

Thermal diffusivities and thermal conductivities of garnet and olivine at temperatures to 1000 K under high pressure

Masahiro Osako[1], Eiji Ito[2], Akira Yoneda[3]

[1] Div.Astro.Geophys., Natl.Sci.Mus., [2] ISEI, [3] ISEI, Okayama Univ.

<http://www.kahaku.go.jp>

Thermal conductivities and thermal diffusivities of olivine and garnet were measured in a split-sphere apparatus under pressures to 8 GPa and at temperatures to 1000 K. The sample in the form of three identical disks with a diameter of 4mm and with a total thickness of 1mm was installed in a 18mm-edged pressure medium. A thin metallic heater between the disks was heated by a pulse current.

Pressure dependence of thermal diffusivity of olivine (5 %/GPa for the b-axis) is larger than that of garnet (2 % at 5 GPa). Thermal diffusivity or thermal conductivity of garnet changes moderately with temperature increase unlike normal insulators in the T-inverse law of thermal conductivity, and its pressure derivative decreases with pressure increase.