

Thermal conductivity and thermal diffusivity of mantle minerals at temperatures to 1000K and under pressures to 8 GPa

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Thermal conductivities and thermal diffusivities of mantle minerals have been measured in a split-sphere apparatus under pressures to 8.3GPa and at temperatures to 1000K. The sample was made in the form of three identical disks with a diameter of 4mm and with a total thickness of 1mm. A thin metal heater in the sample was heated by a pulse current. Temperature profile with time was detected by a thermocouple. To heat up the ambient temperature of the sample, planar furnaces were installed in the 11mm-edged pressure medium.

Temperature effects on thermal diffusivity and thermal conductivity of natural garnet are in agreement with those at zero pressure: they decrease 50 per cent from room temperature to around 600K, and they have small change over that temperature.