THE GEODYNAMICS SEMINAR Nº 572

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2021.6.3 (Fri.) 16:30 ~

Venue: Zoom
A link will be sent @grc-all within 30 minutes before the beginning of the seminar.

Rheology of dhcp-FeHx

An experimental study using a D111-type high-pressure deformation apparatus at SPring-8, BL04B1

Among candidates for the light element(s) in the Earth's core, hydrogen is one of the most important candidates. Although many hypotheses have been proposed for the origin of the inner core seismic anisotropy, there is no general consensus for its origin partly due to lack of accurate information of viscosity in the inner core. In this study, we have studied effect of hydrogen on the rheology of iron based on high-pressure and high-temperature deformation experiments.

A high-pressure deformation apparatus D111-type apparatus was recently installed on a synchrotron beamline BL04B1, SPring-8. We have conducted in-situ high-pressure deformation experiments on double hexagonal close-packed (dhcp) iron hydride (FeHx) using this apparatus. Steady-state deformation of dhcp-FeHx with x = 0.74-0.78 was observed at 17 conditions in pressure of 12.7-16.1 GPa and temperature of 623-823 K. Stress values of dhcp-FeHx were only slightly lower than those of hcp-Fe at same conditions. This result suggests that influence of hydrogen on the inner core viscosity is limited. On the other hand, the effect of hydrogen in the hcp-FeHx with lower hydrogen content can be intrinsically different, and thus, the inner core viscosity would be discussed more carefully.