Temperature of the mantle transition zone inferred from high pressure and high temperature measurement of pyrolite density.

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High pressure and high temperature in situ X-ray observations of Pyrolite-like composition were carried out using MA8-type multi-anvil apparatus combined with synchrotron radiation. At pressures of 17-18GPa and temperatures of 1200-1600K, unit cell volumes of spinel and garnet phases were measured simulaneously. Thermal expansion at 17.3 GPa (equivalent to 504 km in depth) up to 1600K was determined from the P-V-T data obtaines in the present study. Density for Pyrolite composition was estimated as a function of temperature at the depth. Comparing with the seismological model (PREM) , temperature for this depth was estimated. It was found that a predicted temperature was higher than that of geotherm.