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SIT04-P02 Room:Convention Hall Time:May 27 18:15-19:30

Fabrication of textured Fe-free and Fe-bearing olivine aggregates using colloidal processing under high magnetic field

KOIZUMI, Sanae[1*] ; SUZUKI, Tohru S.[2] ; SAKKA, Yoshio[2] ; HIRAGA, Takehiko[1]

[1]Earthquake Research Institute, University of Tokyo, [2]National Institute for Material Science

Crystallographic preferred orientation (CPO) of minerals is considered to be widely produced in the Earth's interior. Due to the presence of anisotropic physical properties such as elasticity, plasticity, electron conductivity and etc... of single crystal minerals, their bulk rock properties can significantly be affected by the presence of CPO. To measure CPO effect on the bulk rock properties by room experiments, it is required to prepare polycrystalline materials with ideally controlled CPO.

Magnetic field was applied to fine-grained ($\sim$120 nm) equigranular Fe-free and Fe-bearing olivine particles, which were dispersed in ethanol (solvent) with dispersant (polyethyleneimin). We expected the particles to align with respect to magnetic direction due to their magnetic anisotropy. The aligned particles were gradually deposited on a solid-liquid separation filter during ethanol drainage. The directions of magnetic field and particle deposition were parallel. The dried particles were then densified isostatically at 200 MPa for 10 min and sintered using the alumina tube furnace with vacuum pump.

Highly dense (density of $\geqq$ 99%) and fine grained ($\sim$1 μm) samples with a-axis alignment for Fe-free and c-axis alignment for Fe-bearing olivine to the magnetic direction were obtained. Such synthesized aggregates will allow us to measure CPO effect on the physical properties of olivine aggregate.

Keywords: crystallographic orientation, olivine