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**Magnetic Properties of Fe-alloy Catalyst Nanoparticles for Carbon Nanofiber Synthesis**[1] K. D. SORGE, TH. LEVENTOURI, C. FINKEL, O. MALKINA, Florida Atlantic University, P. D. RACK, University of Tennessee, A. V. MELECHKO, J. D. FOWLKES, K. L. KLEIN, M. L. SIMPSON, University of Tennessee and Oak Ridge National Lab — The magnetic properties of Fe-alloy nanoparticles, used as catalysts in vertically-aligned carbon nanofiber (VACNF) growth, has been investigated. First, Fe and Co or Ni were co-sputtered onto Si substrates in order to make a catalyst alloy film. These substrates were then placed in a plasma-enhanced CVD chamber with a substrate temperature of 700°C and a flowing mixture of acetylene ($C_2H_2$) and ammonia ($NH_3$) gas. During the PECVD, the catalyst film breaks into nanoparticles of 50–200 nm and VACNFs are grown. EDX shows that the catalyst nanoparticles nominally have the deposited alloy ratio. In addition, the nanoparticles are still magnetic and have a non-negligible remanence and hysteresis. Their magnetic properties are investigated by SQUID magnetometry in applied field of $|H| \leq 50$ kOe and temperatures of 5–400 K. In addition, AC susceptibility studies give energy loss characteristics of the co-synthesized VACNF system.

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