

Phase boundary between diaspore and δ -AlOOH

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Phase boundary between diaspore and δ -AlOOH was investigated using in situ X-ray powder diffraction technique and a large volume press. Experiments were carried out using a Kawai-type multi-anvil apparatus (MAX-III) installed at the AR-NE7A station at KEK (High Energy Accelerator Research Organization) in Japan. X-ray diffraction data were collected using a pure-Ge solid-state detector by the energy-dispersive method. Tungsten carbide cubes with 22mm edges were used. The size of the truncated corners was 3 mm. Semi-sintered zirconium oxide was used as the pressure-transmitting medium. A cylindrical heater was manufactured using the BN Composite EC (Denka, Co. Ltd.). The sample temperature was monitored using a W97Re3-W75Re25 thermocouple. The starting material was a mixture of diaspore, δ -AlOOH and NaCl. δ -AlOOH was synthesized at 18 GPa and 1000 K for 30 min from natural diaspore from Turkey. Pressure was determined using an equation of state of NaCl. Time-resolved X-ray diffraction measurement confirmed the stable phase at the experimental conditions. This study shows that the phase boundary between diaspore and δ -AlOOH locates around 15 GPa. The detail is mentioned in the on-site presentation.

Keywords: aluminum oxyhydroxide, high pressure, AlOOH, phase boundary, hydrous phase

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