

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Suspension of SWNTs in water: a dynamic optical study GOKI EDA, GIOVANNI FANCHINI, MANISH CHHOWALLA, Rutgers University — Dispersion of single-wall carbon nanotubes (SWNTs) in water is critical for processing. Dispersions are often unstable and the dynamics associated with SWNT bundle formation are poorly understood. We have devised a simple method to examine the dispersion properties based on changes in transmittance at three different levels of the suspension using 650 nm lasers. Our results show that the suspension is stable up to 1 hr with the transmittance remaining constant. Above 1 hr, anomalous transmittance behavior is observed. It initially increases, as expected, but then decreases for a short amount of time before constantly increasing. These fluctuations suggest Mie scattering from changes in the SWNT bundle size. The dynamic nature of the suspension and the fact that the SWNTs and their bundles are significantly smaller than the wavelength of the lasers means that the interpretation of the transmittance data requires careful analysis in terms of the effective medium theory. Our findings provide an understanding of the SWNT suspension behavior which has important implications for the emerging applications of SWNTs based on solution processing.

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Date submitted: 03 Dec 2006

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