

Optical Absorption Analysis of Raw SWNTs

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Abstract: The ability to form stable dispersions of raw laser vaporization and arc-discharge produced single wall carbon nanotubes(SWNTs) has been analyzed in N,N-dimethylacetamide(DMA) and a 1% w/w Sodium dodecylbenzene sulfonate-Deuterium oxide solution(NaDDBS-D₂O). Optical absorption spectroscopy over a designed series of concentrations has allowed for calculation of extinction coefficients and dispersion limits. The dispersion limits of SWNT solvent dispersions have been calculated based on absorption deviation from a Beer's law regime. The dispersion limits of raw laser produced SWNTs and arc-discharge produced SWNTs were found to be 7.9 ug/mL and 9.7 ug/mL at 1.25 eV, respectively. The linear data region has allowed for the calculation of extinction coefficients at the same energy for the laser and arc-produced SWNTs in DMA, 23 mL mg⁻¹ cm⁻¹ and 28.9 mL mg⁻¹ cm⁻¹, respectively. Additionally, the experimental results indicate that DMA and NaDDBS-D₂O are comparable in their ability to form stable dispersions.