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Magnetic Properties of Fe-Co Catalysts for Carbon Nanofiber Synthesis[1] O. MALKINA, C. FINKEL, K. D. SORGE, T. LEVENTOURI, Florida Atlantic University, J. D. FOWLKES, P. D. RACK, University of Tennessee, K. L. KLEIN, A. V. MELECHKO, M. L. SIMPSON, Oak Ridge National Laboratory — The magnetic properties of Fe-Co alloys used as catalysts for vertically-aligned carbon nanofiber (VACNF) growth are presented. 10 nm thick layers of Fe_xCo_{100-x} of varying composition ($10 \leq x \leq 75$) are deposited on Si wafers by a co-sputtering technique. VACNFs are then grown by Plasma-Enhanced Chemical Vapor Deposition (PECVD) in an atmosphere of NH_3 and C_2H_2 at a temperature of $\sim 570^{\circ}$C. The catalyst particles on the tips of the VACNFs are 30–80 nm in size after growth. The magnetic properties are investigated at various stages of the fabrication process by SQUID magnetometry in a field range of $|H| \leq 10$ kOe and temperatures of $T = 5$–300 K. The particles are ferromagnetic with moderate coercivity and remanence. The magnetization, however, is lower than expected at each stage.

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