

**Mr. Goru Takaichi**

PhD Student (D1)

Geodynamics Research Center

2021.7.29 (Fri.) 16:30 ~**Venue: Zoom**

A link will be sent @grc-all within 30 minutes before the beginning of the seminar.

The stability of hydrous SiO₂ stishovite in the deep mantle

マントル深部における含水SiO₂スティショバイトの安定性

SiO₂ stishovite is one of the most abundant minerals in crustal materials such as sediments and basalts. Understanding of water solubility in stishovite is important because presence of hydrous stishovite greatly affects water distribution and water transport efficiency in the deep mantle. Litasov et al. (2007) reported that Al-bearing stishovite retains up to 0.3 wt% water. On the other hand, recent studies have indicated that much larger amounts of water (>3 wt%) can dissolve in the high-pressure phases of pure SiO₂ silica (e.g., Spektor et al., 2016; Lin et al., 2020). However, the stability conditions of hydrous stishovite are quite different between studies based on multi-anvil apparatus and laser-heated DAC. In this study, we determined changes in the cell volume of stishovite up to 1300°C and 13-29 GPa under water-saturated conditions by means of in-situ X-ray observation using the SPEED-1500 multi-anvil apparatus at SPring-8 BL04B1. The results show stability of stishovite with high water content (> 1 wt%) is limited to temperatures below 550°C. This is contradictory to Lin et al. (2020) who reported solubility of >3 wt% water at lower mantle pressures and above 1000°C. Therefore, SiO₂ stishovite is unlikely to be the main hydrous phase, at least at conditions up to the top of the lower mantle.

Keywords: 1. High-pressure in-situ experiment
2. NAMSs
3. Hydrous stishovite