Effect of Pr substitution on magnetoresistance in La23/Ba13/MnO3 perovskite

ABSTRACT

Polycrystalline of (La1-xPrx)0.67Ba0.33MnO3 with x = 0, 0.167, 0.33, 0.5, 0.67, 0.833, 1 have been prepared using solid state reaction. The effect of substituting praseodymium at La-site on magnetoresistance (MR) effect has been investigated. The electrical property, was determined by using standard four-point probe resistivity measurement in a temperature range of 30 K to 300 K. Metal-insulator transition temperature (Tp) shifted to lower temperatures with the increases of Pr doping with the value of >300, 270, 250, 226, 202, 186 and 158 K for x = 0, 0.167, 0.33, 0.5, 0.67, 0.833, 1, respectively. Overall, MR drops slowly when temperature rises. All doping concentration give small variation range (5% to 25%) except for x=1.0, where this sample show significantly higher MR value at all temperature as compared to other samples. The highest MR value of 38% is observed at 270K. In the semiconducting portion, activation energy (Ea) has been investigated. The Ea increases as the doping concentration increases.

Keyword: Pr; La; Tp; Magnetoresistance; Substitution; Polycrystalline