The 497th Geodynamics Seminar

Crystallographic preferred orientation of $MnGeO_3$ perovskite: An experimental study using a D111-type guide block

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Flow direction at around the 660 km discontinuity is one of the key to understand the flow pattern of the whole mantle. Recently, Tsujino et al. (2016) determined shear induced crystallographic-preferred orientation of (Mg,Fe)SiO3 bridgmanite and showed that seismic anisotropy in the uppermost lower mantle near subducting slab is reasonably explained by horizontal flow of mantle material while number of their experimental data was limited. In this study, we have conducted high-pressure and high-temperature deformation experiments on $MnGeO_3$-perovskite, which is an analog material of bridgmanite, using D111-type deformation device installed at PF-AR, KEK and DT-Cup at UCL, and determined its deformation-induced crystallographic preferred orientation (CPO). Shear deformed samples consistently show CPO pattern with [010] aligned parallel to shear direction, and [100] and [001] weakly aligned sub-parallel to shear plane normal. A uniaxially compressed sample showed strong alignment of [100] along compression direction. These results suggest that dominant slip system of $MnGeO_3$-Pv is [010](100). Present results also suggest predominance of horizontal flow in the uppermost lower mantle near subducting slab as Tsujino et al. (2016) concluded.

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