## H2O-RICH MAGMAS OR SILICATE-RICH H2O FLUIDS? A PERSPECTIVE FROM HIGH PRESSURE AND TEMPERATURE EXPERIMENTS

# Tatsuhiko Kawamoto[1], Kyoko Matsukage[2], Kenji Mibe[3], Maiko Isshiki[4], Koshi Nishimura[1], Naoki Ishimatsu[5], Shigeaki Ono[6]

[1] Inst. for Geothermal Sciences, Kyoto Univ., [2] Department of Environmental Science, Ibaraki Univ., [3] Geophysical Lab., Carnegie; ERI, Univ. Tokyo, [4] SPring-8/JASRI, [5] Physical Sci., Hiroshima Univ., [6] IFREE, JAMSTEC

http://www.vgs.kyoto-u.ac.jp/InetHome/kawamoto/

Crystalline phases coexisting with H2O fluids in a Bassett type externally heated diamond anvil cell are identified at 800 - 1000C and 0.5 - 5.2 GPa using synchrotron X-ray diffraction at SPring-8. Up to 3.3 GPa, forsterite (Mg2SiO4) crystallizes in enstatite (MgSiO3) - H2O system. In contrast, enstatite dissolve into the H2O fluids congruently at higher pressure conditions. This observation suggests that Mg/Si ratios of the H2O fluids become more than unity at 3.3 GPa corresponding to about 100 km depth. Chemical compositions of silicate dissolved into H2O fluids have been charac-terized by SiO2-rich feature at 1 - 3 GPa (Nakamura and Kushiro, 1974, Cargenie Year Book Ryabchikov et al., 1982, Contrib. Mineral. Petrol., Zhang and Frantz, 2000, Am Mineral.). In contrast, recent quench experiments at higher pressure conditions sug-gested that H2O fluids coexisting with enstatite and forsterite become higher Mg/Si ratios as pressure increases from 3 to 10 GPa (Stalder et al., 2001, Contrib. Mineral. Petrol., Mibe et al., 2002, Geochim. Cosmochim. Acta). Our in-situ experimental data are consistent with the previous quench experimental studies. Partial melts of H2O-saturated peridotite up to 10 GPa (Kawamoto and Holloway, 1997, Science) show similar Mg/Si ratios to the H2O fluids compositions in the quench data by Stalder et al. (2001) and Mibe et al. (2002). It is, therefore, likely to suggest that there is no distinction between silicate-rich H2O fluids and H2O-rich silicate melts somewhere

in the Earth.