Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Growth of vertically aligned multiwall and uniform carbon nanotubes on self-assembled ferromagnetic Fe and Co nanowires L. MOPHADDES-ARDABILI, Univ of Maryland and U C Berkeley, S.Y. YANG, J.H. HAN, J.B. YOO, R. RAMESH — A novel approach to grow vertically aligned and uniformly separated carbon nanotubes on self-assembled α-Fe is reported. We have previously demonstrated that the growth of $LaSrFeO_3$ perovskite oxide by Pulsed Laser Deposition under reducing environments leads to spontaneous formation of an array of single crystalline α-Fe nanowires embedded in an antiferromagnetic $LaSrFeO_4$ matrix. The diameter and spacing of these ferromagnetic nanowires can be controlled by changing the temperature of growth. We now show that these thin films containing self-assembled α-Fe nanowires can be used as a template to grow vertically aligned carbon nanotubes using Plasma Enhanced Chemical Vapor Deposition. Acetylene (C_2H_2) and ammonia (NH_3) were used as a carbon source and diluting gas, respectively. Self-assembled α-Fe nanowires serve as a nucleation sites for the growth of vertically aligned multiwall carbon nanotubes (MWCNTs). The size of carbon nanotubes can be controlled by changing the diameter of α-Fe nanowires. The results of Transmission Electron Microscopy, Raman spectroscopy and field emission data will be presented. By means chemical mechanical polishing we can achieve atomically smooth surfaces and improve the quality of the carbon nanotubes grown on these nanowires.

L. Mophaddes-Ardabili
Univ of Maryland and U C Berkeley

Date submitted: 22 Dec 2004 Electronic form version 1.4