Water contents of lower mantle minerals

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Multi-anvil experiments have been conducted in the KLB-1 + H2O system at pressure of 23.5 Gpa and temperature of 1600-1700*C to investigate the solubility and capacity of water in lower mantle phases that are Mg-perovskite, Ca-perovskite and magnesiowustite. The water contents were obtained from Secondary Ion Mass Spectrometry (SIMS). The results show that (1) Ca-perovskite is the most abundant phase of water which dissolve water up to ~0.4 wt% and (2) Mg-perovskite dissolves water about ~0.2 wt% and (3) magnesiowustite are not likely to dissolve a detectable amount of water. These results suggest that the lower mantle is a significant repository of water ranked with the transition zone.

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