Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Search for Superconductivity in Charge Doped Composites of Carbon Nanotubes and Fullerides AUSTIN HOWARD, JAVIER CARRETERO-GONZALEZ, ELIZABETH CASTILLO-MARTINEZ, RAY BAUGHMAN, ANVAR ZAKHIDOV, The University of Texas at Dallas — The motivation of this study is to develop a highly sensitive method of microwave absorption in low magnetic fields (LFMA), combined with SQUID magnetometry, for searching for superconducting phases in nanocomposites in which carrier concentration is changed by in-situ doping. The unzipped ribbons of multiwalled carbon nanotubes (MWCNTs) (which are stacks of graphene ribbons) are infiltrated by C_{60} fullerenes and doped chemically (by alkali metals) and electrochemically to modulate the carrier concentration. It is demonstrated that hysteretic LFMA appearing below T_c is indeed a highly sensitive test for negligibly small superconducting (SC) phases ($\sim 10^{-11}$ g), and multi-phase SC composites with several T_c can be detected and separated. At the same time, non-SC signals (which are quite similar to SC LFMA) have been found from samples containing magnetic nanoclusters (Fe, Ni/Co, etc.) which are catalyst residuals in CNT synthesis. The strategies of differentiating SC LFMA from magnetic LFMA by complementary SQUID/transport studies are suggested.

Austin Howard
The University of Texas at Dallas

Date submitted: 20 Nov 2009 Electronic form version 1.4