Synthesis and Characterization of Iron-Nickel (Fe$_x$Ni$_{1-x}$) Nanowires

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Department of Physics, Southern Illinois University Carbondale — Electrochemical deposition method was used to synthesize ordered arrays of Fe$_x$Ni$_{1-x}$ (25 < x < 85) nanowires into porous anodic alumina template. These nanowires were structurally characterized by scanning electron microscope (SEM) and transmission electron microscope (TEM). An estimate regarding the elemental composition of the nanowires was obtained by Energy dispersive spectroscopy (EDS). X-ray diffraction studies revealed that the nanowires exhibit a phase transition from face-centered-cubic (FCC) to base-centered-cubic (BCC) crystal structure with increasing iron concentration. The effect of the variation of the compositional ratio of iron and nickel on the magnetic properties of the nanowires will also be presented.

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Date submitted: 01 Dec 2007

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