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Title

Polarization modes in the Ba₂Mg₂Fe₁₂O₂₂ multiferroic

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Abstract

The spectra of complex permittivity of a Ba₂Mg₂Fe₁₂O₂₂ single crystal belonging to the family of Y-type hexaferrites have been measured over a wide temperature range (10-300 K) with the aim of determining the dynamic parameters of the phonon and magnetic subsystems in the terahertz and infrared frequency ranges (3-4500 cm⁻¹). A factor-group analysis of the vibrational modes has been performed, and the results obtained have been compared with the experimentally observed resonances. The oscillator parameters of all nineteen phonon modes of E u symmetry, which are allowed by the symmetry of the Ba₂Mg₂Fe₁₂O₂₂ crystal lattice, have been calculated. It has been found that, at temperatures below 195 and 50 K, the spectral response exhibits new absorption lines due to magnetic excitations. (31 References).