Oral | Symbol S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Techtonophysics

[S-IT38_30PM1]Rheology and Transport Phenomena of Geomaterials

Convener:*Tomohiro Ohuchi(Geodynamics Research Center, Ehime University), Osamu Kuwano(Japan Agency for Marin-Earth Science and Technology), Ichiko Shimizu(Department of Earth and Planetary Science, Graduate School of Science, University of Tokyo), Chair:Noriyoshi Tsujino(Institute for Study of the Earth's Interior, Okayama University)

Wed. Apr 30, 2014 2:15 PM - 4:00 PM 511 (5F)

Dealing with various deformation processes, rheology, and transport phenomena in the crust, mantle and the core. Our goal is to achieve a unified understanding of solid earth science from the viewpoint of rheology. We welcome any approach: field observations, laboratory experiments, numerical simulations, and theories. Interdisciplinary studies on deformation processes (e.g., industrial or materials science) are also welcome in this session.

3:30 PM - 3:45 PM

[SIT38-P05_PG]Synthesis of textural polycrystalline forsterite using colloidal processing in a strong magnetic field.

3-min talk in an oral session

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Keywords:forsterite, polycrystalline, magnetic field, orientation, CPO

It is well known that the crystallographic preferred orientation (CPO) of minerals is commonly produced in the Earth's interior. Thus, it is important to understand the physical properties of the mineral aggregates that exhibit CPO. However, silicate minerals are often feeble magnetic and have small anisotropic susceptibilities so that it is difficult to apply a magnetic field effectively to rotate the mineral particles. Tendency of finer particles to spontaneously agglomerate due to strong attractive interactions (van der Waals forces) add further difficulty. We used a technique of slip casting in a high magnetic field (12T) to align certain crystallographic axis of mineral particles. For the particles to rotate easily in the solvent under a strong magnetic field, we improve the method of deflocculating. To control the surface potential of the particles, we applied various types of polymer modification. Vacuum sintering of the powders that were composed of the aligned particles was expected to produce a polycrystalline material aggregate that exhibits CPO. The resultant materials were characterized by X-ray powder diffraction (XRD), secondary electron microscope (SEM) and Electron Backscatter Diffraction (EBSD). The specimen exposed to a strong magnetic field exhibits preferential A-axis alignment to the magnetic direction. Those synthetic specimens allow us to examine the effect of CPO on the physical properties of the earth's materials in future room experiments.