In situ X-ray diffraction study of perovskites in the system MgSiO3-Al2O3: determination of equation of state

Atsushi Kubo[1], Takehiko Yagi[2], Shigeaki Ono[3], koichi Okabe[4], Nobuyosi Miyajima[3], Nagayoshi Sata[5], Masaki Akaogi[6], Takumi Kikegawa[7]

[1] ISEI, Okayama Univ, [2] Inst. Solid State Phys, Univ. Tokyo, [3] ISSP, Univ. of Tokyo, [4] ISSP.,Tokyo Univ., [5] ISSP, [6] Dept. of Chem., Gakushuin Univ., [7] IMSS, KEK

In situ high-pressure X-ray diffraction experiments for aluminous perovskite of Mg0.9Al0.2Si0.9O3 composition and MgSiO3 perovskite were performed up to 10 GPa using synchrotron radiation to determine the equation of state. Peovskite was compressed in diamond anvil cell using pressure transmitting medium (ethanol- methanol solution, mixing ratio was 4:1 in volume), together with pressure standard material (ruby chips and Au ramps). Generated pressure was determined by ruby fluorescence method and/or equation of state of Au. All experiments were performed at hydrostatic pressure conditions. Bulk modulus of the aluminous perovskite at room temperature was obtained as KT0=216+-1.2GPa, when KT0'=4 was assumed. This KT0 value is significaltly lower than that of MgSiO3 perovskite.