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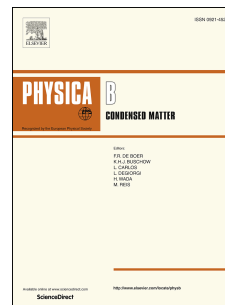
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## Effects of Ga doping on the electric and magnetic properties of $\text{DyMn}_{1-x}\text{Ga}_x\text{O}_3$

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### Abstract

$\text{Ga}^{3+}$  for  $\text{Mn}^{3+}$  substitution in multiferroic  $\text{DyMn}_{1-x}\text{Ga}_x\text{O}_3$  ( $x=0, 0.02, 0.05, 0.1, 0.2, 0.3$  and  $0.4$ ) has been performed to study the change on  $\text{Mn}^{3+}$  ordering, which also influences on the ordering of  $\text{Dy}^{3+}$ . The samples are pure and their dielectric constant, electric polarization and magnetic properties have been investigated. When the content of  $\text{Ga}^{3+}$  increases above 0.1, multiferroic properties completely disappear. These results indicate that  $\text{Ga}^{3+}$  for  $\text{Mn}^{3+}$  substitution in  $\text{DyMnO}_3$  bulk can reduce the exchange interactions of  $J_{\text{Mn-Mn}}$ ,  $J_{\text{Dy-Mn}}$  and the bond angle of Mn-O-Mn, while the electric polarization is observed to decrease rapidly, even for small Ga doping, and the anomaly at low T in  $P(T)$  associated with the Dy ordering is no longer observed for  $x=0.05$ .

Key words: multiferroics; polycrystalline; Raman spectrum; electric polarization; specific heat; antiferromagnetic property

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