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A Mössbauer effect investigation of nanosized $\text{Mn}_x(\text{Mg, Co})_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$

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Abstract content
 (Max 300 words)

In this paper we report Mn substitution in Zn-Mg and Zn-Co spinel oxides. Single phase nanoferrite powders bearing the chemical formula $\text{Mn}_x\text{Mg}_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ and $\text{Mn}_x\text{Co}_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ (in steps of 0.1) have been produced by co-precipitation technique. The compounds were characterised by X-ray diffraction, Mössbauer and VSM measurements. The particle size varies between 9 nm and 15 nm. The variation of Mn concentration has significant effects on the structural and magnetic properties. ⁵⁷Fe Mössbauer effect spectra show ordered magnetic spin state in all the $\text{Mn}_x\text{Co}_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$ compounds. Transformation from ordered to disordered magnetic state has been observed with increasing x in $\text{Mn}_x\text{Mg}_{0.5-x}\text{Zn}_{0.5}\text{Fe}_2\text{O}_4$. The variation of the magnetic parameters such as coercive fields and saturation magnetization as a function of Mn concentration is also presented.

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