The 496th Geodynamics Seminar

Hydroxides in the Earth and Planetary Interior

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Meeting Room #486,
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Hydrous minerals deliver a certain amount of water to the Earth's interior via the subduction of oceanic plates. Finding of some new hydrous minerals, such as $MgSiO_4H_2$ phase H, δ-AlOOH, and pyrite-type FeOOH, suggests delivering water through the lower mantle to the core–mantle boundary. However, there have been few studies on hydrous minerals in the multicomponent system relevant to the actual subducting slabs under the pressure and temperature conditions of the lower parts of the Earth's mantle and those in other planetary interiors. In this presentation, we report the results of in-situ X-ray diffraction experiments on major hydrous phases in the Earth's lower mantle, $CaCl_2$-type δ-AlOOH, and its solid solutions with FeOOH and $MgSiO_4H_2$ using both multianvil apparatus and laser-heated diamond anvil cell (DAC) techniques in a wide range of pressures to 270 GPa. Based on the obtained data, I discuss (1) compression behaviors of hydroxides, (2) possible chemical compositions, (3) high-pressure phase transitions, and (4) the interaction between hydroxides and metallic core.

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