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**Spectroscopic Investigations into the Redox Sorting of Carbon Nanotubes** JASON STREIT, National Institute of Standards and Technology, HUI GUI, University of Southern California, JEFFERY FAGAN, ANGELA HIGHT WALKER, National Institute of Standards and Technology, CHONGWU ZHOU, University of Southern California, MING ZHENG, National Institute of Standards and Technology — Charge-transfer reactions have been shown to alter the electronic structure of single-wall carbon nanotubes (SWCNTs) in a bandgap-dependent fashion. Such electronic modification shows great promise for chiral selective separations. This study investigates the role of redox chemistry in the aqueous two-phase extraction of SWCNTs. We demonstrate a multi-step oxidative extraction procedure to successfully separate SWCNTs both by semiconducting bandgap and metallicity. We propose that electron transfer between redox molecules and the nanotubes induces reorganization of the surfactant coating layer, which in turn affects the partitioning of the SWCNTs between the two different aqueous polymer phases. Spectroscopic measurements are applied to probe surfactant structure reorganization in different redox environments. We suggest that redox-induced modulation of the surfactant coating is a generally observed phenomenon in many different nanotube sorting processes which can be further controlled to improve separation reproducibility and purity.

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