

**Experiment title:**

The crystal structure of Hedenbergite, a major mantle mineral phase, between 20 GPa and 40 GPa

Experiment**number:****01-02-159****Beamline:**

BM01A

Date of experiment:

from:18.Nov.99

to:23.Nov.99

Date of report:

29.Aug.2000

Shifts:

15

Local contact(s):

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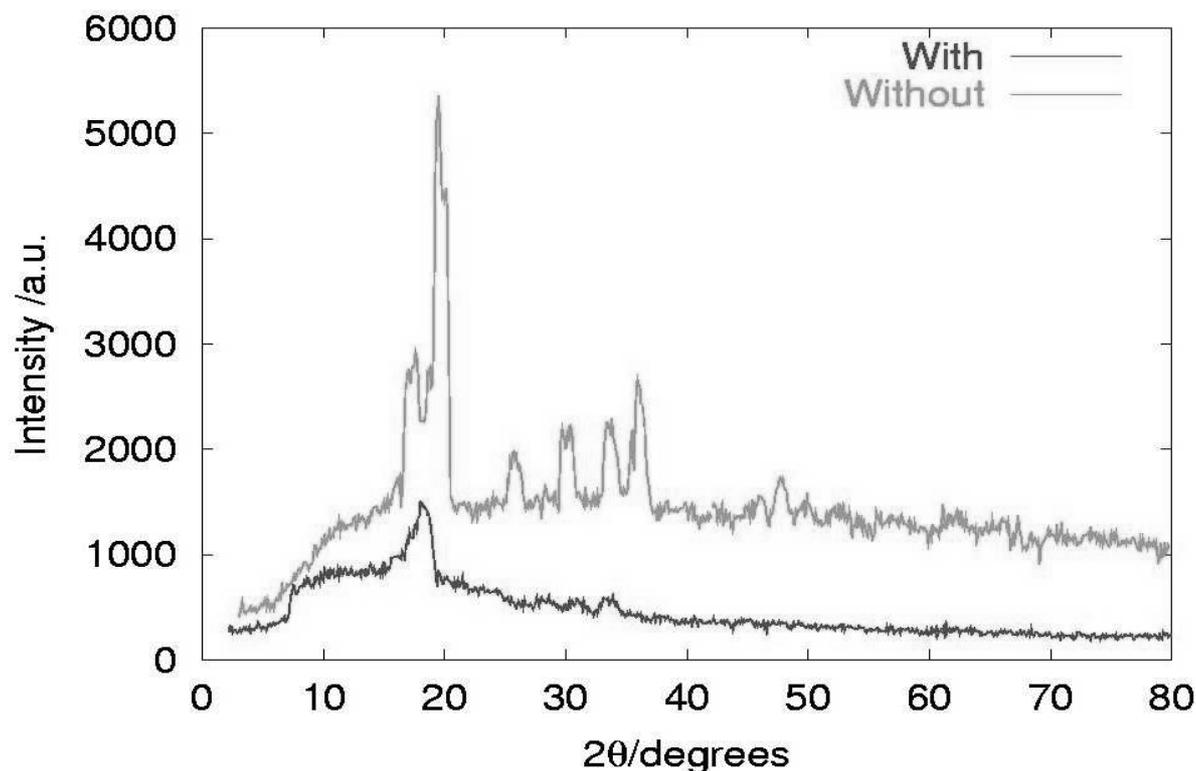
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Report:

Fig. 1. Background at the KUMA diffractometer at BM01 with a Merrill-Bassett cell with and without the special collimator.



Two Merrill-Bassett pressure cells (type: “Quadratic Mao”[1]) , loaded with Helium as pressure transmitting medium, and with single crystals of Hedenbergite at 20 GPa and Almandine at 19 GPa respectively, were brought from Marburg to ESRF. During this experiment important steps were done to improve experimental measurement conditions, when using single-crystal pressure cells on the KUMA6-CH diffractometer.

A newly built collimator, designed to avoid the background produced by the beryllium backing plates of the pressure cell, was used successfully for the first time [4].

Fig. 1 shows the background as a function of 2-theta, with and without this new collimator. The strong beryllium powder lines disappear, only the lines of the gasket remain as the counter still sees the crystal and its immediate neighbourhood.

Also of importance is the strong overall background decrease observed at higher diffracting angles; it yields a better signal-to-noise ratio for the weaker reflections in this high angle region. In this way, it is possible to measure crystals smaller than usual in pressure cells, which is unavoidable when one goes to higher pressure. At our laboratory, we have been using such collimators for a long time already [2,3], but it is new at the synchrotron and even with a KAPPA diffractometer, which leads to additional complications.

Unfortunately the reflections of our hedenbergite crystals were split, a defect which could hardly be seen on our laboratory instrument. Additionally, the data were unreadable when transferred to Marburg, and the original files were deleted at the beamline computers soon after my departure for reasons beyond our control. Because of these difficulties, a comparison of structure determinations „with“ and „without“ collimator can not be shown yet. We will make up for this lack at the next allocated beam time.

1] Ahsbahs (1995) , 20 Jahre Merrill- Bassett Zelle. Einige Neuheiten , Z.Krist. Suppl 9, 42

2] H. Ahsbahs (1987), X-ray diffraction on single crystals at high Pressure,
Prog. Crystal Growth and Charact. 14, 263-302

3)L. Zhang, H. Ahsbahs (1998)

New Pressure Domain in Single Crystal X-ray Diffraction Using a Sealed Source
Rev. High Pressure Sci. Technol., Vol.7, 145-147

4] H. Ahsbahs, Mit Einkristall-Druckzelle und Schneidenblende am Synchrotron,
Z. Kristallogr. Suppl.17, 35 (2000)