

## Supplementary Information

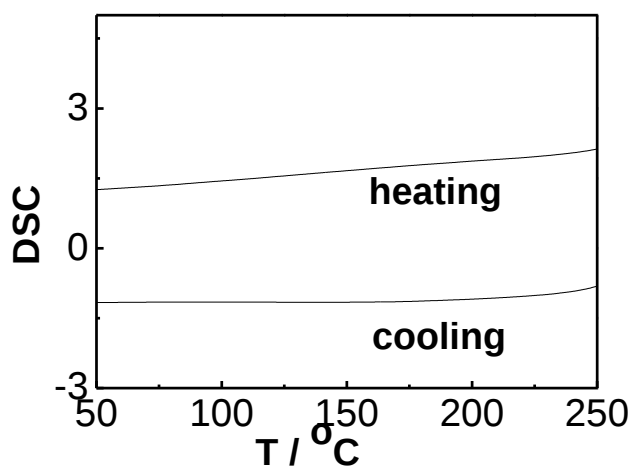
### Design, synthesis and photovoltaic properties of a new D- $\pi$ -A polymer with extended $\pi$ -bridge units

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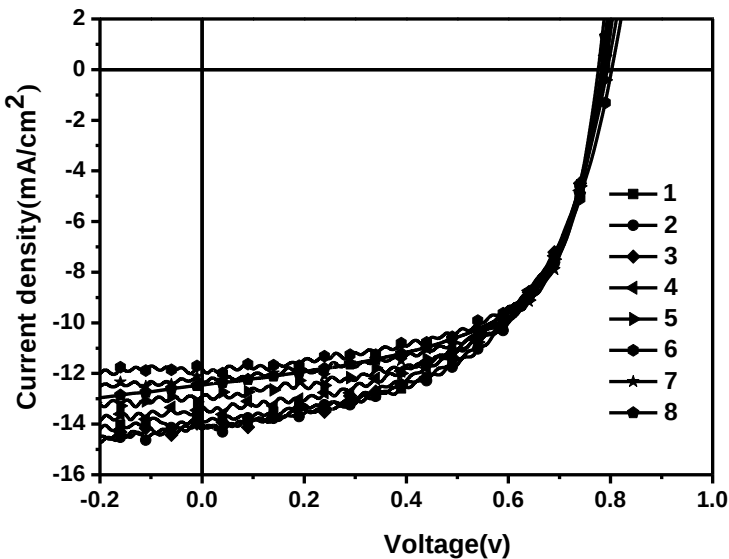


**Figure S1** the DSC plot of **PBDTT-DTTBT**

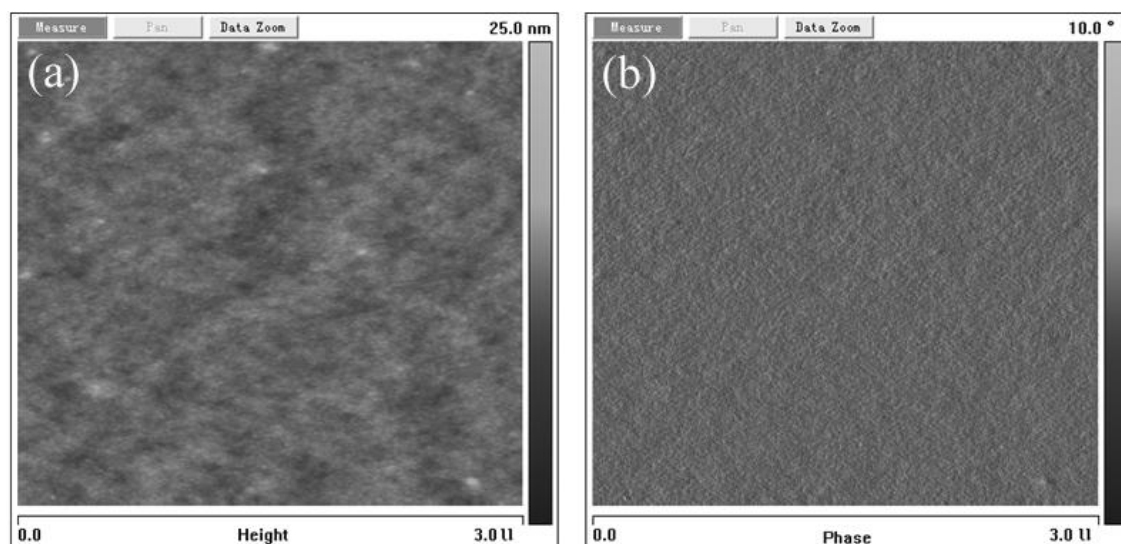
**Table S1.** Photovoltaic properties of the PSCs based on **PBDTT-DTTBT/PC<sub>70</sub>BM**

(1:1, w:w) under illumination of AM 1.5G, 100 mW/cm<sup>2</sup>.

| D:A ratio | V <sub>oc</sub><br>(V) | J <sub>sc</sub><br>(mA/cm <sup>2</sup> ) | FF<br>(%) | PCE<br>(%) |
|-----------|------------------------|------------------------------------------|-----------|------------|
| 1         | 0.79                   | 13.93                                    | 54.1      | 5.95       |
| 2         | 0.78                   | 13.78                                    | 56.0      | 6.02       |
| 3         | 0.79                   | 14.30                                    | 51.7      | 5.83       |
| 4         | 0.79                   | 13.21                                    | 52.2      | 5.77       |
| 5         | 0.79                   | 12.88                                    | 58.7      | 5.97       |
| 6         | 0.80                   | 11.79                                    | 60.6      | 5.72       |
| 7         | 0.78                   | 12.37                                    | 62.2      | 6.00       |
| 8         | 0.78                   | 12.46                                    | 62.0      | 6.03       |



**Figure S2.** J-V curves of the polymer solar cells based on **PBDTT-DTTBT/PC<sub>70</sub>BM(w:w,1:1)** under illumination of AM 1.5G, 100 mW/cm<sup>2</sup>.



**Figure S3.** AFM topography images (a) and phase contrast images (b) of **PBDTT-DTBT** /PC<sub>70</sub>BM (w/w, 1:1) film