Benzodithiophene-based Narrow-band Gap Donor Materials for Organic Polymer Solar Cells

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Abstract

Organic solar cell (OSC) devices provide a promising way to utilize the solar energy efficiently while maintaining low cost.[1] The design and characterization of larrow band gap conjugated polymers as electron donor materials for bulk heterojunction solar cell applications have attracted significant attention during the past decade.[2] A series of new donor-acceptor conjugated small molecules incorporating benzodithiophene as the electron donating unit have designed and synthesized in solar cells with phenanthrothiadiazole(PT) as an electron accepting unit. The DBDTPT and DBDTMBI, were synthesized by stille reaction and evaluated in OPVs. The DBDTPT shows absorption band with maximum peak at about 361 nm in solution. The HOMO and LUMO levels of DBDTPT were exhibited at -5.46 and -3.65 eV, respectively. The small molecule has good thermal stability. The HOMO–LUMO energy bandgaps of this material shows 1.81 eV for DBDTPT.

References

[1] Thompson, B. C.; Frechet, J. M. J., Angew. Chem., Int. Ed., **47** (2008) 58
[2] Cheng, Y. J.; Yang, S. H.; Hsu, C. S., Chem. Rev., **109** (2009), 5868.

Figures