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# Perylenediimide-thiophene based polymer acceptors for solution-processed all polymer bulk hetro-junction solar cells

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**Abstract:**Perylenediimide (PDI) and thiophene/bithiophene based polymers such as P-T-PDI-H and P-BT-PDI-H were designed and synthesized by Suzuki coupling method. The polymers exhibited excellent thermal stability with decomposition temperatures of >300 °C with broad and strong absorption in the visible region (300-800 nm). These two polymers showed highest occupied molecular orbital levels of -5.38 and -5.37 eV and lowest unoccupied molecular orbital levels of -3.90 eV, respectively. The non-fullerene PDI polymer acceptor based device, without thermal annealing afforded a maximum power conversion efficiencies of 0.11% and 0.06%, respectively with P3HT polymer donor.

**Keywords :**Perylene, Suzuki coupling, low band gap, Organic solar cells.