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Applying the extended Drude model for the mid-infrared complex conductivity tensor of $SrRuO_3$ M.-H. KIM, G. ACBAS, M.-H. YANG, C. T. ELLIS, M. EGINLIGIL, J. CERNE, Physics Dept., Univ. at Buffalo, 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 Natl. Lab., Materials Science and Tech. Division, Oak Ridege, TN, Z. FANG, Inst. of Physics, Chinese Acad. Sci., Beijing, China — The complex longitudinal (σ_{xx}) and Hall (σ_{xy}) conductivities in a $SrRuO_3$ film are determined using Faraday and Kerr measurements in the mid-infrared (100 $\sim$ 1000 meV) energy and 10 K $\sim$ 300 K temperature ranges. The extended Drude model (EDM) for (σ_{xx}) is used to subtract the ordinary part of σ_{xy}. Using the EDM parameters, the ordinary contribution to σ_{xy} is found to be significantly smaller than the anomalous contribution at most temperatures and wavelengths, decreasing strongly as the wavelength decreases. We suggest that the paramagnetic part of the σ_{xy} results from the unsaturated magnetization, not from the ordinary part of σ_{xy}. This work was supported by the Research Crop. Cottrell Scholar Award (UB), NSF-CAREER-DMR0449899 (UB), and an instrumentation award from the CAS (UB). Oak Ridge Natl. Lab. Is managed by UT- Battelle, LLC, for the U.S. DOE (contract DE-ACO5-00OR22725).

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