

Synchrotron infrared spectroscopy of OH-chondrodite and OH-clinohumite at high pressure

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ABSTRACT

High-pressure synchrotron infrared (IR) absorption spectra were collected at ambient temperature for OH-chondrodite and OH-clinohumite up to 38 and 29 GPa, respectively, using argon as the pressure-transmitting medium. The crystal structures of both clinohumite and chondrodite are preserved up to the maximum pressure. However, disordering of the silicate framework appears to become more pronounced at high pressure based on significant broadening of the IR bands with increasing pressure. All three OH bands in both structures shift linearly to higher frequency with pressure up to 18 GPa. Above 18 GPa, the variation of OH frequency with pressure remains linear; however, the slopes for the three OH bands are significantly different as a result of different degrees of hydrogen bonding. The IR results are compared to those from recent Raman studies in which water was used as the pressure-transmitting medium.