Organic-Inorganic Nanocomposites via Directly Grafting Conjugated Polymers onto Quantum Dots ZHIQUN LIN, Iowa State University, JUN XU, JUN WANG, MIKE MITCHELL, PRASUN MUKHERJEE, MALIKA JEFFRIES-EL, JACOB W. PETRICH, Iowa State University — Nanocomposites of poly(3-hexylthiophene)-cadmium selenide (P3HT-CdSe) were synthesized by directly grafting vinyl terminated P3HT onto [(4-bromophenyl)methyl]dioctylphosphine oxide (DOPO-Br)-functionalized CdSe quantum dot (QD) surfaces via a mild palladium-catalyzed Heck coupling, thereby dispensing with the need for ligand exchange chemistry. The resulting P3HT-CdSe nanocomposites possess a well-defined interface, thus significantly promoting the dispersion of CdSe within the P3HT matrix and facilitating the electronic interaction between these two components. The photophysical properties of nanocomposites were found to differ from the conventional composites in which P3HT and CdSe QDs were physically mixed. Solid-state emission spectra of nanocomposites suggested the charge transfer from P3HT to CdSe QDs, while the energy transfer from 3.5-nm CdSe QD to P3HT was implicated in the P3HT/CdSe composites. A faster decay in lifetime further confirmed the occurrence of charge transfer in P3HT-CdSe nanocomposites.

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