Development of Organic Functional Materials for Optoelectronic Applications

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Forced planarization by covalently fastening adjacent aromatic units in the conjugated backbone strengthens the parallel p-orbital interactions to elongate effective conjugation length and facilitate electron delocalization, providing an effective way to reduce the band gap and enhances the intrinsic charge mobility. Over the past few years, we have devoted to develop various multifused ladder-type structures with tunable properties and functions. Ladder-type building blocks can be further end-capped with two acceptors to form a new class of n-type nonfullerene acceptors to achieve high power conversion efficiencies of organic photovoltaics.[1-4] Meanwhile, additive using pentafluorophenyl supramolecular interactions to modulate the morphology of Y6:PM6 active layer has led to enhanced efficiency and stability.[5] Finally, synthesis and characterization of sequence-controlled alternating block polychalcogenophenes and transistors for bromine detection will be revealed.

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