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Geometric Frustration and Chemical Tuning of Magnetic Order in the Kagome Lattice System $YBaCo_4O_{7+x}$ JOHN MITCHELL, HONG ZHENG, Materials Science Division, Argonne National Laboratory, LAURENT CHAPON, PAOLO RADAELLI, ISIS, Rutherford Laboratory, ASHFIA HUQ, Spallation Neutron Source, Oak Ridge National Laboratory, PETER STEPHENS, SUNY Stonybrook — Transition metal oxides containing a Kagome lattice motif of magnetic ions form the basis for exploring geometric frustration and exotic magnetic ground states. Examples of such systems include pyrochlores, spinels, $SrCr_{9p}Ga_{12-9}pO_{19}$ (SCGO) and jarosite minerals. Joining this class of Kagome lattice antiferromagnets is the recently reported $YBaCo_4O_{7+x}$ (Y-114), a member of the more general R-114 which can be prepared with small rare-earth ions. The structure is comprised of Kagome layers of CoO_4 tetrahedra linked in the c direction by a triangular layer of CoO_4 tetrahedra. We show that appropriate control of oxygen stoichiometry so that x=0.0 yields a long-range antiferromagnet with a unique spin arrangement that seeks to satisfy the 120^o ground state of the Kagome net in the a-b plane with a strong collinear interaction along the c-axis. This AFM ground state results because of a structural phase transition that breaks the 6-fold symmetry of the Kagome layers. We also discuss chemical approaches whose objective is to preserve the Kagome symmetry to lowest temperatures with concomitant geometric frustration.

John Mitchell
Argonne National Laboratory

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