

# Magnetotransport properties of $\text{La}_{0.55}\text{Ca}_{0.45}\text{MnO}_3/\text{BaTiO}_3$ composites

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We report the effect of  $\text{BaTiO}_3$  content on the structure, magnetic and magnetotransport properties of  $(1-x)\text{La}_{0.55}\text{Ca}_{0.45}\text{MnO}_3 - x\text{BaTiO}_3$  with  $x \leq 0.8$ . The samples were prepared by standard solid state technique. The x-ray and SEM analysis indicated that BTO and LCMO phases exist independently in the samples, without any sign of a new phase. The magnetic measurements do not show significant changes in Curie temperatures ( $T_C = 250$  K), in coercivities ( $H_C = 0.04$  T) and in the magnetic moment ( $m = 3.4 \mu_B/\text{Mn}$ ), suggesting the absence of interaction between the two phases. The system shows a conduction threshold at  $x_c = 0.5$  where the resistivity increases substantially. The samples with  $x < 0.5$  exhibit a metal - insulator transition at a temperature ( $T_p$ ), that decreases with increasing BTO phase content, and is finally suppressed at  $x_c$ . The maximum magnetoresistance (MR) in 7 T was found to increase from 58 % for  $x = 0$  (at 150 K) to 78 % for  $x = 0.3$  (at 110 K). This work provides a promising method for increasing the magnetoresistance of manganites by composites with a proper insulator phase.

9.7 cm

13.4 cm

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