MAGNETOELASTIC ANOMALIES AND SUPPRESSION OF JAHN-TELLER DISTORTIONS IN $La_{1-x}Sr_xMnO_3$ BY PULSED MAGNETIC FIELDS

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9.7 cm

Thermal expansion $\Delta l/l(T)$ and magnetostriction $\lambda_{\|,\perp}(H,T)$ in the pulsed magnetic fields H up to 250 kOe were studied in the single $La_{1-x}Sr_xMnO_3$ crystals (x=0.1, 0.125 and 0.15) at temperatures T=10-320 K. Anomalies in the $\Delta l/l(T)$ curves were observed near a charge (polaron) ordering (T_p) and structural transitions between orthorhombic Jahn-Teller distorted O' phase and high temperature orthorhombic (pseudocubic) O^* one (T_s'). Jumps in magnetic field dependence of the magnetostriction were observed in a narrow temperature range between charge and magnetic orderings indicating on an existence of field induced transitions, which threshold fields were strongly increased with the temperature. Noticeable hysteric phenomena accompanied the magnetostriction behavior. A noticeable increase of the field-induced magnetostriction $\lambda_{\|,\perp}(H)$ (from 10^{-4} up to $7\cdot10^{-4}$) was observed in the O' phase at $T_p < T < T_s'$ for the all compositions studied. The observed features may be related to a suppression of the Jan-Teller O' phase by the magnetic field and field induced transition to an orbital-ordered ferromagnetic state. This work was supported in part by the RFBR (N 97-02-17325).

13.4 cm

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