PHASE TRANSITIONS IN $Sm_{1-x}Sr_xMnO_3$ SINGLE CRYSTALS $(0 \leq x \leq 0.8)$

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9.7 cm

Magnetic and electrical properties of the $Sm_{1-x}Sr_xMnO_3$ $(0 \leq x \leq 0.8)$ single crystals have been studied and T-x phase diagram has been revisited. For the low doped compositions compensation points of spontaneous magnetization were observed which result from an antiparallel orientation of Mn and Sm magnetic moments. The compensation temperature observed is decreased from 9 K for x=0 to zero for x ∼0.1. A detail studies of the spontaneous and field induced transitions near Curie temperature were performed for ferromagnetic compositions at $0.4 \leq x \leq 0.475$. It was shown that ferromagnetic ordering occurs as a first order phase transition, which is accompanied by magnetisation and electrical resistivity jumps. Magnetic field increases the temperature of the transition and spreads it resulting in appearance of the critical point T_{cr}=199 K, H_{cr}=68 kOe. Another transition accompanied by reduction of magnetization has been observed at low temperature ∼40 K. For the higher doping level we have specified a phase T-x diagram as compare to previous polycrystalline data and observed two different regions for x>0.5. For the first region at $0.5 \leq x \leq 0.575$ no spontaneous magnetisation was observed below Neel temperature, while for the second one at $0.6 \leq x \leq 0.675$ an additional low temperature transition to a new phase having non-zero weak ferromagnetic moment was observed. Its temperature is decreased from 40 K at x=0.6 to zero at x>0.7.

13.4 cm

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