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Tailoring magnetic properties of Co-ferrite soft magnetic nanoparticles N. POUDYAL, T.S. VEDANTAM, J.P. LIU, Department of Physics, University of Texas at Arlington — Monodisperse Co-ferrite soft magnetic nanoparticles with particle size from 3 nm to 20 nm and different Co concentration have been synthesized by chemical solution methods. The composition was controlled by varying the mole ratios of the precursors in the solution. It has been found that magnetic properties of the nanoparticles can be tailored by changing the composition, particle size, as well as by subsequent heat treatments. Magnetization value of 223 emu/g was obtained after reduction. Particles with size less than 12 nm showed ferromagnetism-superparamagnetism transitions at temperatures between 10 K and 300K. The magnetic interaction of the nanoparticles was studied by zero-field-cooling and field-cooling experiments. The blocking temperature of the nanoparticles was found to increase with increasing particle size. The 4 nm and lesser sized particles showed exchange bias at 10 K. A coercivity value of 1.8 T was obtained at 10 K for the 20 nm particles.

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