spectroscopy, X-ray diffraction (XRD), scanning electron microscopy (SEM) and pair distribution function analysis (PDF). The analyses show that, depending on the reaction conditions, different products are formed. Some of these are nanocrystalline.

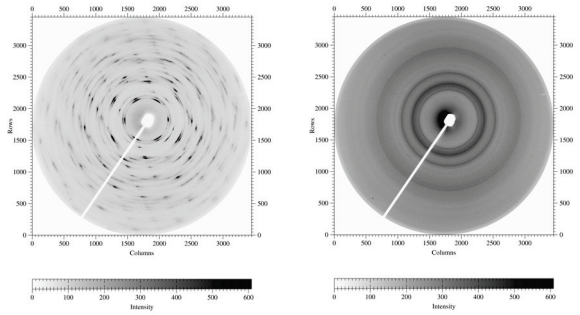

Fig. 1: Synchrotron X-ray diffraction patterns before (left) and after (right) laser heating $W(CO)_6$ in a diamond anvil cell.

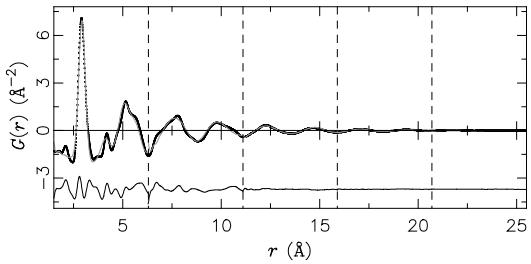

Fig. 2: PDF refinement results of the decomposition product obtained in the autoclave at lower pressures and temperatures. Note that the structural correlations end at about 2-2.5 nm.

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Keywords: diamond anvil cells, decomposition, tungsten compounds

FA2-MS19-P04

Compressional Behaviour of Diomignite, $Li_2B_4O_7$.

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Despite the fact that diomignite ($Li_2B_4O_7$, $I4_1cd$ symmetry) may control the physicochemical properties of highly fractionated late stage fluids in pegmatites [1], no diffraction studies concerning its compressional behaviour are available. In respect to technological importance, pegmatites are the primary source of lithium, which is widely employed in different fields of science and engineering (e.g. as a battery material, coolants for heat transfer applications etc.). Synthetic $Li_2B_4O_7$ can be implemented in acoustoelectronics, non-linear optics and piezotechnolodgy.
Compression of weakly scattering diomignite was also investigated for the purpose of commissioning an Eulerian single crystal diffractometer with an ultra high intensity rotating anode X-ray source equipped with multilayer optics [2]. This technique allows 8-position centring of Bragg reflections for accurate measurements of lattice parameters. Full details of single crystal instrumentation and methodology are described in [3]. A sample was placed in a BGI design diamond anvil cell in ethanol:methanol (1:4) pressure transmitting media (steel gasket with a 350 microns hole preindented at 110 microns). For comparison, reference data were also collected for the same crystal at the same pressures using a Eulerian diffractometer equipped with a conventional X-ray source/optics [3]. The crystal size (180×120×50 mkm^3) was selected on the basis of its scattering power, such that the Bragg maxima were reasonably intense on the conventional system. In summary, we note that the lattice parameters measured using both diffractometers agree perfectly, lying within less than 2 estimated standard deviations.
Ultrasonic wave velocity measurements indicate that the dependency of the second order elastic stiffness tensor component C_{66} vs. P extrapolates to zero at 3.2 GPa [4]. The possibility of a phase transition was therefore suggested [4]. However, we observed no transition up to 7 GPa, which agrees with high pressure Raman scattering study [5]. F_E-f_E plot for $Li_2B_4O_7$ indicates a positive slop, therefore, a Birch-Murnaghan 3rd order EoS was fitted to the volume-pressure data (V_0=923.26(4) Å^3, K=46(1) GPa, K'=6.8(5)). $Li_2B_4O_7$ is more compressible along polar c-axis with $\beta_0 a$:$\beta_0 c$=1:3.04. Finally, relations between thermal expansion and compressibility of $Li_2B_4O_7$ will be presented.

Support from European research Council Advanced Grant "Deep Earth Elastic Properties and Universal Pressure Scale".

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Keywords: high-pressure mineralogy-1, elastic properties-2, X-ray high-pressure techniques-3

FA2-MS19-P05

Crystallographic Characterisation of Copper Based Shape Memory Alloys.

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Shape-memory alloys are functional materials due to their unusual ability to "remember" the desired particular shapes at different temperatures. This ability arises from the characteristic microstructures in parent and product phases. These alloys exhibit a peculiar property called shape memory effect and involve the repeated recovery of macroscopic shape of material at different temperatures. The origin of this phenomenon lies in the fact that the material changes its internal crystalline structure with changing temperature.
Shape memory effect comprises crystallographically reversible transition from the high-temperature parent phase with high symmetry to low-temperature product phase, martensitic phase with low symmetry and exhibits dynamic recovery of the shape. This effect leads to a displacive transition, martensitic transition, which precedes through a series of metastable states in copper based shape memory alloys with changing temperature.
Copper-based alloys exhibit this property in β-phase field which has a bcc structure at high temperature parent phase. The high temperature bcc-structure undergoes two types of