Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

SMP06-02 Room:411 Time:April 28 14:30-14:45

Influence of H2 fluid on the stability of MgSiO3 enstatite in the upper mantle condition

SHINOZAKI, Ayako[1*] ; KAGI, Hiroyuki[1] ; HIRAI, Hisako[2] ; OHFUJI, Hiroaki[2] ; OKADA, Taku[3] ; NAKANO, Satoshi[4] ; YAGI, Takehiko[2]

[1]GCRC, The university of Tokyo, [2]GRC, Ehime university, [3]ISSP, The university of Tokyo, [4]NIMS

C-O-H fluids affect the phase relation and melting of silicate minerals in the mantle of the Earth. The mantle is expected to become progressively reduced with increasing depth, so that H_2 fluid is considered to exist in the deep mantle with H_2O fluids. In this study, influence of H_2 fluid on stability and phase relation of enstatite, which was the secondary most abundant mineral in the upper mantle, was examined using a laser heated diamond anvil cell.

In this presentation, we will report the results of $MgSiO_3$-H_2 system, which is non-iron-bearing system. After heating at 3.1-13.8 GPa and about 1500-2000 K, decomposition of enstatite and formation of forsterite (Mg_2SiO_4), periclase (MgO) and coesite/stishovite (SiO_2) were observed from XRD measurements. The presence of H_2 fluid were observed from Raman spectra even after the heating. Since the studied P-T range is in the stability field of orthoenstatite and high pressure clinoenstatite under dry condition, the decomposition reaction observed in the present study was presumably induced by H_2 fluid. Formation process of these silicate phases were evaluated by observation of quench texture of the recovered samples using SEM and TEM.

Keywords: enstatite, H2 fluid, upper mantle, laser heated diamond anvil cell