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Synthesis of Narrow Chirality Distributions of Single-Walled Carbon Nanotubes using Catalyst Particle Templates Produced by Nanosphere Lithography NOUREDDINE TAYEBI, JOSEPH LYDING, University of Illinois at Urbana-Champaign — We report a simple and inexpensive technique based on nanosphere lithography [1], which allows for the fabrication of periodically-spaced and monodispersed metal particles from which the chemical-vapor-deposition synthesis of single-walled carbon nanotubes (SWNTs) is achieved. We have controlled the diameter of these metal particles, and thus that of the SWNTs, from 1 nm down to 0.7 nm, with an interparticle spacing varying from 50 nm down to 5 nm. Raman spectroscopy analysis reveals that a narrow chirality distribution is achieved. We are currently confirming the chirality results using fluorescence spectroscopy and scanning tunneling microscopy. Transmission electron microscopy analysis reveals that the 0.7 nm particles are crystallographically identical, which could be the origin of such a narrow distribution. Furthermore, the current technique was used to grow aligned SWNTs on single-crystal quartz substrates [2]. [1] J. C. Hulteen et al., J Vac Sci Technol A, 13, 1553 (1995) [2] C. Kocabas et al., J Am Chem Soc, 128, 4540 (2006)

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