Abstract Submitted
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Oxygen hole-doping effects on magnetic properties of the spin-chain system $\mathbf{Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}}$ KEESEONG PARK, THEODORE CACKOWSKI, JOHN MARKERT, Department of Physics, The University of Texas at Austin — The magnetic properties of the low-dimensional spin-chain system $Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}$ were studied as a function of oxygen content. The temperature dependence of the magnetic moment and specific heat were measured for a series of samples with different oxygen contents, prepared by solid state reaction under various oxygen pressures up to 225 atm and characterized by x-ray diffraction and iodometric titration. At fixed oxygen pressure, oxygen deficiency increases with Ca doping. For example, when annealed at 1 atm O_2 pressure, the $x = 0$ sample was multiphased due to excess oxygen, whereas the samples with $x > 1.2$ were also multiphased due to oxygen deficiency. With decreasing oxygen deficiency, the antiferromagnetic transition temperature decreases for $x = 0.50$, $x = 0.75$, $x = 0.90$, and $x = 1.00$ doped samples. In particular, for the fully oxygenated $x = 1.00$ sample the transition is completely suppressed, which is contrary to the single crystal result recently published by K. Kudo *et al.*[1], where long range order disappeared at $x \approx 1.4$ for the apparently oxygen-deficient crystals. A new magnetic phase diagram is proposed to include both Ca doping and oxygen deficiency.

[1]K. Kudo, S. Kurogi, and Y.Koike, Physical Review B **71**, 104413 (2005)

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