

Abstract Submitted
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Magnetic Properties of Cobalt-Ferrite Nanoparticles Prepared by a Sol-Gel Synthesis Technique¹ THOMAS EKIERT, KARL UNRUH, University of Delaware, E. CARPENTER, Virginia Commonwealth University, K. PETTIGREW, J. LONG, D. ROLISON, Naval Research Laboratory — Cobalt-ferrite nanoparticles have been prepared as highly porous aerogels using a sol-gel technique and characterized by XRD, TEM, and nitrogen-sorption porosimetry measurements. The XRD patterns for calcined Co-ferrite aerogels corresponded to a cubic structure with a lattice parameter near that of bulk Co-ferrite and a particle size of about 6 nm. TEM images indicated a similar particle size and a morphology similar to that of silica aerogels. The magnetic properties of these materials have been studied from 5 K to 340 K. Hysteresis loop measurements indicated that the coercivity and saturation magnetization of these materials evolves from nearly 19 kOe and 56 emu/g at 5 K to less than 10 Oe and 40 emu/g at 340 K. ZFC magnetization curves displayed a broad maximum that smoothly varied between about 300 K in an applied field of 100 Oe to about 180 K in a 10 kOe field. These measurements have been interpreted in terms of a distribution of effective particle sizes arising from a distribution in interparticle interactions.

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