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-xCuxO3compounds 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.