

Abstract Submitted
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Anisotropic polarizability of single wall carbon nanotubes measured via the electro-optical effect JEFFREY A. FAGAN, BARRY J. BAUER, ERIK K. HOBBIE, NIST — The electro-optical response of 400 nm long single wall carbon nanotubes (SWNTs) suspended in water with single stranded DNA was measured in response to high frequency electric fields. Specifically, the dichroism of the SWNTs at their chirality dependent optical transitions was recorded, allowing for calculation of the induced alignment of the SWNTs by the applied field. The anisotropic polarizability of an individual SWNT chirality can be clearly assigned from this data. Strong alignment with nematic order parameters above 0.5 was achieved at high field strengths. We find anisotropic polarizabilities a factor of five larger than that previously measured for gold colloidal rods and an order of magnitude larger than that previously measured for tobacco mosaic virus (TMV). The characterization of the anisotropic polarizability is a large step towards exploiting this property for the directed manipulation of specific nanotubes.

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