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Mid-infrared Hall conductivity in $Ca_xSr_{1-x}RuO_3$ films M.-H. KIM, G. ACBAS, M.-H. YANG, V. KURZ, M. EGINLIGIL, J. CERNE, Physics Dept., Univ. at Buffalo (UB), SUNY, Buffalo, NY, P. KHALIFAH, Chemistry Dept., Univ. at Stony Brook, SUNY, Stony Brook, NY, I. OHKUBO, Applied Chemistry Dept., Univ. of Tokyo, Tokyo,Japan, H. CHRISTEN, D. MANDRUS, Oak Ridge National Lab., Materials Science and Technology Division, Oak Ridge, TN, Z. FANG, Institute of Physics, Chinese Academy of Science, Beijing, China — We have studied the complex longitudinal (σ_{xx}) and transverse (Hall, σ_{xy}) conductivities in a series of $Ca_xSr_{1-x}RuO_3$ films by measuring the magnetic field induced polarization changes of mid-infrared (100 - 1000 meV) radiation in the 10 K-300 K temperature range. The infrared σ_{xy} shows strong energy dependence and sign changes. We compare the complex magneto-conductivities σ_{xx} and σ_{xy} [M.-H. Kim, PRB 2007] with dc measurements and with calculations [Z. Fang, Science 2003] of the intrinsic anomalous Hall effect. To test the accuracy of these measurements and to remove the background magneto-optical response of windows and substrates, the magnetic field induced changes in the polarization of transmitted light also were measured in GaAs, ZnSe, and BaF_2. This work was supported by the Research Corp. Cottrell Scholar Award (UB), NSF-CAREER-DMR0449899 (UB), and an instrumentation award from the CAS(UB). Oak Ridge Nat. Lab.is managed by UT- Battelle, LLC, for the U.S. DOE (contract DE-ACO5-00OR22725).

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