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Infrared Optical Properties of $La_{0.7}Ca_{0.3}MnO_3$ Epitaxial Films ALEXANDRE V. BORIS, A. V. BAZHENOV, N. N. KOVALEVA, Institute of Solid State Physics, Russian Academy of Sciences, Chernogolovka, Moscow distr., 142432, Russia, ARKADII V. SAMOILOV, NAI-CHANG YEH, 114-36 Department of Physics, California Institute of Technology, Pasadena, California 91125, RICHARD P. VASQUEZ, Center for Spatc Microelectronic Technology, Jet Propulsion Laboratory, California institute of Pethnology, Pasadena, CA 91109

We report the infrared (IR) properties of $La_{0.7}Ca_{0.3}MnO_3$ (LCMO) epitaxial films on various perovskite-based substrates: $LaAlO_3$ (LAO), $SrTiO_3$ (STO), and YA103 (YAO). The IR reflectance and transmittance spectra are measured with a Fourier-transform infrared spectrometer at 10 K - 300 K in the entire infrared region (50 cm^{-1} - 6000 cm^{-1}). Using the dielectric functions obtained directly from the bare substrates, we have fitted the measured reflectance and transmittance of the LCMO epitaxial films on the substrates by modeling the complex dielectric functions of LCMO. The frequency and temperature dependences of the complex conductivity and infrared-active phonon spectra of bare LCMO deposited on various substrates are presented. Our work indicates that the optical conductivity of LCMO and the observed Mn-O stretching ($\approx$580 cm-l) and Mn-O-Mn bending ($\approx$350 cm^{-1}) phonon modes are strongly affected by substrate-induced lattice distortion.

[X] Prefer Oral Session
[ ] Prefer Poster Session

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