عنوان مقاله:

Structual, Magnetic, and Transport Properties of LaMn۱-xCuxO۳ (x= ۰-۰.۱۲۵) Ceramics

محل انتشار:

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خلاصه مقاله:

The present study investigates the structural, magnetic, and electrical properties of non-stoichiometric LaMn۱-xCuxO۳ (x= ۰, ۰.۰۲۵, ۰.۰۵, ۰.۰۷۵, and ۰.۱۲۵) ceramics. The results of X-ray diffraction refinement indicated that all samples were crystallized in an orthorhombic structure and no apparent crystal structure change was introduced by doping Cu up to x=۰.۱۲۵. The Ferromagnetic (FM) nature revealed by non-stoichiometric LaMn۱-xCuxO۳-d was verified through the appearance of Paramagnetic-Ferromagnetic (PM-FM) transition temperatures in AC magnetic susceptibility measurement of the samples. Due to the coexistence of Antiferromagnetic (AFM) and FM phases, all samples contained Re-entrant Spin Glass (RSG) and Cluster Spin Glass (CSG) states. The results showed that FM phase was comparable or even dominant in the doped samples up to x=۰.۰۷۵; however, after doping, AFM phase overcame the FM phase as a result of reduction of double exchange interaction. Temperature dependence of resistivity measurement indicated that upon increasing the Cu-doping level, resistivity decreased, except for the x=۰.۱۲۵ sample, and that metal-insulator transition at low temperatures was detected in the doped samples. Furthermore, changing the magnetic phase in the case of x=۰.۱۲۵ sample from FM (in x=۰.۰۷۵) to AFM dominant phase was accompanied by changing the transport parameters obtained from small polaron hopping models.

کلمات کلیدی:

Manganite oxides, Doping, Spin glass, Small polaron hopping