

Recent progress for stability and water solubility of hydrous and nominally anhydrous minerals in the mantle
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井上 徹^{1*}; 柿澤 翔¹; 蔡 鬧¹; 藤野 清志¹; 栗林 貴弘²; 長瀬 敏郎²; Greaux Steeve¹; 肥後 祐司³;
坂本 直哉⁴; 塚本 尚義⁴

INOUE, Toru^{1*}; KAKIZAWA, Sho¹; CAI, Nao¹; FUJINO, Kiyoshi¹; KURIBAYASHI, Takahiro²;

NAGASE, Toshiro²; GREAUX, Steeve¹; HIGO, Yuji³; SAKAMOTO, Naoya⁴; YURIMOTO, Hisayoshi⁴

¹ 愛媛大学地球深部ダイナミクス研究センター, ² 東北大学, ³ JASRI, SPring-8, ⁴ 北海道大学

¹ Geodynamics Research Center, Ehime University, ² Tohoku University, ³ JASRI, SPring-8, ⁴ Hokkaido University

Recently hydrous ringwoodite was found in natural diamond inclusion, which water content was ~1.4-1.5 wt%. This shows that the mantle transition zone is really hydrous condition, at least in some regions. In addition, new dense hydrous magnesium silicate, phase H was newly found by first-principle calculation and experimental studies. Thus the study on the water in the mantle becomes a hot topic again after the finding of hydrous wadsleyite and hydrous ringwoodite.

Our group has been conducting the study for the stability and water solubility of hydrous and nominally anhydrous minerals, and the recent target is the effect of Al. In this process, we found the new Al-bearing hydrous phase in the upper mantle condition. In addition, we found that Al-bearing bridgmanite (Mg-silicate perovskite) can contain significant amount of water. So we are doing those projects to clarify the maximum water solubility in P-T conditions, structure by single crystal X-ray and power neutron diffractions, equation of state and elastic wave velocity. In this talk, we will introduce the recent progress of the water in the mantle based on our projects.