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SIT037-05 会場:展示ホール7別室2 時間: 5月27日11:45-12:00

Deforamtion-Cubic Anvil Pressと放射光を用いたファヤライトの変形実験

Deformation experiment on fayalite using deformation-Cubic Anvil Press with synchrotron X rays

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We installed a deformation cubic anvil press, D-CAP 700 at the 14C2 beamline of the Photon Factory, which is essentially similar to the conventional D-DIA system. The differential rams are driven by micro-discharge pumps, and the deformation cubic anvil component is driven by MAX-III 700ton press installed at the 14C2 beamline. Now, the apparatus was moved to the NE7 beamline of the PF-AR, due to the relocation of the high pressure beamline. Two differential rams are controlled by an oil pressure controller, and both of the pressure control and the displacement control are available. The displacements of two differential rams are measured by the stroke sensor attached to rams. An incident X-ray beam was monochromatized at energy of 50 keV by a monochromater. Strain is observed from transmitted X-ray imaging of sample using the YAG single crystal phosphor and the CCD camera. Stress is measured by analyzing the two dimensional diffraction patterns of samples. The two dimensional diffraction patterns are collected by an imaging plate.
Using this new deformation apparatus, D-CAP 700 and the measurement system at the 14C2 beamline of the Photon Factory and NE7 beamline of the PF-AR, we have conducted the deformation experiments of fayalite. And also we started deformation experiments during transformation from olivine to spinel. It is important to understand the influence of transformation on deformation behavior.
Sample is loaded into the pressure medium (9mm edge length cube), wich is made of mixture of amorphous boron and epoxy resin. Temperature was generated using a graphite heater and measured by W3%Re-W25%Re thermocouples. Samples were deformed at a confining pressure of 1.9 to 4.8 GPa, a temperature between 773 and 873 K, a differential stress 0.4~1.6 GPa, the maximum strain 28 %. The deformation mechanism of fayalite under high pressure and low temperature conditions and transformation effect on deformation behavior will be discussed.