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Optical Anisotropy of Aligned Single Wall Carbon Nanotubes JEFFREY A. FAGAN, BARRY J. BAUER, IDAN MANDELBAUM, MATTHEW L. BECKER, ERIK K. HOBBIE, NIST — The optical properties of single wall carbon nanotubes (SWCNTs) are of significant importance for a variety of applications, particularly for fractions containing well defined tube lengths and chiralities. In this work, stable suspensions of DNA wrapped SWCNTs were mechanically aligned by dispersing them in amorphous polymer films, and their intrinsic optical anisotropy measured through a combination of polarized light spectroscopy, polarized Raman spectroscopy, and small-angle neutron scattering (SANS). Conventional measures of nematic alignment in the stretched polymer films typically varied from 0.7 to 0.9. The quality of the nanotube dispersion within the centimeter scale polymer film samples was also directly investigated by means of atomic force and electron microscopy. We obtain the intrinsic optical anisotropy of the SWCNTs over a broad range of photon energies, with a number of well-resolved absorption peaks corresponding to specific SWCNT chiralities.

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