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Title:Absence of ferroelectricity in BiMnO<inf>3</inf> ceramics
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Abstract:We performed factor-group analysis of all phonons in possible monoclinic C2/c and C2 structures of BiMnO<inf>3</inf> and compared it with our experimental infrared and Raman spectra. We conclude that the crystal structure is centrosymmetric C2/c in the whole investigated temperature range from 10 to 550 K, therefore BiMnO<inf>3</inf> cannot be ferroelectric. We revealed a dielectric relaxation in THz spectra above the structural phase transition taking place at T<inf>C1</inf>=475 K giving evidence in strong lattice anharmonicity and a large dynamical disorder of Bi cations above T<inf>C1</inf>. Step-like dielectric anomaly observed at T<inf>C1</inf> in THz permittivity reminds antiferroelectric phase transition. Nevertheless, the low-temperature dielectric studies did not reveal any antiferroelectric or ferroelectric hysteresis loop. Our experimental results support theoretical paper of Baettig (J. Am. Chem. Soc. 129, 9854 (2007)) claiming that BiMnO<inf>3</inf> is not multiferroic but only antipolar ferromagnet. © 2012 American Institute of Physics.
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