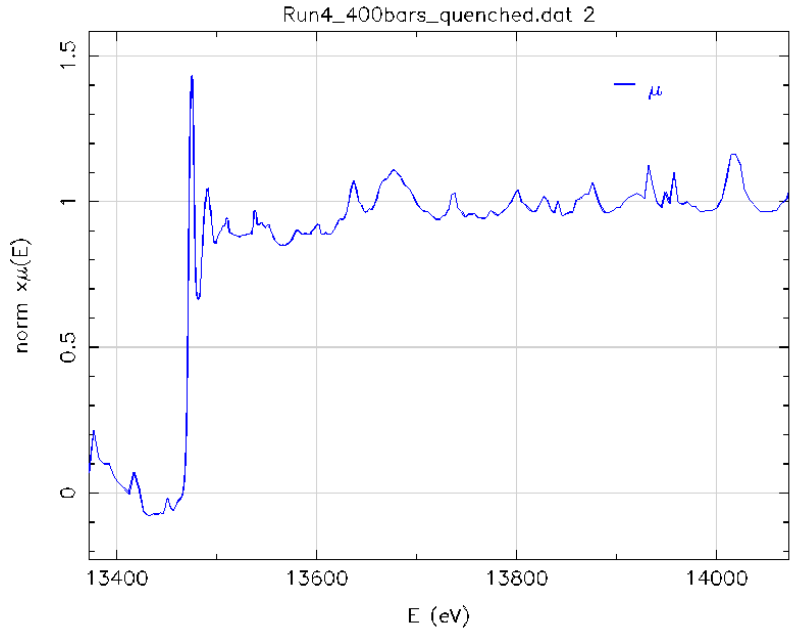


Fig.1 : Top, transmission EXAFS scan on the starting granitic glass at the Br K-edge. Bottom : sample confined in a polycristalline diamond capsule and compressed at 4 GPa.