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Frustrated magnetism in doped quasi-triangular lattice materials, $Cu_{2(1-x)}Zn_{2x}(OH)_3NO_3/(C_7H_{15}COO)$ JIAN WU, FLETCHER WERNER, ANUP K. GANGOPADHYAY, S.A. SOLIN, Washington University in St Louis — We have performed DC and AC magnetic susceptibility measurements on the spin S=1/2 quasi-triangular lattice materials $Cu_{2(1-x)}Zn_{2x}(OH)_3NO_3/(C_7H_{15}COO)$. The X-ray diffraction experiments reveal that this class of materials has a crystal structure in $P2_1/m$ space group, in which Cu^{2+} and Zn^{2+} ions are arranged on a slightly distorted triangular lattice [1]. $Cu_{2(1-)}Zn_{2x}(OH)_3NO_3$ with a short inorganic intercalation NO_3 group, have a long-range antiferromagnetic order at low temperature. The Neel temperature T_N decreases from 11K to 5.6K while the Curie-Weiss temperature increases from -5.1K to +2.8K as the Zn concentration increases from 0 to 65%. After a longer alkanecarboxylate $C_7H_{15}COO$ group was introduced into the interlayer space, a spin-glass like behavior in magnetic properties was observed [2]. The value $|\Theta_{cw}\ /T_N|$ is approximately 20, indicating the materials are in a medium level frustrated state. The onset of a ferromagnetic correlation was found in both DC and AC susceptibility data. The interplay of geometrical frustration and the coexistence of ferromagnetic and antiferromagnetic couplings has driven the materials into a glassy ground state.

[1] G. Linder, et al., Journal of Solid State Chemistry (1995)
[2] M. A. Girtu et al, Phys Rev B 61,4117(2000).

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