In situ X-ray diffraction experiment of the postspinel phase transition in a pyrolite composition

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We attempted to determine the precise postspinel phase transition pressure in a pyrolite composition, which is a representative model mantle composition, by means of in-situ X-ray diffraction measurements at high-pressure and high-temperature. The experiments were carried out using the SPEED-1500 system, which was installed at BL04B1 of SPring-8. We employed two internal pressure standards, Au and MgO, and thus determined postspinel phase transition pressures in a pyrolite composition are 20.8 GPa and 22.2 GPa, respectively. The postspinel phase transition pressure determined in this study is similar to but slightly lower than that previously determined for Mg2SiO4 composition, and inconsistent with the pressure equivalent to the 660 km seismic discontinuity.