291v Investigation of DNA Hybridization on Individually Dispersed Single Walled Carbon Nanotubes

Esther S. Jeng and Michael S. Strano

Near infrared fluorescent optical sensors have the potential to be used in biological applications due to the low absorption of blood and tissue at this wavelength range. Individual semiconducting single walled carbon nanotubes (SWNT) are excellent candidates for optical sensors because they fluoresce at near infrared wavelengths, are sensitive to adsorption at the surface and are not susceptible to photobleaching. SWNT can be individually dispersed by adsorbing molecules to the nanotube surface in solution. DNA has been shown to adsorb strongly to the surface of nanotubes resulting in a stable suspension. We investigated and observed the hybridization of DNA with its complement on the surface of the nanotube while maintaining colloidal stability. We monitored the fluorescence signal of the DNA-SWNT while introducing the complement in order to detect any optical modulation due to the hybridization event. We also studied the optical signal of the DNA-SWNT with the addition of molecules that are known to change the conformation of DNA and can interact with the surface of the nanotube.