The 419th Geodynamics Seminar

Experimental study of Al,Fe-bearing phase H

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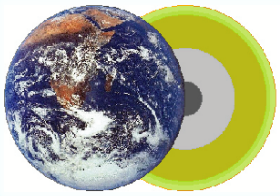

EHIME UNIVERSITY GRC GEODYNAMICS RESEARCH CENTER

Abstract

Since aluminous phase H ($MgSiO_4H_2$ – AlOOH) is stable over the entire pressure range of the lower mantle, the hydrated subducting plate is considered to deliver a certain amount of water to the deepest lower mantle (Tsuchiya 2013; Nishi *et al*., 2014; Ohira *et al*., 2014; Walter *et al*., 2015). Compositional analysis of phase H grains synthesized from natural serpentine shows the presence of the Fe component in this phase (Nishi *et al*., 2015). This result suggests that phase H would also form solid solutions with ε-FeOOH, since ε-FeOOH is isostructural to phase H and δ-AlOOH. However, very few attempts have been made at these multicomponent systems, although Fe is one of the most important elements in the Earth's interior. In this presentation, we discuss the high-pressure mineralogy of Al,Fe-bearing phase H based on the recent experimental results. Compositional changes and equation of state were examined using in-situ X-ray diffraction measurements in conjunction with a multi-anvil apparatus. The sintered diamond anvil was used for pressure generations up to 60 GPa. Preliminary results show that large amounts of Fe and Al are partitioned into phase H relative to bridgmanite. Also, high-pressure stability of δ-AlOOH was studied using a laser-heated diamond-anvil cell (DAC) technique up to 210 GPa. We found that δ-AlOOH transform to pyrite-type structure at high pressure above 190 GPa. These experimental results are supported by first-principles density-functional calculations.

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