Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Incremental Growth of Single-Wall Carbon Nanotube Arrays Explored by Pulsed CVD[1] JEREMY JACKSON, Oak Ridge National Laboratory, ALEX PURETZKY, IGOR MERKULOV, CHRISTOPHER ROULEAU, KARREN MORE, NORBERT THONNARD, GYULA ERES, DAVID GEOHEGAN, CNMS AND MSTD DIVISIONS, OAK RIDGE NATIONAL LABORATORY TEAM —
Gas pulses of variable duration and peak flux were used to explore the incremental growth and evolution of alignment of vertically-aligned carbon nanotubes arrays (VANTAs) by typical chemical vapor deposition within a tube furnace. Time-resolved reflectivity from Fe/Al catalyst-coated Si substrates was used to follow the growth of the arrays after the arrival of successive acetylene gas pulses injected into fast argon-hydrogen flows at 6 Torr total pressure. The evolution of alignment of the arrays measured with the in situ optical reflectivity data was correlated with SEM images for growth resulting from single- and multiple-pulse growth. The incremental length per pulse was varied from 20 nm to several microns in less than a second, corresponding to growth rates ranging up to 7 microns/second. Effects of repeated renucleation of growth along the nanotube wall structure were measured by HRTEM and Raman spectroscopy.

[1]Research sponsored by DOE-BES (DMSE).

David Geohegan
Oak Ridge National Laboratory

Date submitted: 21 Nov 2008 Electronic form version 1.4