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Nanoparticulate Alnico Thin Films with High Coercivity[1] OZAN AKDOGAN, GEORGE C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware, Newark, DE, U.S.A. — Alnico V (Fe–8% Al–14% Ni–24% Co–3% Cu) nanoparticulate thin films have been produced by dc magnetron sputtering. The films were sputtered on Si substrates for magnetic measurements and carbon-coated copper grids for TEM measurements. The as-deposited films have a fine grained microstructure with the bcc crystal structure. The as-made films were subjected to a full heat treatment which consists of heating the sample to 900 °C, then cooling it to 600 °C and finally annealing it at 600 °C for several hours. After the heat treatment, the thin films broke up into large nanoparticles (20-60 nm) surrounded by small nanoparticles (2 nm). Electron diffraction data showed that the annealed samples had an fcc structure. The maximum room temperature coercivity was found to be 2 kOe after 6h of annealing at 600 °C. The high coercivity could be due to strain that was induced during precipitation. The evolution of crystal structure and microstructure with annealing will be monitored and related to the observed magnetic properties.

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Ozan Akdogan
Department of Physics and Astronomy,
University of Delaware, Newark, DE, U.S.A.

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