

## Reaction of MORB and water under the lower mantle

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High-pressure hydrous phases are considered to play important role for possible water reservoir in the Earth. The reaction between water and down welling slab into the lower mantle region containing mid-ocean ridge basalt (MORB) and surrounding minerals are important to understand water cycle in the mantle. Among the known hydrous minerals, Phase H has a deepest stability field up to ~60GPa in the MgO-SiO<sub>2</sub>-H<sub>2</sub>O system (Ohtani et al., 2014) and ~128GPa in the MgO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-H<sub>2</sub>O (MASH) system (Ohira et al., 2014), suggesting possible transportation of water into the deep Earth.

Here we report the results of the direct reaction of the MORB + H<sub>2</sub>O system under high-pressure and high-temperature to investigate the effect of iron and aluminum. We carried out in-situ X-ray diffraction experiments at High Energy Accelerator Research Organization (KEK), Photon factory (PF-AR). High pressure and temperature experiments were conducted using laser-heated diamond anvil cell installed at the station NE1A. Starting materials of glass MORB powder and pure water were confined in rhenium gasket. The pressure was measured using the equation of state of ice VII (Frank et al., 2013). The double-sided heating with Nd:YAG laser to heat, the reaction temperature was estimated from spectroradiometry of the high temperature portion of the sample. X-ray diffraction measurements to identify phases were performed using monochromatic x-ray with about 30keV and imaging plate detector at each step of elevated temperature to about 1000K. We identified the crystalline phases and the reaction products up to 35GPa under laser-heating condition.

Ca-Perovskite, Stishovite and Phase D were observed as the reaction product in all runs. The results indicate an expanding of stability field to high pressure in Phase D than that of MgO-SiO<sub>2</sub>-H<sub>2</sub>O system, we will present further results of SEM-EDS analysis of the recovery sample.

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