

Abstract Submitted
for the NWS08 Meeting of
The American Physical Society

Synthesis and characterization of nanostructured cobalt-zinc ferrites ERIC MONTOYA, AARON PATZ, DAN SHAW, TAKELE SEDA, Western Washington University — Research in the area of nanomaterials has been increasing in the past few decades. Differing from their bulk phase counterparts, the properties of these nanomaterials are highly size dependent. Such materials promise to be of great importance: from high frequency applications to aided drug delivery to the study of quantum effects on the macro scale [quantum dots]. Synthesis of $\text{Co}_{1-y}\text{Zn}_y\text{Fe}_2\text{O}_4$ nanoparticles was achieved through microemulsion techniques, where ‘y’ ranges from 0 to 1 and was used to determine the relative concentration of Co and Zn cations in the spinel structure. XRD estimates that the particle size ranged from 10 to 20 nanometers. Vibrating SM and ^{57}Fe Mössbauer spectroscopy were used to study the magnetic and electronic properties of these nanomaterials. Our preliminary results suggest there are small but significant magnetic interactions between the particles. These interactions can be explained in terms of surface effects and in part the agglomeration of the particles.

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Date submitted: 18 Apr 2008

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