

Abstract Submitted
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Magnetic Carbon Nanotubes: Materials Development and Property Characterization DEREJE SEIFU, Department of Physics, Morgan State University, Baltimore, MD 21251, USA, SHASHI KARNA, US Army Research Laboratory, Weapons and Materials Research Directorate, ATTN: AMSRD-ARL-WM, Aberdeen Proving Ground, MD 21005-5069, USA — A versatile chemical method was used to fill multi-wall carbon nanotubes (MWCNTs) with ferromagnetic nanoparticles [1]. For the first time, pulsed laser deposition and magnetron DC sputtering were used to fill vertically aligned MWCNTs. The later approaches gave high-yield nanoparticle filling of MWCNTs. Samples were characterized by Electron Microscopy, Energy Dispersive Spectroscopy, Mössbauer Spectroscopy, and magnetization measurements. Mössbauer measurements on chemically impregnated MWCNTs clearly show the presence of atomic Fe as well as mixed phases of Fe nano-particles inside the tubes. Magnetization measurements on PLD-filled vertically aligned MWCNTs indicate reasonable coercivity. However, the magnetic anisotropy appears to be randomly oriented, suggesting polycrystalline sample. Acknowledgement: The research at Morgan State University was partially supported by the US ARL-WMRD (W1813LT-5006-7056).
[1] D. Seifu, Y. Hijji, G. Hirsch, and S. P. Karna, *J. Magn. Magn. Mat.* **320**, 312 (2008).

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