

Titre: “Fluorescence Anisotropy Based on Highly Polarized Emitting Dyes Confined inside BNNTs”

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Résumé :

Polarized fluorescence emission of nanoscale emitters has been extensively studied in photonics with increasing impact in advanced fields such as bioimaging, display and communication. Extending the polarization properties in compact and large emitters assemblies is, however, extremely challenging due to depolarization and quenching effects induced by self-aggregation and random dipolar orientation. Here we demonstrate a highly polarized fluorescence from α -sexithiophene (6T) molecules encapsulated inside a boron nitride nanotube (6T@BNNT). Experiments on many 6T@BNNTs indicate that a polarization extinction ratio as high as 700 can be obtained from individual nanohybrids at room temperature. Using ac-HRTEM, we then correlate the fluorescence anisotropy with the alignment of hundreds of encapsulated 6T molecules relative to nanotube main axis and show that this alignment is driven by competing intermolecular vs. molecular/nanotube interactions. Last, transparent and flexible thin films of PMMA mixed with 6T@BNNTs are prepared and show strong enhancement of the fluorescence anisotropy after stretching. This work demonstrates that these nanohybrids can operate as efficient nano emitters ensuring dipolar alignment and stabilization for polarized light emission at nanoscale but also at macroscale. This work led to a possible new organization of molecules inside BNNTs, which I am currently investigating...