

## **Phase transition of Ca-perovskite and stability of Al-bearing Mg-perovskite in the lower mantle**

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### **ABSTRACT**

Here, using in situ X-ray diffraction combined with a laser-heated diamond anvil cell at high temperatures and high pressures, a phase relationship in KLB-1 peridotite composition samples was investigated from 38 to 106 GPa, and 300 to 2600 K, in order to determine the stability of phases in the lower mantle. We observed that Al-bearing Mg-perovskite and magnesiowüstite remained stable up to 106 GPa, which corresponds to a lower mantle depth of 2400 km depth. By contrast, a phase transition in Ca-perovskite from a cubic to a tetragonal structure was observed. The amount of distortion in this material increases as pressure increases at 300 K. The temperature of the tetragonal to cubic structure transition, therefore, appears to increase with increasing pressure. There is a possibility that this Ca-perovskite phase transition contributes to unidentified seismic anomalies in the lower mantle.