Stability field of phase egg (AlSiO3OH) at high pressure and temperature and transportation water in mantle

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It is important to determine the stability fields of hydrous minerals because they may transport water to earth interior. Phengite, topaz-OH and phase egg were stable phase in sediment-H2O systems,but stability field of phase egg at high pressures is not yet determined.

In this study, high pressure stability limits of phase egg have been determined by quench experiments and in-situ X-ray measurements. The stability fields extend temperature up to 2223K at 22 GPa. The upper pressure limits is bounded by the reaction, phase egg = deruta-AlOOH + stishovite. Deruta-AlOOH is observed at 23.4GPa 1103K and 25GPa 1273K in the present experiments, and phase boundary will locate around these conditions. The present results suggest that phase egg in slabs may transport water into deep mantle.