

Self-assembly of Amphiphilic Conjugated Oligomeric Species for Organic Electronics

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The interest in solution-processible organic electronics, such as light-emitting diodes, field-effect transistors, solar cells and electrochromic devices, has been driven by the design and synthesis of new organic materials, spanning from small molecules and short-chain oligomers to long-chain polymers. Due to their well-defined molecular structure, and therefore well-determined optical and electronic properties, oligomeric species have been increasingly applied as functional materials in these devices. Compared to their corresponding polymers, however, oligomers frequently lack the desired mechanical properties coming from entanglements of macromolecular chains. Here, we report on a series of DPP-based (Diketo-Pyrrolo-Pyrrole) oligomers that contain three functional segments, namely a conjugated building block, hydrophilic hydrogen-bonded motifs and hydrophobic solubilizing groups. This set of oligomers demonstrates great versatility and potentials for organic electronics, resulting from tunable energy levels and gaps, solution processability and material properties.