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Mechanical Measurement of Magnetization Reversal in a Single Iron Filled Carbon Nanotube PALASH BANERJEE[1], M. HERMAN, K.C. FONG, D.V. PELEKHOV, YU. OBUKHOV, P. CHRIS HAMMEL, Dept. of Physics, Ohio State University, 191 W. Woodruff Ave, Columbus OH 43210, F. WOLNY, U. WEISSKER, T. MÜHL, A. LEONHARDT, BERND BÜCHNER, Leibniz Institute for Solid State and Materials Research (IFW) Dresden, Helmholtzstrasse 20, D-01069 Dresden Germany — The hysteresis loop and switching behavior of an *individual* Fe-filled carbon nanotube (FeCNT) has been measured at low temperatures using cantilever magnetometry. From the magnetometry data, we are able to extract the total moment of the nanotube and the effective anisotropy field arising from the extreme aspect ratio of the nanotube (length ~ 13 μm, diameter $\sim$ 25 nm). We find the magnetization reversal in the FeCNT occurs at a well defined switching field H_{sw} and in a single step. These switching fields ($H_{sw} = 2245$ G at 4.2 K) are characterized by a narrow distribution ($\sigma_{sw} \leq 1$ G) and their measured temperature dependence is consistent with a thermally activated process of magnetization reversal. This work was supported by the NSF Materials World Network grant DMR-0807093 and a NSF I2CAM Grant DMR-0645461. P.B. acknowledges support of the ICAM Branches Cost Sharing Fund for a postdoctoral fellowship.

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