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The Magnetic phase diagram of the spin-chain system $\mathbf{Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}}$: Oxygen hole-doping KEESEONG PARK, Department of Physics, The University of Texas at Austin, JOHN MARKERT, Department of Physics, The University of Texas at Austin — Recently, K. Kudo et al.[1] studied the magnetic ground state in the edge-sharing CuO_2 chains in the spin- chain system $Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}$. In that study, the antiferromagnetic transition temperature decreases with increasing x and disappears around x=1.4 followed by the appearance of a spin-glass phase at x=1.5. We propose that the oxygen content should be included in the hole doping effect by $p = 1/5(x - 2\delta)$ in the spin-chain system. We present x-ray diffraction, magnetic susceptibility, specific heat and iodometric titration measurements[2] which indicate that an oxygen deficiency shifts the magnetic features toward higher x. For example, for $x = 1$ samples, the single crystals of Ref.1 are equivalent to our oxygen deficient polycrystalline sample with $\delta \approx 0.5$. Such a composition has an only slightly suppressed Néel temperature, while for nearly fully oxygenated $x = 1$ samples, the antiferromagnetic transition is completely suppressed.[3]

[1]K. Kudo, S. Kurogi, and Y.Koike, Physical Review B **71**, 104413 (2005)
[2]This work is supported by the Robert A. Welch Foundation grant No.F-1191 and the National Science Foundation grant No. DMR-0210383
[3]M. D. Chabot, and J. T. Markert, Physical Review Letters **86**, 163 (2001)

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