Effects of Mn doping on structural and magnetic properties of the tetragonally distorted copper ferrite

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The aim of this work was to obtain more information about the influence of small quantities of Mn^{2+} ion on the structural and magnetic properties of the tetragonally distorted of $Cu_{1-x}Mn_xFe_2O_4$. A series of ferrite samples of the chemical composition $Cu_{1-x}Mn_xFe_2O_4$ (with x = 0.0; 0.05 and 0.1) prepared by the combustion method using citrate-nitrate precursors. The samples underwent a successive thermal treatment in air 300, 600, and 900^{o}C for 4 hours. After heating, the preparations were either cooled slowly to the room temperature. Structural analysis results for tetragonal copper ferrite indicated that above 360^{o}C a part of copper ions moves into the tetrahedral sites and structural tetragonal *($I4_1amd$)* $\rightarrow$ cubic *($Fd\bar{3}m$)* phase transition appears. Substitution with small quantities of manganese ions clearly decreases the temperature of structural transformation for $Cu_{1-x}Mn_xFe_2O_4$ system. The obtained result indicates that the distribution of cations has a great influence on the structural and magnetic properties of the modified copper ferrites.