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Efficient excitation energy transfer in single-walled carbon nanotube/porphyrin complexes JOHN P. CASEY, SERGEI M. BACHILO, R. BRUCE WEISMAN, Department of Chemistry, Rice University — A novel method for generating single-walled carbon nanotube (SWNT) excited states by energy transfer from porphyrin molecules is presented. Addition of SWNTs to a series of micelle suspended porphyrins results in efficient quenching of porphyrin fluorescence. Analysis of concentration-dependent porphyrin quenching reveals that intermolecular energy transfer is associated with complex formation. Two-dimensional excitation/emission spectroscopy demonstrates that photoexcitation of porphyrin absorption bands results in characteristic near-IR SWNT photoluminescence. The porphyrin/SWNT hybrid displays significantly shifted absorption and emission transitions as a result of strong electronic coupling between these two pi-conjugated systems. These interactions allow controllable tuning of SWNT transition energies. Complexation of SWNTs with organic photosensitizing molecules provides uniform excitation of a wide range of nanotube species in polydisperse samples using a convenient single excitation wavelength.

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