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Ellipsometric Study of the Electronic Band Structure of CrO_2 across the Ferromagnetic Transition M.K. STEWART, B. CHAPLER, M.M. QAZILBASH, A.A. SCHAFGANS, D.N. BASOV, Department of Physics, University of California, San Diego, K. CHETRY, A. GUPTA, Center for Materials for Information Technology, University of Alabama, T. TIWALD, J. A. Woollam Co., Inc. — We present a detailed study of the optical properties of half metallic CrO_2 at temperatures below, at, and above the Curie temperature. The films were grown epitaxially on (100) and (110) oriented TiO_2 substrates by chemical vapor deposition. Using variable angle spectroscopic ellipsometry we have extracted the optical conductivity of the films in the range from 0.06 to 6 eV. Our data reveal an important anisotropy in the films which is in good agreement with what is know about their crystal structure. The main features of the conductivity spectra in the ferromagnetic state are consistent with existing band structure calculations. However, we observe no temperature dependence of these features across the ferromagnetic transition, posing questions about the electronic structure of the material.

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