Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Quenching Photoluminescence in Single-Walled Carbon Nanotube/Copolymer Composite Materials ANDREW SCHOCH, Material Science and Engineering Dept. Northwestern University, L. CATHERINE BRINSON, Mechanical Engineering Dept. Northwestern University, KENNETH R. SHULL, Material Science and Engineering Dept. Northwestern University — Single-walled carbon nanotubes (SWNTs) stabilized by A-B diblock and A-B-A triblock copolymers are excellent model systems for studying the relationship between nanotube dispersion and mechanical response. The SWNTs cannot be dispersed in the alcoholic solvent used here without the addition of copolymer. However, the B blocks are in good solvent conditions for all temperatures and the A blocks solvent quality decreases with decreasing temperature. This solvent quality difference drives the formation of micelles with A block cores at low temperatures. As verified by AFM, the micelles form heterogeneous micelles in solutions by incorporating the SWNTs. The dispersion has also been verified with near-IR photoluminescence spectroscopy (NIR-PLS) and the mechanical properties of these materials have been examined with rheological methods. The elastic contribution to the shear modulus increases while at high temperatures which we attribute to an increase in the number of NT-NT contacts. We have attempted to verify this observation by simulating the high temperature environment in the NIR-PLS measurements and looking for quenching.

Andrew B. Schoch
Material Science and Engineering Dept. Northwestern University

Date submitted: 21 Nov 2008 Electronic form version 1.4