# Radiative thermal conductivity of majoritic garnet

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Majoritic garnet is one of the major phases in the Earth's mantle transition zone, which according to recent results on hydrous ringwoodite and wadsleyite may contribute significantly to heat transfer in the Earth's interior. Here, a series of majoritic garnet samples with varying proportions of Si, Fe, Al, Cr and $H_2O$ (100-2200 wt ppm) was synthesized at conditions of 18-19 GPa and 1500-1800°C. Optical absorption measurements were carried out on 10 $\mu$m to 25 $\mu$m thick clear doubly polished single-crystals of majoritic garnet loaded in resistively heated diamond-anvil cells with argon as pressure medium. UV-Vis-IR spectra, recorded at room conditions and at simultaneous high pressure and high temperature up to 1000 K, were used to calculate thermal radiative conductivites. The absorption spectra of majoritic garnet at ambient conditions reveal OH bands with maxima between ~3100 $cm^{-1}$ and ~3630 $cm^{-1}$ and bands at 5580 $cm^{-1}$, 7160 $cm^{-1}$, 10400 $cm^{-1}$, 14700 $cm^{-1}$, 19100 $cm^{-1}$ and 23500 $cm^{-1}$. With increasing pressure bands shift to higher frequencies and the absorption coefficient increases. The average thermal conductivity at transition zone conditions was determined to be 0.6 W/m/K. Here we will discuss absorption band assignment and the effect of pressure, temperature, iron and hydration on thermal radiative conductivities of majoritic garnet.