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論文要約

The Earth's inner core dynamics inferred from experimental determinations of transport properties of iron at high pressures

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The Earth's inner core is predominantly composed of iron and showing complex seismic anisotropy suggesting lattice preferred orientation (LPO) in the inner core. Viscosity and thermal conductivity of the inner core are key parameters to properly estimate likely mechanism(s) inducing the LPO. In order to constrain viscosity and thermal conductivity of the inner core, I examined on 1) self-diffusion coefficient of solid iron 2) Fe-Ni inter-diffusion in Fe-Si 2 wt.% alloy and 3) anisotropic thermal conductivity of hcp iron based on high-pressure experiments utilizing a diamond anvil cell. By extrapolating the obtained results to inner core pressure condition, I estimate viscosity and thermal conductivity of the inner core and further discuss likely mechanism(s) that can attribute LPO and seismic anisotropy of the inner core.