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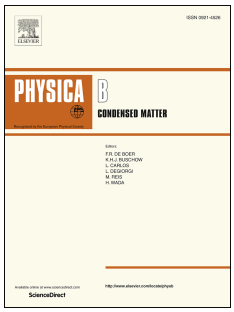

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Effect of Cr^{3+} Substitution at Mn-Site on Electrical and Magnetic Properties of Charge Ordered $Bi_{0.3}Pr_{0.3}Ca_{0.4}MnO_3$ Manganites

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Abstract. The effect of Cr^{3+} substitution at Mn-site on the structure, magnetic and electrical properties of $Bi_{0.3}Pr_{0.3}Ca_{0.4}Mn_{1-x}Cr_xO_3$ manganites were studied by using X-ray diffraction method, AC susceptibility and electrical transport measurements. All the samples with starting composition of $Bi_{0.3}Pr_{0.3}Ca_{0.4}Mn_{1-x}Cr_xO_3$ (x=0,0.04,0.08,0.1,0.12 and 0.14) were prepared using solid state method. R versus T curve shows that x=0 sample exhibits a strong insulating behavior while Cr^{3+}substitution at x=0.08 induced metal-insulator (MI) transition at MI transition temperature (T_{MI}) of 56 K. The substitution for x=0.08 successfully weakened the hybridization effect which may related to strong ferromagnetic (FM) interaction between Cr^{3+}-O-Mn^{3+} as well as Mn^{3+}-O-Mn^{4+}. Further substitution of Cr^{3+} for x=0.1 increased the T_{MI} to 58 K decreased to 36 K for x=0.12. Rietveld Refinement of the X-ray diffraction data showed a decreased of unit cell volume which indicated partial substitution of Cr^{3+} (0.615Å) at Mn^{+3}(0.64 Å) site. Susceptibility, χ' versus temperature, T measurements, showed an increase of ferromagnetic-paramagnetic, FM-PM transition temperature, T_C from 66 K (x=0.04) to 125 K (x=0.14) which suggested that Cr^{3+} substitution enhanced the growth of FM phase. Fitting of the experimental data in the metallic region to scattering models