[JJ] Evening Poster | S (Solid Earth Sciences) | S-MP Mineralogy & Petrology

[S-MP38]Physics and Chemistry of Minerals

convener:Hiroaki Ohfuji(Geodynamics Research Center, Ehime University), Seiji Kamada(Frontier Research Institute for Interdisciplinary Sciences, Tohoku University)
Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
In this session, we will discuss the physics and chemistry of the Earth and planetary materials (including amorphous and melts) based on the results obtained from various experimental methods such as X-ray diffraction, FT-IR, Raman spectroscopy, electron microscopy and computer simulations.

[SMP38-P04]Melting experiments on the $MgSiO_3$-SiO_2 system to deep lower mantle pressures

*Miyuki Anzai[1], Keisuke Ozawa[1], Kei Hirose[1,2], Ryosuke Sinmyo[1], Shigehiko Tateno[2] (1.The University of Tokyo, 2.ELSI, Tokyo Tech)
Keywords:High Pressure, Melting, Lower Mantle

$MgSiO_3$–SiO_2 system is important to understand SiO_2-rich chondritic mantle materials, but its melting phase relations have been determined experimentally only up to 1 GPa. Here we conducted melting experiments in a pressure range from 41 to 139 GPa using a laser-heated diamond-anvil cell (DAC), in order to determine the change in a eutectic melt composition. A cross section at the hot spot of a heated sample was prepared with a focused ion beam (FIB), and its textural and compositional characterizations were made with a SEM/EDS. Quenched molten samples always exhibited a concentric texture, with quenched melt at the center surrounded by liquidus phase(s) of $MgSiO_3$ and/or SiO_2. Our data show that eutectic composition changes with increasing pressure from $SiO_2/(MgO+SiO_2)$ = 0.55 (molar ratio) at 1 GPa (Hudon et al., 2005 J. Petrol.) to ~0.60 at 41 GPa and further to ~0.65 at 135 GPa. Combining with the results on the MgO–$MgSiO_3$ system (Ozawa et al., this meeting), we discuss a large-scale differentiation in chondritic mantles starting from a wide range of MgO/SiO_2 ratios.

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