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Impact of Co-doping on the structural and magnetic properties of multiferroic $\text{CaMn}_7\text{O}_{12}$

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ABSTRACT

In this manuscript we showed that Co-doping into $\text{CaMn}_7\text{O}_{12}$ (CMO) induces charge disordering between Mn^{3+} and Mn^{4+} ions into the B site in the perovskite structure leading to a cubic structure $Im\bar{3}$. Both antiferromagnetic transitions at T_{N1} and T_{N2} previously observed in CMO are strongly influenced by Co-doping. The transition at T_{N1} disappears due to the structural disorder due to the Co doping, while that one at T_{N2} occurs at high temperatures. Our magnetic results explained the role of Co-doping on the magnetic ordering of CMO. Since this magnetic ordering drives the induced electric polarization in such compound, the Co doping comes up as a simple way to tune the coupling between electric polarization and magnetic helix in CMO.

Keywords: Multiferroic; $\text{CaMn}_7\text{O}_{12}$; Quad-perovskites; Magnetolectric; XANES.

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