

## Structure of MgO-SiO<sub>2</sub>-H<sub>2</sub>O melts under high pressure

# Akihiro Yamada[1]; Toru Inoue[1]; Satoru Urakawa[2]; Nobumasa Funamori[3]; Ken-ichi Funakoshi[4]; Takumi Kikegawa[5]; Tetsuo Irifune[1]

[1] GRC, Ehime Univ.; [2] Dept.of Earth Sci., Okayama Univ.; [3] Earth and Planetary Sci., Univ of Tokyo; [4] JASRI; [5] IMSS, KEK

Recent studies on melting of mantle minerals have revealed that the liquidus phases change from olivine to pyroxene, and further stishovite with increasing pressure under hydrous condition, and the compositions of the liquid generated in the deep mantle become enriched in MgO component (e.g. Inoue, 1994, Yamada et al., 2004). This phenomenon implies the structural changes of the hydrous silicate melts in the vicinity of the pressure at which liquidus phases are changed, because the liquidus phases and the melting relations should be strongly affected by the melt structures. We have conducted in-situ X-ray diffraction experiments of hydrous Mg-silicate melts up to 5 GPa and 1900 K to constrain the structures. Experiments were conducted at AR-NE5C bending magnet beamline, using MAX-80 cubic type high-pressure apparatus. Starting materials were prepared by mixing of Mg(OH)<sub>2</sub>, MgO, and SiO<sub>2</sub> to make the systems of MgO-SiO<sub>2</sub>-H<sub>2</sub>O (Mg/Si=1.0, 1.5 and 2.0). Special attentions were made to obtain the diffraction by introducing the new diamond capsule system.

We could succeed to get good quality diffraction data of hydrous silicate melt up to 6.5 GPa by using diamond capsule, and also could 8 times reduce the exposure time comparing with the use of Ag-Pd capsule, in which we have done experiments previously. In the derived structure factors  $S(Q)$ s, first sharp diffraction peaks (FSDP), which may be related to the size of intermediate range ordering such as SiO<sub>4</sub> tetrahedral network in silicate melts, shift to higher  $Q$  (where  $Q$  is the scattering vector which dimension is 1/Ang.) with increasing MgO content and pressure. Further details about the real space data from radial distribution functions which are derived by Fourier transform of structure factors will be presented.