Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Magnetic properties and electronic structure of doped multiferroic $Y_xA_{1-x}MnO_3$(A=Ca, Sr, Ba) J. Y. JUANG, Electrophysics, National Chiao-Tung University, C. C. HSIEH, T. Y. CHENG, J. M. LEE, J. M. CHEN, J.-Y. LIN, K. H. WU, T. M. UEN, Y. S. GOU — We report the magnetic properties, X-ray absorption spectroscopy (XAS) on a series of doped multiferroic materials $Y_xA_{1-x}MnO_3$(A=Ca, Sr, Ba). $YMnO_3$ when doped by alkaline-earth metal with various ionic sizes, display dramatic changes in magnetic properties as compared with the parent compound. For Ca-doped sample, the antiferromagnetic (AFM) phase transition appears to take place at a much lower temperature (30 K) as compared to that of undoped one (42 K), which could be Mn-rich. On the other hand, when doped with ions of larger size such as Ba and Sr, the AFM temperature decreased only slightly to around 38 K but with significantly smeared transition. By comparing the XAS results to standard manganese oxide powder, $YMnO_3$ exhibits the dominant Mn^{+3} characteristics obtained from the standard Mn_2O_3 powder. Although, the undoped-$YMnO_3$ and Sr-, Ba-doped $YMnO_3$ exhibited very similar electronic structure as revealed in the XAS data, the XAS of Ca-doped sample, again, is very different from that of $YMnO_3$. It is surprising to observe that Ca-doping has resulted in most significant modifications in the magnetic property and electronic structure of $YMnO_3$, since Ca^{+2} is having exactly the same ionic size as that of Y^{+3} and is expected to cause minimal distortion on the lattice.

J. Y. Juang
Electrophysics, National Chiao-Tung University

Date submitted: 18 Nov 2006 Electronic form version 1.4