Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Raman and IR Spectroscopy of Chemically-Processed Single-Walled Carbon Nanotubes C. A. FURTADO, (Centro de Desenvolvimento da Tecnologia Nuclear CDTN/CNEN, Belo Horizonte, MG, Brazil), U. J. KIM, X. LIU, H. R. GUTIERREZ, G. CHEN, A. GUPTA, P. C. EKLUND, (Department of Physics, The Pennsylvania State University) — We have used IR and Raman spectroscopy to study the evolution of the vibrational spectrum of bundled single-walled carbon nanotubes (SWNTs) during the purification process needed to remove metal catalyst and amorphous carbon from arc-derived soot and after high temperature annealing. We have carried out a systematic study to define the different outcomes stemming from different purification protocols, e.g., DO, DO/HCl, DO/HNO_3, H_2O_2, H_2O_2/HCl, where the first step is either dry oxidation (DO) in flowing air or wet oxidation in refluxing H_2O_2 to remove amorphous carbon. The second step is an acid reflux step to remove the residual growth catalyst (Ni-Y). Using IR transmission through thin films of nanotubes, we resolve structure due to functional groups, which are present in the as-prepared material (e.g., -COC-), and groups added through the chemical processing (e.g., -COOH, -OH). After high temperature vacuum annealing at 1100^{o}C, most of oxygen-containing groups were removed. [†]This work was supported, in part, by the NSF NIRT program (DMR-0304178).

Gugang Chen

Date submitted: 01 Dec 2004 Electronic form version 1.4