Abstract Submitted
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Infrared and Visible Dielectric Properties of $(LaAlO_3)_{0.3}$ $(Sr_2AlTaO_6)_{0.7}$[1] TIMOTHY NUNLEY, TRAVIS WILLETT-GIES, STEFAN ZOLLNER, New Mexico State University — LSAT $(LaAlO_3)_{0.3}$ $(Sr_2AlTaO_6)_{0.7}$ is a crystal with a perovskite structure that has a good lattice match for many oxide materials and could replace $LaAlO_3$ and $SrTiO_3$ substrates. We measured the pseudo-dielectric function of LSAT from 0.6 to 6.3 eV using spectroscopic ellipsometry. The dielectric function was then modeled allowing us to obtain the optical band gap of 4.9eV. A transmission series was also taken in vacuum from 77 K to 600 K in 25 K steps showing that the change in the band gap of LSAT is inversely proportional to the change in temperature. Transmission measurements were also taken in air at room temperature allowing us to calculate and plot the absorption coefficient as a function of photon energy. Fourier-transform infrared (FTIR) ellipsometry was also performed from 250 to 8000 cm^{-1}. The dielectric function in this range was then modeled using a factorized dispersion model containing transverse (TO) and longitudinal (LO) optical phonon energies and independent broadenings for each mode. Five TO phonons were found at 284, 392, 444, 663, and 756 cm^{-1}. There were five corresponding LO phonons located at 355, 434, 551, 753, and 788 cm^{-1}. A possible strong TO mode located at 150 cm^{-1} is below our spectral range.

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