

Novel benzothiadiazole-derivative for application in small molecule organic solar cells

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The thin film solar cells based on solution-processed organic semiconductors have attracted remarkable interest as an alternative to the conventional, inorganic photovoltaic technologies. The organic solar cell devices have the merits as low weight and flexibility, easy conversion into other products, significantly low costs and low environmental impact during synthesis and operations. Benzothiadiazole-based small molecules have shown great applications in various fields as solar cells, organic light emitting diode, organic field effect transistors owing to the strong electron-accepting tendency, high absorption properties and low optical band. In this work, novel benzothiadiazole-based organic semiconductor was synthesized via Suzuki coupling and applied as electron-donor materials for the solution-processed fabrication of small molecule organic solar cells. The small molecule displays strong absorption and electrochemical properties owing to presence of terminal -CF<sub>3</sub> moieties. The fabricated devices attained performance of ~3.52% for CF-BTz-ThR: PCBM (1:3, w/w) ratio with the short circuit current density (JSC) of ~10.38 mA/cm<sup>2</sup> and the open-circuit voltage (VOC) of ~0.68 V.