

Figure 1. Polarized IR reflectance spectra of diopside slabs from sample 95AK6 and the Cr diopside orientation standard (from Shannon et al. 1992). Spectra are shifted vertically for comparison.

Figure 2. (a) Polarized FTIR spectra of diopsides, normalized to 1 mm thickness. Spectra are offset for clarity, and the absorbance scale is different for each sample to show details of spectra. (b) The β polarized spectra for all samples, on the same absorbance scale for comparison. OH concentration in the samples increases from bottom to top.

Figure 3. Total OH content of diopside samples from IR spectroscopy vs. water fugacity, as predicted from oxygen isotope measurements (Edwards and Valley 1998). OH from bands that increase in intensity during hydrothermal experiments (Skogby and Rossman 1989) is also plotted as open symbols.

Figure 4. Concentration of hydrogen versus average concentration of total (a) Fe^{3+} (b) Al (c) Ti (d) Na, and (e) M^{3+} . Fe^{3+} concentration is determined from the Mössbauer data; all others are from microprobe analysis. In addition to total OH concentration, hydrogen concentrations due to individual peaks (3645 and 3450 cm^{-1}) are also shown if a discernable trend can be seen. For elements other than H, the error shown is the standard deviation of the average of four analyses for each sample.

Figure 5. Optical absorption spectra of diopsides in the α polarization direction. Spectra are offset vertically for clarity (in order of increasing OH content) and are normalized to 1 mm thickness.

Figure 6. Representative Mössbauer spectra and quadrupole splitting distribution (QSD) fits (solid lines) for Fe in diopside. Isomer shifts are reported relative to metallic Fe. Each spectrum was fit with two Fe^{2+} components (with δ about 1.1 to 1.2) and up to two Fe^{3+} components (with δ about 0.3 to 0.4).