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Structural and Magnetic Properties of As-Prepared and Annealed Ni/Cu Core/Shell Nanoparticles THOMAS EKIERT, University of Delaware, KYLER CARROLL, EVERETT CARPENTER, Virginia Commonwealth University, KARL UNRUH, University of Delaware — Air stable Ni-core Cu-shell nanoparticles with diameters between about 100 and 300 nm have been synthesized via a one-pot polyol synthesis. Structural and chemical analysis shows the particles to be essentially free of metallic oxides and copper rich ($Cu_{59}Ni_{41}$), while room temperature magnetic measurements indicate a similar composition. The freely-flowing powder was compacted into disks under moderate pressure and a series of these samples were were annealed by scanning in a DSC to progressively higher maximum temperatures under a constant flow of forming gas. A DSC scan to a maximum temperature of 250 $^\circ$C results in a large drop in the coercivity (208 Oe to 133 Oe) and relatively little change in the high-field magnetization ($\sim$20 emu/g of sample) and XRD-determined lattice parameter (0.3625(1) nm to 0.36169(5) nm). The high-field (H=9T) magnetization remains relatively unchanged near 20 emu/g for samples similarly scanned up to 400 $^\circ$C, while samples scanned to higher temperatures have high-field magnetizations and coercivities that drop to a final value of 2.8 emu/g and 76 Oe upon scanning to 600 $^\circ$C.

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