Spectroscopy and Single-Molecule Emission of a Fluorene-Terthiophene Oligomer

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Abstract

We study the thiophene-based oligomer poly[2,7-(9,9-bis(2′-ethylhexyl)fluorene)-alt-2,5-terthiophene] (PF3T) in solution and when dispersed at low concentration into a polynorbornene matrix. We find that at high concentration in solution the 0–0 electronic transition observed in fluorescence is suppressed, a result indicative of the formation of weakly coupled H-aggregates. At low concentration in a polymer matrix, emission from both single molecules and molecular aggregates is observed. We find that the fluorescence spectra of most PF3T emitters are composed of a number of relatively narrow emission features, indicating that the emission usually occurs from multiple chromophores. A small number of PF3T molecules are however characterized by single chromophore emission, spectral blinking, and narrowed emission peaks.

Published In: Journal of Physical Chemistry B