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**Direct comparison of hole doping effects due to cation and to oxygen content on magnetic properties of the spin-chain system $\mathbf{Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}}$**[1] KEESEONG PARK, THEODORE CACKOWSKI, JOHN MARKERT, Department of Physics, The University of Texas at Austin — A quasi-one dimensional system, $Ca_{2+x}Y_{2-x}Cu_5O_{10-\delta}$ (CaYCuO) is studied to compare the magnetic effects of cation doping with those of oxygen deficiency. Hole doping ($p$) due to cation concentration ($x$) and oxygen deficiency ($\delta$) in other copper oxides is often observed to obey $p = x - 2\delta$. CaYCuO has a simple edge shared CuO structure and is hole dopable up to a formal copper valence of 2.4. Various Ca doped CaY-CuO specimens were fabricated in different oxygen environments, including high pressure oxygen up to 170 atm. X-ray diffraction and iodometric titration were used to confirm phase and oxygen content. Samples are found to be more oxygen deficient with increasing cation doping. Magnetic moment and specific heat were measured. The antiferromagnetic phase was observed up to $x = 1.0$ doping for fully oxygenated specimens. Néel temperatures decreased with increasing cation doping and decreasing oxygen deficiency. The decrease in Néel temperature is found to be more than expected from hole doping $p = x - 2\delta$. A new quantity that describes all of the behavior of Néel temperature, $p' = x - (2/3)\delta$, is proposed.

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