Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Fluorination and Defluorination of Double-wall Carbon Nanotubes JUNGHO KANG, MERLYN PULIKKATHARA, VALERY KHABASHESKU, KEVIN KELLY, RICE University — Due to the unique physical structure double-wall carbon nanotubes (DWNTs), the outer tube can be chemically functionalized while the inner tube is left in pristine condition. Using a fluorinating agent, DWNTs are fluorinated and X-ray photoelectron spectroscopy data indicates that the resulting product composition is equivalent to C3F. The diameter of bare DWNTs is around 2-3 nm as measured by scanning tunneling microscopy, but fluorinated DWNTs possess much larger diameters in a range from 3-10 nm due to a stronger electronic interaction. In addition to imaging the as prepared material, the material was imaged after annealing at temperatures up to 650 K. Due to defluorination, the diameter is decreased down to that of the initial bare DWNTs and atomic resolution of the lattice was recovered. In addition, it was possible to observe that the initial and final structures on the same nanotubes and the evolution of their associated defect structures. Lastly, Raman spectroscopy was employed to confirm the defluoration by revealing the recovery of the RBM peak which disappeared upon fluorination.

JungHo Kang
RICE University

Date submitted: 27 Nov 2007 Electronic form version 1.4