

431. Title:Dielectric and lattice vibrational spectra of Cu₂O hollow spheres in the range of 1-10 THz

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Abstract:The transmitted spectra of Cu₂O hollow spheres have been measured in the range of 1-10 THz and analyzed by the classical dispersion theory and group theoretical analysis. Two strong phonon resonances are observed at $\nu_1 = 4.54$ THz (148.3 cm⁻¹) and $\nu_2 = 4.91$ THz (163.5 cm⁻¹), corresponding to the transverse optical (TO) phonon and longitudinal optical (LO) phonon modes, respectively. In addition, we have identified a possible surface optical (SO) phonon mode located between the TO and LO phonon frequencies and have observed that a forbidden phonon mode at 9.36 THz (312 cm⁻¹) is activated due to the imperfect lattice of the Cu₂O hollow spheres. The optical and dielectric parameters are also derived and discussed based on the Lorentz model of dielectric response.