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Order/Disorder Effects in Perovskite Manganites B. DABROWSKI, Argonne National Laboratory, S. KOLESNIK, Dept. of Physics, Northern Illinois University, O. CHMAISSEM, ANL, E.N. CASPI, Nuclear Research Centre-Negev, Beer-Sheva, Israel, J. MAIS, Dept. of Physics, Northern Illinois University, J.D. JORGENSEN, ANL — Indirect magnetic interactions between transition metals in perovskites ABO_3 are commonly described in terms of superexchange and double-exchange interactions that depend on the bond angle B-O-B. By useing the tolerance factor parameterization procedure we have designed and obtained new substituted manganites with randomly-mixed and layer-ordered structures having identical chemical compositions. The order/disorder effects on magnetic properties have been investigated as a function of the bond angle disorder for both the A- and Mn-sites. By comparing ordered (containing planes of the RO_2 and BaO_2) and disordered ferromagnetic compounds $La_{1-x}Ba_{1+x}Mn_2O_6$, we have demonstrated that by decreasing local structural and charge disorder, an increase of T_c of over 100 K can be achieved. Similar effects have been demonstrated for Sr_2MnGaO_{6-d} where transitions from spin-glass seen for the disordered compound to antiferromagnetic behavior seen for the ordered material (containing planes of the MnO_2 and GaO_{2-d}), have been observed. Supported by NSF (DMR-0302617) and U.S. Department of Energy, BES – Materials Sciences (W-31-109-ENG-38)

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