Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Improved CMR properties of RE-doped (La,Sr)MnO_3 single crystals JUN-ICHI SHIMOYAMA, Department of Applied Chemistry, University of Tokyo, TETSURO OGATA, YUUI YOKOTA, HIRAKU OGINO, SHIGERU HORII, KOHJI KISHIO — The relationships among crystal structure, T_C and CMR effect have been eagerly studied for (La,Sr)MnO_3 system mainly as a functions of the Sr composition, x thus far. In the present study, we have attempted to improve the CMR properties near room temperature of the present system by optimizations of T_C and phase transition temperature between orthorhombic and rhombohedral through RE mixing and elimination of excess oxygen, *i.e.* cation vacancies, for $(La_{1-x}Sr_x)MnO_3$ single crystals with $x = 0.2$ and 0.25, which have higherT_C than room temperature and essentially high electronic conductivity. Crystal boules with nominal compositions of $La_{0.8-z}RE_zSr_{0.2}MnO_y$ and $La_{0.75-z}RE_zSr_{0.25}MnO_y$ (RE = Pr, Nd, Sm : $z = 0 \sim 0.3$) were grown by the floating zone method. Crystal structure of $La_{0.75-z}Pr_zSr_{0.25}MnO_3$ at ∼300 K changed from rhombohedral ($z = 0$, 0.15, 0.25) to orthorhombic ($z = 0.3$) due to a decrease in mean ionic radius of A site. In addition, Pr-doping systematically decreased T_C. Similar tendencies were confirmed for Nd- or Sm-doped samples. The RE-doped samples exhibited large CMR ratio at ∼300 K comparable to that of $La_{0.825}Sr_{0.175}MnO_3$ and much higher conductivity reflecting high Sr concentration when phase transition temperature and T_C were optimized.

Jun-ichi Shimoyama
University of Tokyo

Date submitted: 26 Nov 2007 Electronic form version 1.4