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## Effect of domain transformation on the magnetic properties of $\text{Ni}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$

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In this study, nanoparticles of  $\text{Ni}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$  ( $x = 0, 0.1, 0.2, 0.3, 0.8$  and  $1.0$ ) were produced by glycol thermal process and characterized by several techniques such as XRD, TEM, SEM, FTIR, Mössbauer spectroscopy and magnetization measurements. The as-prepared fine powders show transformation from single- to multi-domain behaviour at a critical particle size dependent on sample chemical composition. The effect of domain transformation on the magnetic properties has been investigated.  $^{57}\text{Fe}$  Mössbauer spectral studies and magnetization data show significant differences between single- and multi-domain particles. The results are explained on the basis of crystallite size and constituent atoms. The variation of the magnetic parameters such coercive fields and saturation magnetization revealed by hysteresis loop measurements in the temperature range  $4 - 300$  K is also reported.

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