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Title

Optical and electrical properties of CuS nanoparticles in terahertz frequency

Source

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Abstract

The spectral response of the mixture composed of CuS nanoparticles and polyethylene powder was measured by the terahertz time domain spectroscopy (THz-TDS). The low-frequency optical properties of pure CuS nanoparticles, including absorption coefficient, complex dielectric constants as well as conductivity, were calculated by the effective medium theory. The Lorentz theory of dielectric response and the Drude-Smith model of conductivity provide good fits on the measured dielectric function as well as conductivity, respectively. In addition, some terahertz optical properties, such as the frequency of the lattice vibration and the time constant for the carrier scattering, are also obtained by the fitting. Our investigation could help to reveal the material properties in the terahertz range and to find out the promising physical effect for special application. (21 References).