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Effects of internal structural parameters on the properties of Ba-substituted $La_{0.5}Sr_{0.5}MnO_3$[1] OMAR CHMAISSEM, BOGDAN DABROWSKI, STANISLAW KOLESNIK, LEOPOLDO SUESCUN, Northern Illinois University and Argonne National Laboratory, JAMES MAIS, TIMOTHY MAXWELL, Northern Illinois University, JAMES D. JORGENSEN[2], Argonne National Laboratory — Barium substituted $La_{0.5}Sr_{0.5-x}Ba_xMnO_3$ materials have been synthesized and investigated using neutron powder diffraction. We show that Ba substitution suppresses the low temperature orbital-ordering previously observed in $La_{0.5}Sr_{0.5}MnO_3$, and demonstrate the evolution of the magnetic and nuclear structures as a function of increasing Ba content. All samples exhibit paramagnetic and ferromagnetic properties near room temperature. The effects of A-site ionic size, size variance, and strains in the lattice on the ferromagnetic ordering temperature, T_C, are discussed and compared with other members of the general $La_{0.5}(Ca,Sr,Ba)_{0.5}MnO_3$ series. Depending on the substitution path, the relationship between T_C and $<r_A>$ is either nearly constant or looks like an inverted parabola.

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