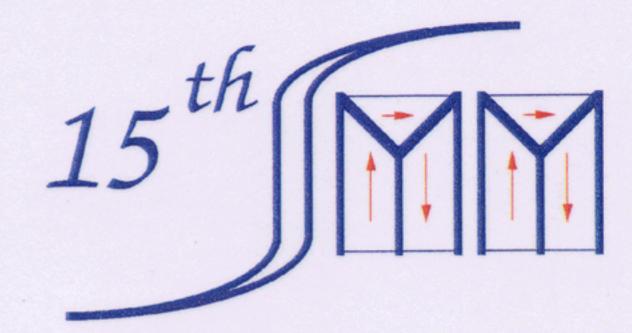
Bilbao, 5-7 September 2001

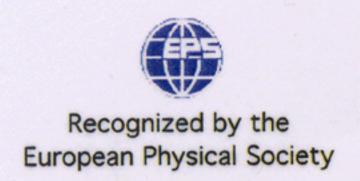


Soft Magnetic Materials Conference

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BOOK OF ABSTRACTS





SUBSTITUTION DEPENDENCE OF MAGNETORESISTANCE IN SOL-GEL DERIVED La_{2/3-x}Tl_xCa_{1/3}MnO_{3-δ}

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We have fabricated a series of polycrystalline bulk samples of La_{2/3-x}Tl_xCa_{1/3}MnO₃. $\delta(0.0 \le x \le 0.20; LTCMO)$ by sol-gel process and studied their magnetization M, electrical resistivity ρ, and magnetic field dependence of resistivity (MR=([R(H=0)-R(H=B)]/R(H=0))) in the temperature range 77≤T≤300 K. The experiments have shown a strong correlation between the magnetotransport and concentration of Tl. Polycrystalline samples of La_{2/3-x}Tl_xCa_{1/3}MnO_{3-δ} 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 prefired 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)).