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Title:Lattice dynamics and broad-band dielectric properties of the KTaO3 ceramics
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Abstract:High-density KTaO3 ceramics were synthesized and studied by means of microwave, terahertz, infrared, and Raman spectroscopies. The results were analyzed together with recently published radio-frequency data. [S. Glinsek et al., J. Am. Ceram. Soc. 94, 1368 (2011)] Three polar modes expected for the cubic structure were observed. As in single crystals, the lowest-frequency TO1 mode (soft mode) strongly softens on cooling, while the TO2 and TO4 mode frequencies do not change with temperature. The permittivity does not show any significant dispersion below the soft mode frequency and its value in the kHz and GHz range is mainly given by the intrinsic polar lattice modes contribution. The soft mode frequency agrees with the values found in single crystals; this indicates a negligible influence of the grain boundaries on the dielectric response in KTaO3 unlike in other ferroelectric or incipient ferroelectric perovskite ceramics. (C) 2012 American Institute of Physics. [http://dx.doi.org/10.1063/1.4714545]
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