Abstract Submitted
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Ellipsometry studies of the optical phonons in hexagonal manganites $R\mathbf{MnO}_3$[1] R. BASISTYY, T.N. STANISLAVCHUK, Department of Physics, NJIT, Newark, NJ, USA, M. KOTELYANSKII, Rudolph Technologies Inc., NJ, USA, N. LEE, X. WANG, S-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers U., NJ, USA, G.L. CARR, National Synchrotron Light Source, Brookhaven National Lab, Upton, NY, USA, A.A. SIRENKO, Department of Physics, NJIT, Newark, NJ, USA — Optical properties of hexagonal multiferroic oxides $R\mathrm{MnO}_3$, where R = Ho, Er, Tm, Yb, and Lu, have been studied in the far-infrared spectral range between 10 and 4000 cm^{-1} and temperatures between 1.5 K and 300 K. An advanced experimental technique of Muller matrix Spectroscopic Ellipsometry was used at the U4IR beamline of the National Synchrotron Light Source, Brookhaven National Lab. Spectra of the optical phonons will be presented in terms of the temperature dependencies of the phonon frequencies, their oscillator strength, anisotropy, and signatures of the spin-phonon interaction at the antiferromagnetic (AFM) phase transition. The spin-phonon interaction reveals itself as a non-Grüneisen behavior of several phonon frequencies below T_N (Mn^{3+}). A decrease of the ionic radius for R^{3+} ions between Ho^{3+} and Lu^{3+} resulted in a systematic increase of the optical phonon frequency.

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