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Magnetic anisotropy and geometrical frustration in the Ising spin-chain system $Sr_5Rh_4O_{12}$[1] GANG CAO, SHALINEE CHIKARA, VINOBALAN DURAIRAJ, 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 — A structural and thermodynamic study of the newly synthesized single crystal $Sr_5Rh_4O_{12}$ is reported. $Sr_5Rh_4O_{12}$ consists of a triangular lattice of spin chains running along the c-axis. It is antiferromagnetically ordered below 23 K with the intrachain and interchain coupling being ferromagnetic (FM) and antiferromagnetic (AFM), respectively. There is strong evidence for an Ising character in the interaction and geometrical frustration that causes incomplete long-range AFM order. The isothermal magnetization exhibits two step-like transitions leading to a ferrimagnetic state at 2.4 T and a FM state at 4.8 T, respectively. $Sr_5Rh_4O_{12}$ is a unique frustrated spin-chain system ever found in 4d and 5d based materials without a presence of an incomplete 3d-electron shell.

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Shalinee Chikara
University of Kentucky

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