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The effect of transition metal ions distribution on magnetic properties of $\mathbf{Li}_x(\mathbf{Ni}_y\mathbf{Mn}_y\mathbf{Co}_{1-2y})\mathbf{O}_2$. NATASHA A. CHERNOVA, MIAOMIAO MA, JIE XIAO, M. STANLEY WHITTINGHAM, Institute for Materials Research, SUNY at Binghamton, Binghamton NY 13902-6000, PETER Y. ZAVALIJ, Department of Chemistry and Biochemistry, University of Maryland, College Park, MD 20742-4454 — $Li_x(Ni_yMn_yCo_{1-2y})O_2$ compounds have layered O(3) structure with an occupancy disorder as Ni ions migrate to the lithium layer. Ni ions provide strong antiferromagnetic (AF) exchange between the transition metal (TM) layers; therefore the degree of disorder has a pronounced effect on the magnetic properties. Ni migration is reduced when the amount of Co or Li is increased. In this work we study temperature and magnetic field dependences of magnetization and the ac susceptibility of $Li_x(Ni_yMn_yCo_{1-2y})O_2$ with various Li and Co contents. We have shown that in $LiNi_{0.5}Mn_{0.5}O_2$ compound large amount of Ni on Li sites facilitates AF order within the TM layer, while interlayer Ni ions contribute to the net magnetic moment. This is consistent with the "flower" order of the TMs proposed from the Monte-Carlo simulations. With increasing Co content, the "flower" structure is destroyed and a spin glass state is observed in Co-containing compounds. This work is financially supported by the US Department of Energy, Office of FreedomCAR and Vehicle Technologies, through the BATT program at LBNL.

Natasha A. Chernova
SUNY at Binghamton

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