

Dispersion of Single-Walled Carbon Nanotubes of Narrow Diameter Distribution

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Abstract

Single-walled carbon nanotubes (SWNTs) from two sources (CoMoCAT and HiPco) were dispersed in surfactant solution with same procedure. The diverse spectra of them show the differences in sample composition. The dispersion of CoMoCAT sample provided us a way to understand the properties of one specific nanotube. Its optical absorption spectra were related to the ratio of individual tubes in the dispersion by using resonance ratio. After tuning the dispersion procedure, one optimal procedure was selected to maximum the spectra features. Using this procedure, resonance ratio of various surfactants suspended SWNT were compared and discussed on structure, pH and concentration. Several surfactants which are as good as or better than dodecylbenesulfonic acid sodium salt (NaDDBS) were identified. Both using different surfactants and varying dispersing procedures (time of sonication, degree of centrifugation, etc.) can change the degree of dispersion as measured by the resonance ratio. However, they neither create new features in optical adsorption nor change the distribution of nanotube types which confirm the high selectivity of the original sample rather than selective suspension. So the spectra of SWNT suspensions reflected the composition of the original samples.