

# **Role of the Critical Micelle Concentration on the Stability of Carbon Nanotube Dispersions in Water**

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## **Abstract**

Concentrated solutions of Sodium dodecylbenzene sulfonate (SDDBS) with higher than the nominal critical micelle concentration (CMC) of each surfactant have been prepared. Dispersions of carbon nanotubes in water with the aid of a surfactant are believed to be more stable when the surfactant concentration is close to the critical micelle concentration (CMC) value. This misconception can lead to poor dispersion of the nanotubes even more pronounced as the aspect ratio increases i.e. in SWNT dispersions. The present work shows that the optimum surfactant concentration for the highest nanotube stability to be obtained is not the CMC of the surfactant but that of the surfactant-nanotube system. The two may be similar but may also be significantly different as the CMC equilibrium shifts in the presence of nanotubes owing to the adsorption of the surfactant monomers onto the tubes surface.

**Keywords:** Carbon nanotubes, surfactant, stability