含水ブリッジマナイト：下部マントルにおける貯水能力
Hydrous bridgmanite: Water storage capacity in the lower mantle

*井上 徹[1]、柿澤 翔[1]、藤野 清志[1]、栗林 貴弘[2]、長瀬 敏郎[2]、Greaux Steeve[1]、肥後 祐司[3]、坂本 直哉[4]、坏本 尚義[4]、服部 高典[5]、佐野 亜沙美[5]
*Toru Inoue[1], Sho Kakizawa[1], Kiyoshi Fujino[1], Takahiro Kuribayashi[2], Toshiro Nagase[2], Steeve Greaux[1], Yuji Higo[3], Naoya Sakamoto[4], Hisayoshi Yurimoto[4], Takanori Hattori[5], Asami Sano[5]

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、5.JAEA
1.Geodynamics Research Center, Ehime University, 2.Tohoku University, 3.JASRI, SPring-8, 4.Hokkaido University, 5.JAEA

Recently hydrous ringwoodite was found in a natural diamond inclusion, which includes ~1.5 wt% H_2O. In addition, the experimental studies show that wadsleyite and ringwoodite, which are the most abundant minerals in the mantle transition zone, can contain water up to 2.2–2.7 wt% [e.g. Inoue et al., 1995, 1998, Kohlstedt et al., 1996]. These results show that the mantle transition zone is a strong water reservoir in the Earth’s interior, and at least locally, hydrous. On the other hand, the water storage capacity in the lower mantle is a matter of debate.
We have 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 that Al-bearing bridgmanite (Mg-silicate perovskite) can contain significant amount of water. The possible H substitution mechanism can be proposed by means of chemical compositional relationship between Mg, Si, Al and H. In addition, we clarified the possible H position in the bridgmanite by means of the powder neutron diffraction analysis in J-PARC, together with the single crystal X-ray structural analysis in PF. This shows that the significant amount of H (water) can be stored in the Earth’s lower mantle.
Because of the H in the bridgmanite, the physical properties of the bridgmanite can be changed. The information is very important to discuss the water content and the composition in the lower mantle. We have also conducted the equation of state and the ultrasonic wave velocity measurements of hydrous bridgmanite in BL04B1, SPring-8 to determine the elastic wave velocities and the elastic properties under high pressure and temperature condition. In this talk, I will introduce about our “hydrous bridgmanite” project.

キーワード：含水ブリッジマナイト、下部マントル、放射光Ｘ線その場観察実験、中性子回折、弾性的性質
Keywords: hydrous bridgmanite, lower mantle, Synchrotron X-ray in situ experiment, neutron diffraction, elastic property

