Fe solubility and structural change in CaSiO3 perovskite at the lower mantle condition

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Fe solubility and structural change in CaSiO3 perovskite at the lower mantle condition were studied by a laser-heated diamond anvil cell experiment, synchrotron X-ray radiation experiment and analytical electron microscopy. CaSiO3 perovskite was stable up to the pressure and temperature condition of the lowermost part of the lower mantle, while a mixture of FeO and SiO2 was stable for FeSiO3, and CaSiO3 perovskite, FeO and SiO2 phases coexisted in the intermediate region of the CaSiO3-FeSiO3 system at the same high pressure and high temperature region. CaSiO3 perovskite has a significant Fe solubility and Fe containing CaSiO3 perovskite was tetragonal at very high pressure and 2000 K.