Geodynamics Seminar

第304回ジオダイナミクスセミナー

Decomposition of forsterite with existence of H_2 under high pressure and temperature

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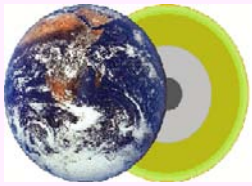
主催：愛媛大学地球深部ダイナミクス研究センター
日時：9/30（金）午後 4時30分～
場所：総合研究棟 4F 会議室



EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

C-O-H fluids play important roles in the dynamics and evolution of the Earth's mantle. For example, the existence of H_2O significantly affects some key physical properties of mantle minerals, such as melting temperature, elastic properties, electric conductivies, and phase transitions pressures, which are important in addressing these phenomena and possess within the mantle. The composition of C-O-H fluids depends on the surrounding oxidation states in the mantle. The oxidation state of the mantle is known to be reduced with depth. In deeper part of the upper mantle, even H_2-fluids exist in addition to H_2O fluids. Olivine is the most abundant mineral in the upper mantle. The reaction of H_2O with olivine has been shown to significantly influence its melting temperature, reduce electric conductivity, and decrease the phase transition pressure. Influence of H_2 to stability of olivine is also great interest. In the present study, high pressure-temperature experiments using a mixture of forsterite (Mg_2SiO_4) and H_2 were performed in a laser heated diamond anvil cell. At 8.8 GPa to 15.4 GPa and above 1600K, decomposition of olivine and formation of periclase (MgO), and stishovite/coesite (SiO_2) were observed from XRD measurements. Such decomposition was not observed in dry olivine and H_2O-olivine system, indicating that decomposition of olivine was occurred by the reaction with H_2 fluids. Dissolution of SiO_2 into H_2-fluids was suggested by TEM observations.

詳細は当センターホームページ: http://www.ehime-u.ac.jp/~grc/をご覧ください
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