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Ferromagnetism in Ba_2NaOsO_6 ANN ERICKSON, Stanford University and Geballe Laboratory for Advanced Materials, GORDON MILLER, Iowa State University and Ames Laboratory, SUMOHAN MISRA, Iowa State University, ZACK SCHLESINGER, RAJ GUPTA, University of California, Santa Cruz, IAN FISHER, Stanford University and Geballe Laboratory for Advanced Materials — Due to the extended nature of 5d orbitals, magnetism in systems of 5d electrons is uncommon. Here we present results of structural, thermodynamic and optical reflectivity experiments on single crystals of the novel magnetic material Ba_2NaOsO_6. The material has a double perovskite structure, space group Fm-3m, with full occupancy of all sites. The osmium ions have a 7^+ valence, corresponding to a $5d^1$ electron configuration. The effective moment at high temperatures is 1.10 μ_B, somewhat less than the spin-only value due to spin-orbit coupling, with no apparent anisotropy. The Weiss temperatures are -11.0 and -12.4 $\pm$ 0.4 K for fields orinted along the [100] and [111] directions respectively. At 6.8 K a sharp anomaly in the heat capacity indicates the onset of long range magnetic order. The ordered state is characterized by a small ferromagnetic moment of just 0.2 μ_B per formula unit, with only a slight anisotropy, indicative of a helical magnetic structure. Infra red reflectivitity measurements confirm that the material is an insulator.

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