



The effect of Cu/Mn substitution in 2223 Bi-based HTSC

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Abstract

The effect of partial Cu by Mn substitution in the 2223 high-T_c superconductor (Bi_{0.8}Pb_{0.2})₂(Sr_{0.9}Ba_{0.1})₂Ca₂(Cu_{1-x}Mn_x)₃O_{10+y} with Mn concentration in the range 0 < x < 0.3 was studied by resistivity, DC susceptibility, XRD, EDX, and neutron diffraction measurements. The EDX analysis confirmed the Mn presence inside the grains in Mn-doped samples. Neutron diffraction measurements show no evidence for magnetic ordering of Mn for 20K < T < 300K. The critical temperature, T_c^{onset}, of the samples, determined from the temperature dependence of the electrical resistivity, R(T), and from the diamagnetic response, M(T), show no changes of T_c^{onset} = 108K for a wide Mn concentration range, 0 < x < 0.2. A substitution of Cu by Mn in the Cu–O pyramids and not in the Cu–O sheets of the 2223 lattice may be the reason of the Mn concentration independence of T_c^{onset}.