

SMP057-02

Room: 301A

Time: May 23 13:58-14:11

Reaction of hydrogen molecules and olivine under the mantle condition

Ayako Shinozaki^{1*}, Hisako Hirai¹, Hiroyuki Kagi², Takehiko Yagi³

¹GRC, Ehime university, ²Geochemical Laboratory, Graduate School, ³Institute for Solid State Physics, Unive

Hydrogen is most abundant element in the cosmos. Many data suggest that a considerable amount of hydrogen can be stored in the Earth's interior. Mantle dynamics considerably depends on hydrogen. Thus, existence and states of the hydrogen in the Earth's mantle are important issues to be understood. H₂O fluids are stable in the crust and the upper part of the mantle such as higher oxygen fugacity. CH₄, H₂O, H₂ fluids are stable in the lower part of the mantle showing lower oxygen fugacity. Many studies of water content in the mantle minerals were performed previously. However, no studies of relationship between hydrogen molecules and mantle minerals have been reported. In this study, therefore, high pressure and high temperature experiments with hydrogen and olivine were performed and effect of hydrogen on stability and crystal structure of olivine were examined.

High-pressure and temperature experiments of forsterite-hydrogen system, were performed using Laser heated diamond anvil cell. A lever- and spring-type diamond anvil cell (DAC) was used in the high pressure experiment. For pressure measurements, a ruby fluorescence method was used. Heating experiments were performed with CO₂ laser heating systems. Under room temperature, X-ray diffractometry, Raman spectroscopy and FT-IR spectroscopy were performed. In recovered sample, Raman spectroscopy, FT-IR spectroscopy, and TEM observation were performed.

Keywords: LHDAC, mantle, olivine, hydrogen