



On the phonon thermal conductivity at the mantle/core boundary

S. Maj / IGPh-PAS

Institute of Geophysics, Pol.Acad.Sci., ul. Ks.Janusza 64, 01-452 Warsaw, Poland
(maj@igf.edu.pl/(48)(22)69-15-915)

A modified, more general, relationship between the phonon thermal conductivity (PTC) and seismic parameter F for silicate/oxide geomaterials is derived. The research is based on the Debye's theory of lattice vibrations and on the seismic equation of state for minerals (so-called the Anderson-Jordan equation). Thermodynamical laboratory data of several main silicates and oxides in the form of polycrystalline aggregates were also used. This new relationship suggests that the PTC-values at the mantle/core boundary from the perovskite variant of the PREM could be about 11-13 W/m K. These values are in sufficient agreement with the independent results obtained from shock experiments and laboratory data obtained in the laser-heated diamond-anvil cell at pressures of 58 and 125 GPa: $PTC = 5-12$ W/m K (according to Jeanloz and Manga -1997).