

Effect of sintering temperature on the microstructure, electrical and magnetotransport properties of $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ compound

ABSTRACT

In this work, we report the effect of sintering temperature (900°C, 1000°C, 1100°C and 1200°C) on the electrical and magnetotransport properties of polycrystalline $\text{La}_{0.67}\text{Sr}_{0.33}\text{MnO}_3$ (LSMO). Single phase of LSMO hexagonal structure (R-3c) accompanied with minor phases was successfully synthesized by co-precipitation method. With increasing sintering temperature, grain growth was promoted and grain connectivity was improved. It was found that an enhancement of resistivity on smaller grain size was due to larger grain surface over volume (grain boundaries effect). The shifting of the metal-insulator transition (TMI) to higher temperature was also responsible for observed changes in physical properties. TMI of 900°C, 1000°C and 1100°C were 232 K, 278 K and 298 K respectively however 1200°C was out of measurement range (higher than 300 K). In summary, CP900 with smaller grain size distribution (~200 nm) displayed the highest resistivity and MR% of -19.2% (at 80 K, 10 kG).

Keyword: Grain size; Magnetoresistivity; Sintering effect