

## Supporting Information

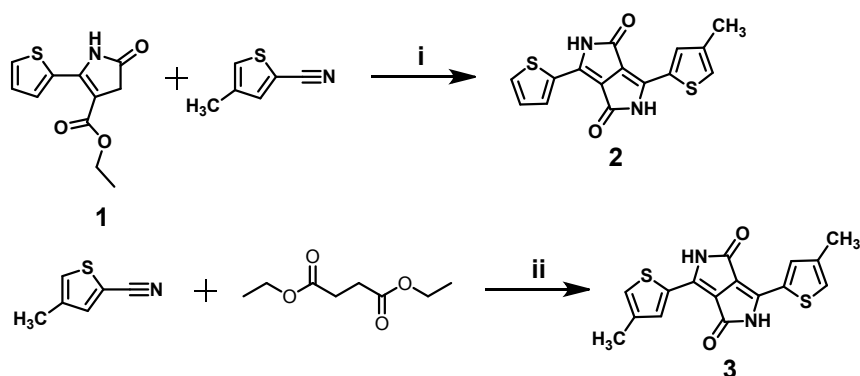
# Enhancing the Photovoltaic Performance of Binary Acceptors-based Conjugated Polymers Incorporating Methyl Units

Guitao Feng,<sup>a,b</sup> Yunhua Xu,<sup>\*a</sup> Yang Wu,<sup>c</sup> Cheng Li,<sup>b</sup> Fan Yang,<sup>b</sup> Yaping Yu,<sup>b</sup> Wei Ma<sup>\*c</sup> and Weiwei Li<sup>\*b</sup>

<sup>a</sup> Department of Chemistry, School of Science, Beijing Jiaotong University, Beijing 100044, P. R. China. [yhxu@bjtu.edu.cn](mailto:yhxu@bjtu.edu.cn).

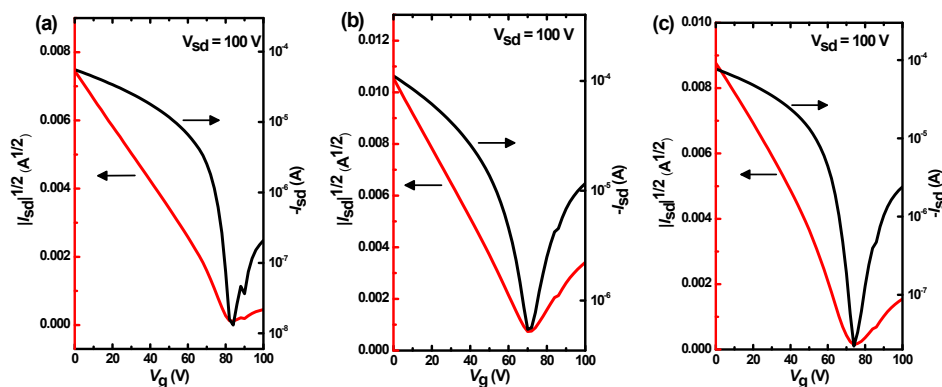
<sup>b</sup> Beijing National Laboratory for Molecular Sciences, CAS Key Laboratory of Organic Solids, Institute of Chemistry, Chinese Academy of Sciences, Beijing 100190, P. R. China. E-mail: [liweiwei@iccas.ac.cn](mailto:liweiwei@iccas.ac.cn)

<sup>c</sup> State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University, Xi'an 710049, P. R. China. E-mail: [msewma@xjtu.edu.cn](mailto:msewma@xjtu.edu.cn)



**Scheme S1.** The synthetic procedures for the starting compound **2** and **3**. (i) sodium/FeCl<sub>3</sub> in 2-methyl-2-butanol at 95 °C, 2 h; **1** was added and 4-methylthiophene-2-carbonitrile was added dropwise at 120 °C; reflux at 120 °C, 3 h.

(ii) sodium/FeCl<sub>3</sub> in 2-methyl-2-butanol at 95 °C, 2 h; 4-methylthiophene-2-carbonitrile was added and diethyl succinate was added dropwise at 120 °C; reflux at 120 °C, 3 h.

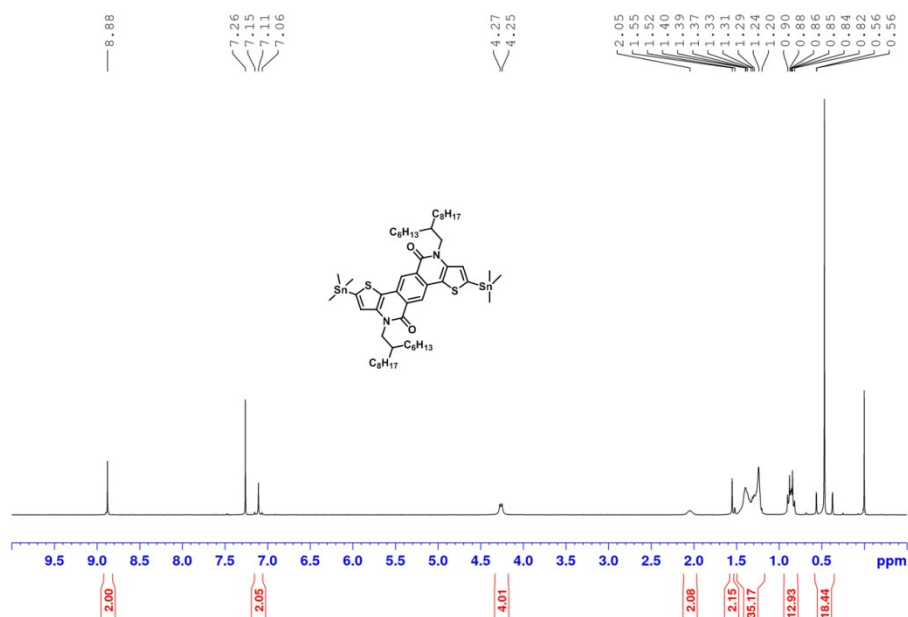


**Fig. S1** Transfer curves obtained from BGBC FET devices for n-type characteristics. (a) for DPP2TPCL; (b) for PMDPP2TPCL and (c) for P2MDPP2TPCL. The thin films were spin cast from CHCl<sub>3</sub>/o-DCB (10%) solution and annealed at 120 °C for PDPP2TPCL and P2MDPP2TPCL, and 150 °C for PMDPP2TPCL.

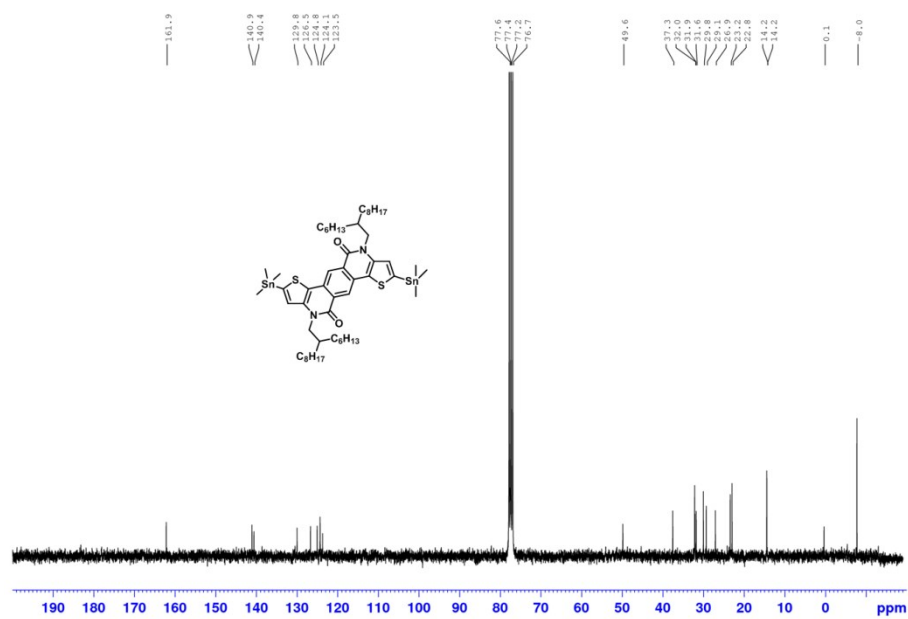
**Table S1.** Field-effect electron mobilities of the polymers in a BGBC configuration.

Polymer	$\mu_e$ (cm <sup>2</sup> V <sup>-1</sup> s <sup>-1</sup> )	$V_T$ (V)	$I_{on}/I_{off}$
PDPP2TPCL <sup>a</sup>	0.01	84.8	$1.6 \times 10^1$
PMDPP2TPCL <sup>b</sup>	0.07	64.3	$2.1 \times 10^1$
P2MDPP2TPCL <sup>a</sup>	0.03	74.5	$1.1 \times 10^2$

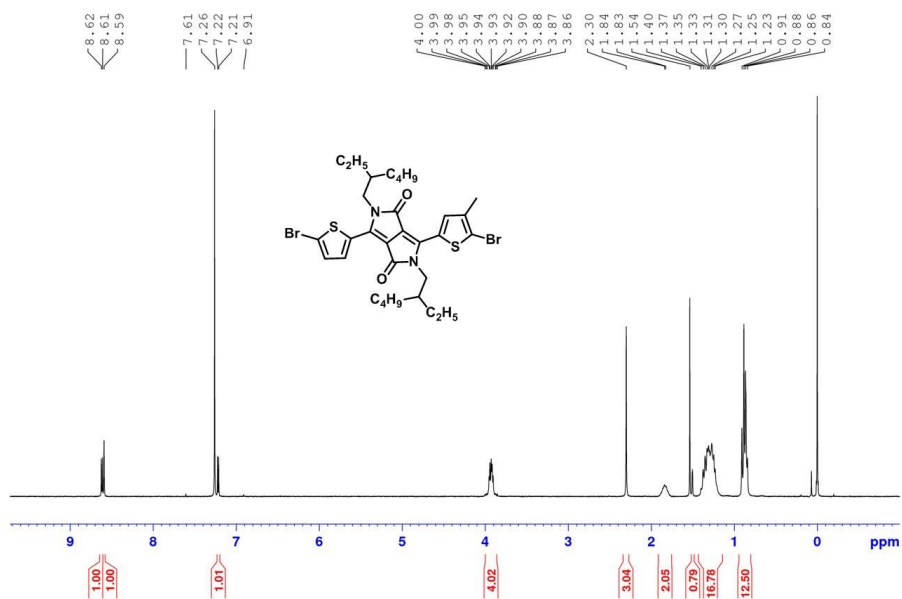
<sup>a</sup> Thermal annealed at 120 °C. <sup>b</sup> Thermal annealed at 150 °C. The polymer thin films were spin coated from CHCl<sub>3</sub>/o-DCB (10%).



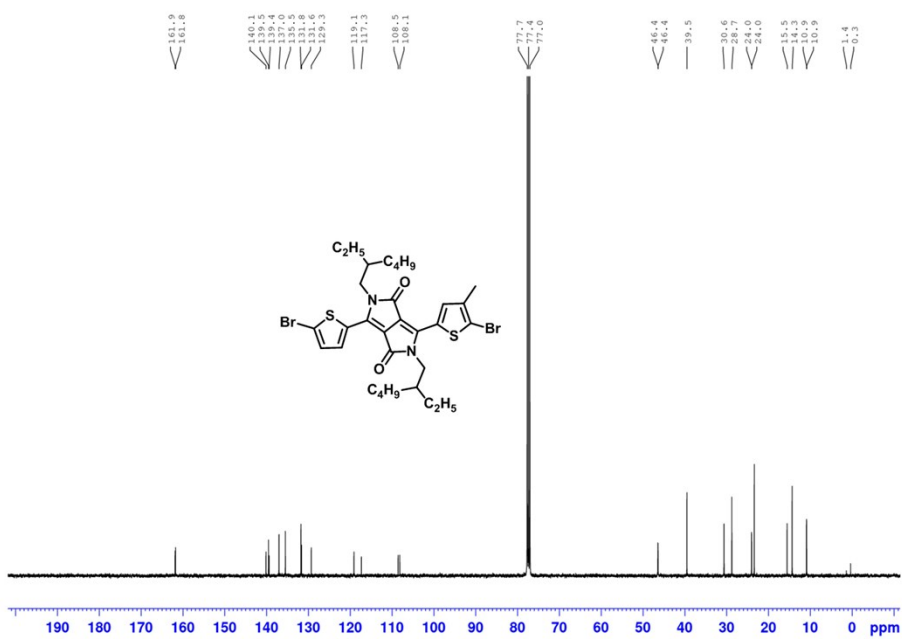
**Figure S2.** <sup>1</sup>H-NMR of the monomer **M1** recorded in CDCl<sub>3</sub>.



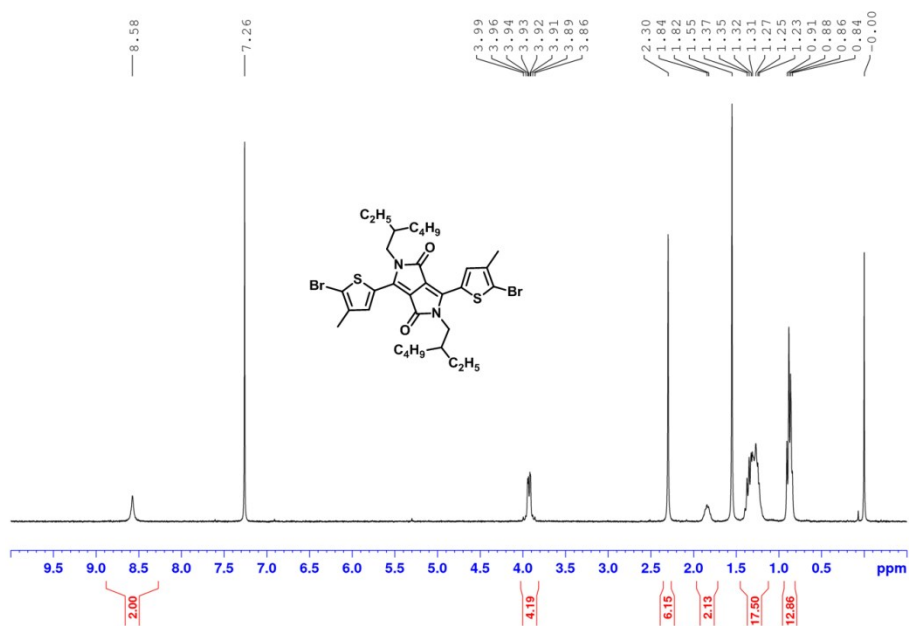
**Figure S3.** <sup>13</sup>C-NMR of the monomer **M1** recorded in CDCl<sub>3</sub>.



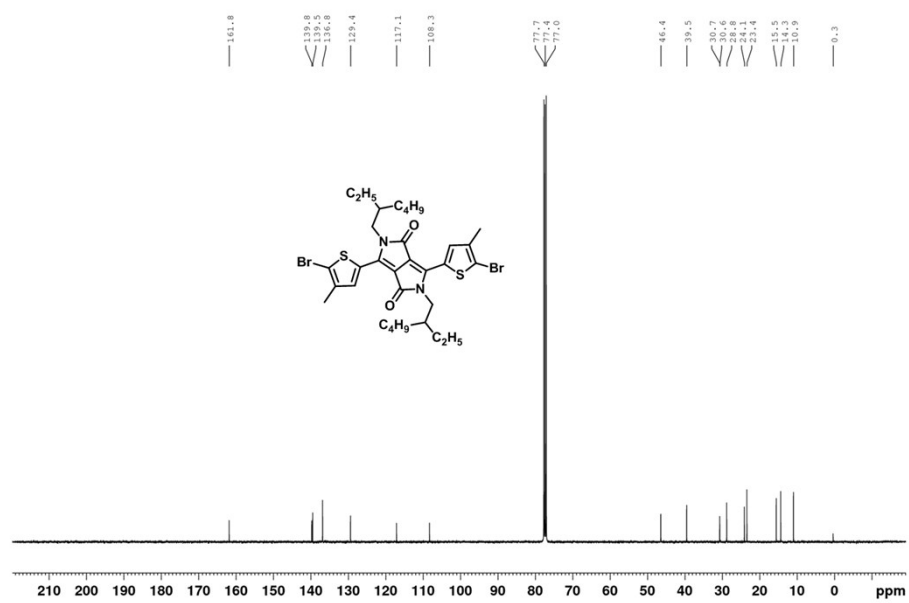
**Figure S4.**  $^1\text{H-NMR}$  of the monomer **M3** recorded in  $\text{CDCl}_3$ .



**Figure S5.**  $^{13}\text{C-NMR}$  of the monomer **M3** recorded in  $\text{CDCl}_3$ .



**Figure S6.** <sup>1</sup>H-NMR of the monomer **M4** recorded in CDCl<sub>3</sub>.



**Figure S7.** <sup>13</sup>C-NMR of the monomer **M4** recorded in CDCl<sub>3</sub>.