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**MULTI-MODES WAVEGUIDING PROPERTY IN ORGANIC NANOWIRE-
QUANTUM DOTS HYBRID SYSTEM AND CHARGE TRANSFER BETWEEN D-A
HETEROJUNCTION USING A COAXIAL NANOWIRE**

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The multi-modes delivery system of photon from organic nanowire (NW) and quantum dots (QDs) was realized using 1,4-bis(3,5-bis(trifluoromethyl)styryl)-2,5-dibromobenzene (TSDB) NW and CdSe/ZnS coreshell QDs. For hybrid nanostructures, the attached area of QDs on the NW was precisely controlled and a laser confocal microscope PL spectra were measured at different positions on the TSDB-QDs hybrid NW. The guiding emission color of TSDB-QDs NW was changed by optical properties of QDs and the results were analyzed by energy transfer effect between TSDB NW and QDs.

**INFLUENCE OF FULLERENE INTERCALATION ON POLYMER STRUCTURE:
A THEORETICAL INVESTIGATION OF THE IMPACT ON
THE ELECTRONIC PROPERTIES**

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Fullerene intercalation amongst the polymer side chains can substantially influence the device performance in polymer-based bulk-heterojunction solar cells. The structure-property relationships of poly(2,5-bis(3-tetradecyl thiophene-2-yl)thieno[3,2-b]thiophene) (PBTTT-C14) in the absence / presence of phenyl-C71-butyric acid methyl ester (PC71BM) were examined through a series of theoretical calculations. Molecular mechanics and molecular dynamics simulations were carried out to obtain molecular packing configurations that were then used in the simulation of 2D X-ray diffraction patterns for direct comparison to experiment. Quantum-chemical calculations were performed to evaluate the electronic properties of the model structures.