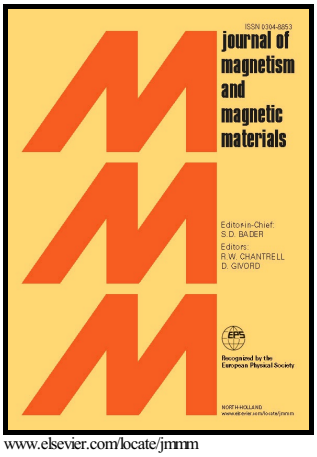

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Exchange Spring like Magnetic Behavior in Cobalt Ferrite Nanoparticles

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Abstract: Cobalt ferrite nanoparticles were prepared by sol-gel technique and were annealed at 900 °C in air for 2 hours. Structural properties were studied by X-ray diffraction, Raman spectroscopy and Fourier transformed infrared spectroscopy. Scanning electron microscopy and transmission electron microscopy studies show presence of mostly two different sizes of grains in these samples. Magnetization value of 58.36 emu/g was observed at 300 K for the as prepared sample and an enhanced magnetization close to the bulk value of 80.59 emu/g was observed for the annealed sample. At 10 K a two stepped hysteresis loop showing exchange spring magnetic behavior was observed accompanied by very high values of coercivity and remanence. Two clear peaks were observed in the derivative of demagnetization curve in the as prepared sample where as two partially overlapped peaks were observed in the annealed sample. The observed magnetic properties can be understood on the basis of the grain size and their distribution leading to the different types of intergranular interactions in these nanoparticles.

Keywords: Cobalt ferrite, Sol gel method, Magnetic studies

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