

Microstructure, electrical and magnetic properties of polycrystalline La_{0.85}K_{0.15}MnO₃ manganites prepared by different synthesis routes

ABSTRACT

Influence of different synthesis techniques (solid state reaction, sol–gel and co-precipitation) on the structure, microstructure, magnetic and electrical properties of polycrystalline La_{0.85}K_{0.15}MnO₃ (LKMO) sintered at 900 °C is investigated. All the as-synthesized compounds were confirmed as single phase and hexagonal structure at room temperature. The nano-crystallite size and average grain size were increased from the sample synthesized through solid state, sol–gel and co-precipitation techniques. The electrical and magneto-transport properties of polycrystalline LKMO was relied on the synthesis method. Significant decreases in metal–insulator transition temperature (T_p) with the increment of resistivity were observed for co-precipitation synthesized sample when comparing with solid state and sol–gel synthesized samples. Magnetization was decreased while ferro-paramagnetic transition temperature (T_c) was shifted toward lower temperature from solid state synthesized sample to co-precipitation synthesized sample. Furthermore, co-precipitation synthesized sample achieved the highest negative magnetoresistance at room temperature.

Keyword: Manganite; Magnetic and electrical properties; Sol-gels