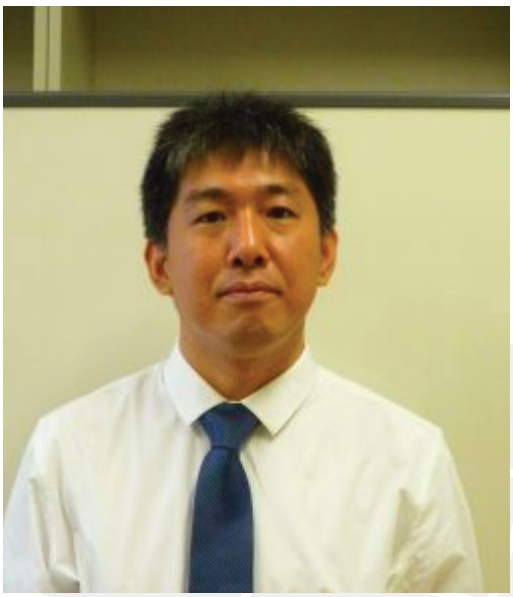

Dr. Yoshio Kono
Associate Professor
Geodynamics Research Center

2020.12.11 (Fri.) 16:30 ~

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

Structural evolution of SiO_2 glass and amorphous TiO_2 at high pressures

Knowledge of pressure-induced structural changes in network-forming glasses is of great interest in various scientific fields such as condensed matter physics, materials science, and engineering, as well as geophysics as analogue of silicate magmas. As a prototype network-forming glass, SiO_2 glass has been the most extensively studied. It has been well known that the coordination number of Si [CSi] in SiO_2 glass gradually increases from 4 to 6 at ~15–50 GPa. However, further structural changes to CSi> 6 at ultrahigh pressure conditions are controversial. Our pair distribution function measurement of SiO_2 glass up to 120 GPa reveals changes in the first-, second-, and third-neighbor distances associated with an increase in CSi to >6 above 95 GPa. Packing fractions of Si and O determined from the first- and second-neighbor distances show marked changes accompanied with the structural evolution from CSi=6 to >6. Structural constraints in terms of ionic radius ratio of Si and O, and ratio of nonbonded radius to bonded Si-O distance support the structural evolution of SiO_2 glass with CSi>6 at high pressures. At the seminar, in addition to the structural change in SiO_2 glass, I will introduce further structural change to coordination number of 9 in amorphous TiO_2.

Kono, Y. et al. (2020). Structural Evolution of SiO_2 Glass with Si Coordination Number Greater than 6. *Physical Review Letters*, 125(20), 205701.
Shu, Y., Kono, Y. et al. (2020). Observation of 9-Fold Coordinated Amorphous TiO_2 at High Pressure. *The Journal of Physical Chemistry Letters*, 11(2), 374-379.

Keywords: 1. Polyamorphism
2. Glass
3. Magma