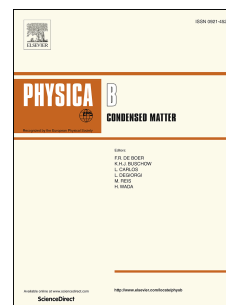


# Accepted Manuscript

Effect of  $\text{Cr}^{3+}$  substitution at Mn-site on electrical and magnetic properties of charge ordered  $\text{Bi}_{0.3}\text{Pr}_{0.3}\text{Ca}_{0.4}\text{MnO}_3$  manganites

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Effect of  $\text{Cr}^{3+}$  Substitution at Mn-Site on Electrical and Magnetic Properties of Charge  
Ordered  $\text{Bi}_{0.3}\text{Pr}_{0.3}\text{Ca}_{0.4}\text{MnO}_3$  Manganites

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**Abstract.** The effect of  $\text{Cr}^{3+}$  substitution at Mn-site on the structure, magnetic and electrical properties of  $\text{Bi}_{0.3}\text{Pr}_{0.3}\text{Ca}_{0.4}\text{Mn}_{1-x}\text{Cr}_x\text{O}_3$  manganites were studied by using X-ray diffraction method, AC susceptibility and electrical transport measurements. All the samples with starting composition of  $\text{Bi}_{0.3}\text{Pr}_{0.3}\text{Ca}_{0.4}\text{Mn}_{1-x}\text{Cr}_x\text{O}_3$  ( $x=0,0.04,0.08,0.1,0.12$  and  $0.14$ ) were prepared using solid state method.  $R$  versus  $T$  curve shows that  $x=0$  sample exhibits a strong insulating behavior while  $\text{Cr}^{3+}$  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  $\text{Cr}^{3+}\text{-O-Mn}^{3+}$  as well as  $\text{Mn}^{3+}\text{-O-Mn}^{4+}$ . Further substitution of  $\text{Cr}^{3+}$  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  $\text{Cr}^{3+}$  ( $0.615\text{\AA}$ ) at  $\text{Mn}^{+3}$  ( $0.64\text{\AA}$ ) site. Susceptibility,  $\chi'$  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  $\text{Cr}^{3+}$  substitution enhanced the growth of FM phase. Fitting of the experimental data in the metallic region to scattering models

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