Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Doping-Induced Structural and Physical Properties Changes in $Sr_3(Ru_{1-x}Mn_x)_2O_7$ Single Crystals BIAO HU, Univ. of Tennessee, Knoxville, TN 37996, MANUEL ANGST, Materials Science and Technology Division, ORNL, Oak Ridge, TN 37831, OVIDIU GARLEA, Neutron Scattering Science Division, ORNL, Oak Ridge, TN 37831, V.B. NASCIMENTO, Univ. of Tennessee, Knoxville, TN 37996, DAVID MANDRUS, Materials Science and Technology Division, ORNL, Oak Ridge, TN 37831, E.W. PLUMMER, Univ. of Tennessee, Knoxville, TN 37996 and Materials Science and Technology Division, ORNL, Oak Ridge, TN 37831, R. JIN, Materials Science and Technology Division, ORNL, Oak Ridge, TN 37831 and Univ. of Tennessee, Knoxville, TN 37996 — In the homologous strontium ruthenate series $Sr_{n+1}Ru_nO_{3n+1}$, double-layered $Sr_3Ru_2O_7$ exhibits unique physical properties. However, the partial substitution of Ru by the smaller Mn was found to change its ground state from a paramagnetic metal to an antiferromagnetic insulator with less distorted crystal structure. Interestingly, our Hall effect measurements show no change in the carrier concentration ($x \leq 0.2$), suggesting that Mn is isovalent with Ru in $Sr_3(Ru_{1-x}Mn_x)_2O_7$. This is further supported by the magnetization data, which yield effective spin $S = 3/2$ for Mn corresponding to Mn^{4+}. In addition to bulk physical properties, the doping dependence of the surface structure and lattice dynamics of $Sr_3(Ru_{1-x}Mn_x)_2O_7$ single crystals will be discussed.

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Date submitted: 27 Nov 2007 Electronic form version 1.4