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**BOOK  
OF  
ABSTRACTS**



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**SUBSTITUTION DEPENDENCE OF MAGNETORESISTANCE  
IN SOL-GEL DERIVED  $\text{La}_{2/3-x}\text{Tl}_x\text{Ca}_{1/3}\text{MnO}_{3-\delta}$**

**In-Bo Shim, Sung-Roe Yun, Young-Suk Cho, and Chul Sung Kim**

*Department of Electronic Physics, Kookmin University, Seoul 136-702, Korea*

We have fabricated a series of polycrystalline bulk samples of  $\text{La}_{2/3-x}\text{Tl}_x\text{Ca}_{1/3}\text{MnO}_{3-\delta}$  ( $0.0 \leq x \leq 0.20$ ; LTCMO) by sol-gel process and studied their magnetization  $M$ , electrical resistivity  $\rho$ , and magnetic field dependence of resistivity ( $\text{MR} = ([R(H=0) - R(H=B)]/R(H=0))$ ) in the temperature range  $77 \leq T \leq 300$  K. The experiments have shown a strong correlation between the magnetotransport and concentration of Tl. Polycrystalline samples of  $\text{La}_{2/3-x}\text{Tl}_x\text{Ca}_{1/3}\text{MnO}_{3-\delta}$  with  $x=0$  %, 5 %, 10 %, and 20 % were synthesized low temperature (800 °C) sol-gel process. The stock solution was dried at 150 °C and then pre-fired at 600 °C for 3h. The powder was ground again, pressed into small pellets, sintered at 800 °C for 6 h in oxygen, and then cooled slowly to room temperature. Their crystallographic structure was studied with an x-ray diffractometer. We found that for increasing  $x$ , the LTCMO structure varied gradually from a nearly cubic perovskite structure to an orthorhombic with decreasing lattice constant. The field dependence of the electrical resistivity has been measured by using the four-probes method under fields up to 1 T in the temperature range 77 –300 K. All samples showed a metal-semiconductor transition. We have found that the ferromagnetic transition temperature  $T_C$  decreases ( $x=0$ , 279 K and  $x=0.2$ , 263 K) and the cups of the resistivity occurring at this temperature decreases when the smaller lanthanide Tl is introduced into the lattice. We observed MR value as high as 40 % at  $B=1$  T. The MR value decreases rapidly with increasing  $x$  (44 % ( $x=0.0$ ), 29 % ( $x=0.05$ ), and 22 % ( $x=0.10$ )).