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Infrared Reflectance of Magnesiowustite($Mg_{1-x}Fe_xO$): Experiment and Theory TAO SUN, PHILIP B. ALLEN, Department of Physics and Astronomy, SUNY at Stony Brook, DAVID G. STAHNKE, Department of Physics, University of California, San Diego, STEVEN D. JACOBSEN, Department of Earth and Planetary Sciences, Northwestern University, CHRISTOPHER C. HOMES, Condensed Matter Physics & Materials Science Department, Brookhaven National Laboratory — We measured the optical reflectance spectra(0$\sim$32300 cm^{-1}) of magnesiowustite($Mg_{1-x}Fe_xO$, x=0.06, x=0.27) at 6K and 295K, using a Bruker IFS 113v spectrometer. Kramers-Kronig relations are used to extract the corresponding dielectric functions. The Infrared parts of the spectra resemble those of pure MgO, while showing much smaller temperature dependence. There are two factors determining the structure of dielectric functions: a) anharmonic phonon-phonon interactions, b) disorder scattering. A breathing-shell model is used to evaluate factor a) in pure MgO, and a supercell is built to estimate the influence of factor b) in Fe doped MgO. Our results will be useful for computing the heat conductivity of magnesiowustite in the earth's lower mantle.

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