**Antiferromagnetism in Bulk Rutile RuO$_2$**

T. BERLIJN, Oak Ridge National Laboratory, P. C. SNIJDERS, P. R. C. KENT, T. A. MAIER, Oak Ridge National Laboratory, University of Tennessee, H.-D. ZHOU, University of Tennessee, H.-B. CAO, O. DELAIRE, Y. WANG, Oak Ridge National Laboratory, M. KOEHLER, University of Tennessee, H. H. WEITERING, University of Tennessee, Oak Ridge National Laboratory — While bulk rutile RuO$_2$ has long been considered to be a Pauli paramagnet, we conclude it to host antiferromagnetism based on our combined theoretical and experimental study. This constitutes an important finding given the large amount of applications of RuO$_2$ in the electrochemical and electronics industry. Furthermore the high onset temperature of the antiferromagnetism around 1000K together with the high electrical conductivity makes RuO$_2$ unique among the ruthenates and among oxide materials in general.

1This work was supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.

T. Berlijn
Oak Ridge National Laboratory

Date submitted: 16 Nov 2015

Electronic form version 1.4