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Comparison of Efficiencies of Binary and Ternary Composite Catalysts in Arc-Discharge Synthesis of Single-Walled Carbon Nanotubes
MIKHAIL E. ITKIS, DANIEL E. PEREA, BRETT HAMILTON, ROBERT C. HADDON, Center for Nanoscale Science and Engineering, University of California, Riverside, CA 92521-0403 — The catalyst composition is a major factor determining the efficiency of single-walled carbon nanotubes (SWNTs) synthesis. The binary catalyst composed of transition metal (TM) and rear earth metal (REM) proved to be the most efficient combination for the arc-discharge technique. Recently we proposed a quantitative procedure to assess the relative carbonaceous purity of bulk quantities of SWNT soot on the basis of solution phase NIR spectroscopy.[1] We applied this technique to obtain direct comparison of the efficiency of variety of binary and ternary TM-TM, TM-REM, TM-TM-REM composite catalysts for the arc-discharge synthesis. We found that substituting of either component of the most popular Ni-Y composition by different transition metal (Fe, Co) and rare earth metal (Se, La) affects significantly the efficiency of the SWNT synthesis and modifies the SWNT diameter distribution. This work is supported by DOD/DARPA/DMEA under Award No.DMEA90-02-2-0216. . [1] M.E. Itkis et al., *Nano Lett.* **2003**, 3, 309-314.

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