Abstract Submitted
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Reduction of nickel upon annealing of nickel zinc ferrite nanoparticles S. CALVIN, Sarah Lawrence College, S.A. MORRISON, M.D. SHULTZ, E.E. CARPENTER, Virginia Commonwealth University, R. SWAMINATHAN, M.E. MCHENRY, Carnegie Mellon University — Nickel zinc ferrite (NZFO) nanoparticles were synthesized by two methods: radio-frequency plasma torch and reverse micellar syntheses. Upon annealing, x-ray absorption spectra of both sets of samples provided definitive evidence of a progressive reduction of nickel to an fcc metallic form. X-ray diffraction, however, does not show clear peaks corresponding to fcc nickel, suggesting the metallic crystallites are very small. In the case of the plasma torch samples, annealing under air for one hour at 900 $^\circ$C is sufficient to reduce nearly all of the nickel metal. Testing is still underway for the reverse micellar samples, but in at least one case approximately 80% nickel reduction was achieved by annealing under nitrogen for one hour at 500 $^\circ$C. To elucidate the mechanism of this reduction, a comparative study of annealing under air, nitrogen, and argon is underway, as well as thermogravimetric analysis.

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