Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Optical Transmittance and Sheet Resistance of B-doped Single-Walled Carbon Nanotubes XIAOMING LIU, HUGO ROMERO, HUMBERTO GUTIERREZ, KOFI ADU, PETER EKLUND, Department of Physics, Pennsylvania State University — Thin films of carbon nanotubes have been reported to be a replacement for transparent conducting films of Indium-Tin-Oxide (ITO). Nanotube films can be deposited on flexible plastic and are predicted as a new technology for touch screens, solar cells, etc. Here we report results on thin films of boron-doped single-walled carbon nanotubes (B-SWNTs) obtained from CarboLex, Inc. Boron-doping is expected to raise the conductance of semiconducting nanotubes while not lowering significantly that of the metallic tubes. At room temperature, we have measured the four-probe sheet resistance and the optical transmission in the NIR-UV range to evaluate the performance of these chemically enhanced SWNT films. The structure in the optical spectrum is essentially the same as in pristine tubes, although the positions of optical absorption bands are slightly upshifted (~ 50 meV) relative to pristine SWNTs. The B-loading, microstructure, bonding and defects of the B-doped SWNTs were characterized, respectively, by inelastic neutron scattering, transmission electron microscopy, electron energy loss spectroscopy and Raman spectroscopy. Our preliminary results on B-SWNTs show that the visible optical transmittance is higher and the sheet resistance is much lower than that of similar thickness SWNT films.

XiaoMing Liu
Department of Physics, Pennsylvania State University

Date submitted: 20 Nov 2006 Electronic form version 1.4