

Terminal alkylated D-A-D type linear chromophore for solution-processed organic solar cells

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Recently, thiazolothiazole unit based organic molecules exhibits high electron accepting tendency due to the presence of imine backbone and fused ring system. It is highly stable oligomer which increases the rigidity and co-planarity of the oligomeric backbone. Thiazolothiazole as acceptor moiety has much importance for the designing of D-A-D or A-D-A type oligomers because it shows the good photoactive properties for solution processed SMOSCs. In this paper, terminal alkylated linear chromophore (RTzR) featuring thiazolothiazole-core (acceptor) and terminal alkylated-thiophenes (donor) is designed and synthesized as photoactive material for solution-processed organic solar cells. The terminal alkyl units at both ends of chromophore have significantly improved its solubility and also induce liquid crystalline property with absorbance in the visible region of solar spectrum. The film morphology of active layer blend plays an important role for the performance of the devices. The fabricated bulk-heterojunction (BHJ) solar cell devices show a reasonable power conversion efficiency of ~1.57% with high photocurrent density of ~7.85 mA/cm².