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Transparent Boron-Doped Nanotube Films[1] XIAOMING LIU, HUGO ROMERO, HUMBERTO GUTIERREZ, PETER EKLUND — We report results of FTIR transmission and temperature-dependent resistance measurements on transparent thin films of bundled single-walled carbon nanotubes exposed to B2O3 at 1000C. This reaction is proposed to B-dope the films. Doping is observed to lower the T=300 K dc sheet resistance by a factor of five without changing the optical transmittance in the visible range and suggests that boron-doped SWNT provide a better approach to transparent electrodes. The optical transmission (T=300K) of SWNT and B- doped SWNT films measured in the range 50-7000 cm-1 show that the doped films have a greater optical density in the mid to far IR, consistent with the B-doping creating new free carriers. This optical result shows that the DC conductivity of the doped tubes is indeed higher, with the interpretation not being entangled with changes in the tube-tube contact resistance within the film, as would be the case in a dc conductivity measurement. Also the dc resistance of both B-doped and annealed SWNT films were measured over 10<T<300K. The data showed for the doped films the metallic term (linear in T) is ∼10 times greater than for the annealed and undoped films. Work supported by NSF NIRT ECS 06-09243.

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