Phase transitions in la0.73ca0.27mn1-xcuxo3 (0 < x < 0.19)

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Abstrak

We have performed resistivity measurements as a function of temperature, with and without an external magnetic field. Magnetization measurements are also done as a function of temperature M(T) as well as a function of an external magnetic field M(H) for La0.73Ca0.27Mn1-xCuxO3 compounds with 0<x<0.19. The samples with x = 0 and 0.06 are insulators. As for the samples with x = 0.10, 0.13, and 0.19, they undergo an insulator to metal transition as the temperature is lowered. The insulator-metal transition temperatures are 24 K, 74 K, and 69 K for x = 0.10, 0.13, and 0.19, respectively. The magnetoresistance decreases with increasing values of Cu, i.e. 75%, 72%, 64%, and 35% for x = 0, 0.06, 0.10, and 0.13 respectively. Samples in accordance with the model of crystalline metal Ln R vs. 1/T are compared to Mott insulator models Ln R vs. 1/T0.25. Based on the magnetization curve, a paramagnetic to ferromagnetic transition is observed at Curie temperature, TC, of ~ 196 K, 170 K, 140 K, 137 K, and 113 K for x = 0, 0.06, 0.10, 0.13, and 0.19 respectively.