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Geometric Frustration and Chemical Tuning of Magnetic Order in the Kagome Lattice System $\text{YBaCo}_4\text{O}_{7+x}$ 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, $\text{SrCr}_9\text{Ga}_{12-9p}\text{O}_{19}$ (SCGO) and jarosite minerals. Joining this class of Kagome lattice antiferromagnets is the recently reported $\text{YBaCo}_4\text{O}_{7+x}$ (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° 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.

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