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Antiferromagnetism

and geometrical frustration in one-dimensional $\text{Ca}_5\text{Ir}_3\text{O}_{12}$ and Ca_4IrO_6 single crystals¹ ANGELA DOUGLASS, VINOBALAN DURAIRAJ, SHALINEE CHIKARA, GANG CAO, Department of Physics and Astronomy, University of Kentucky, Lexington, KY40506, SEAN PARKIN, Department of Chemistry, University of Kentucky, Lexington, KY40506, PEDRO SCHLOTTMANN, Department of Physics, Florida State University, Tallahassee, FL32306 — We report a structural, thermodynamic and transport study of the newly synthesized single crystal $\text{Ca}_5\text{Ir}_3\text{O}_{12}$ and Ca_4IrO_6 . Both materials consist of a triangular lattice of spin chains running along the *c*-axis. $\text{Ca}_5\text{Ir}_3\text{O}_{12}$ and Ca_4IrO_6 are antiferromagnetically ordered below 7.8 K and 12 K, respectively. The study reveals an unusually large ratio of the Curie-Weiss temperature to the Neel temperature (>36 for $\text{Ca}_5\text{Ir}_3\text{O}_{12}$) and a small entropy removal associated with the magnetic phase transition. In addition, the magnetic susceptibility and heat capacity show that the phase transition is essentially insensitive to the application of the magnetic field. All results suggest the presence of the geometrical frustration that causes incomplete long-range antiferromagnetic order. The results will be presented and discussed along with comparisons drawn with other related systems.

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