Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Electrochemically mediated charge transfer effects in Single Walled Carbon Nanotubes (SWCNTS) BUDDHIKA ABEYWEERA, Dept. of Physics, University of Louisville, KY, SHARVIL DESAI, Dept of Electrical and Computer Science Engineering, University of Louisville, KY, GAMINI SUMANASEKERA[1], Dept. of Physics, Dept. of Electrical and Computer Engineering, University of Louisville, KY — Electrochemically mediated charge transfer has been studied by its effect on the surface conductivity of diamond. Here we show that the effect is not restricted to diamond, but may occur in other material systems as well, for example, semiconducting single-walled carbon nanotubes (s-SWNTs). For s-SWNTs the electron energies of the redox couple involving oxygen lie within or below the band gap. Nanotubes are known to be inherently n-type in vacuum and p-type under ambient conditions. Systematically sweeping the Fermi energy by controlled removal of oxygen through the redox couple and exposing to moist oxygen and ammonia with controlled pH, the charge transfer effect of the SWNTs was studied by *in situ* monitoring of the Thermoelectric power (S) and Resistance (R). The changes in both R and S correlate very well with the relative position of the Fermi level with respect to the equilibrium chemical potential of the electrons.

[1]Corresponding Author

Sharvil Desai
Electrical and Computer Engineering, University of Louisville

Date submitted: 21 Nov 2008 Electronic form version 1.4