Abstract Submitted
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Determination of the Magnetic Structure, Phase Transitions, and Properties of a New Family of Ferrites[1] TIMOTHY FERREIRA, University of South Carolina, STUART CALDER, Quantum Condensed Matter Division, Oak Ridge National Lab, JEONGHO YEON, HANS-CONRAD ZUR LOYE, University of South Carolina — The search for room temperature multiferroic materials has led to significant research on a family of ferrites that follow the stoichiometry BaO $\bullet n Fe_2O_3$, with the M-type hexaferrite $BaFe_{12}O_{19}$ being the prototypical example. This motivated the synthesis of the first example of a diferrite, $BaFe_4O_7$, in addition to a potassium-doped analog, $K_{0.22}Ba_{0.89}Fe_4O_7$, as single crystals using the novel hydroflux technique. Both materials undergo a reversible phase change at high temperature mediated by oxygen loss leading to an increase in magnetization, which reverses upon exposure to open air. Neutron diffraction experiments aided by magnetometry have revealed the magnetic structure and ordering temperature (T_N = 850 K) of the pre-annealed single crystals. Presented here at the results from the neutron diffraction experiments, SQUID and electrical measurements, and synthetic considerations.

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