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Single Walled Carbon Nanotubes as Macroscopic Surfactant Molecules ERIK K. HOBBIE, BARRY J. BAUER, NIST — Single-walled carbon nanotubes (SWNTs) are made hydrophyllic through coating and wrapping with short segments of single-stranded DNA (ssDNA) containing alternating guanine (G) and thymine (T) units. Small-angle neutron scattering (SANS) measurements on dilute to semi-dilute aqueous suspensions of these colloidal SWNTs raise interesting questions about the degree of nanotube dispersion, with power-law exponents suggestive of weak attractive interactions. The SWNT-ssDNA complexes also act as nanoparticle surfactant, stabilizing the interface between water and toluene, for example. We exploit this to make hydrophillic cross-linked polymer particles coated and stabilized by the ssDNA-SWNT complex. Near-infrared fluorescence microscopy demonstrates the band-gap fluorescence of these SWNT-coated particles, suggesting potential routes to novel platforms and applications. Light scattering and optical microscopy from index-matched suspensions of the SWNT-coated colloids are compared with similar measurements on colloids made with conventional surfactants.

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