

## **Efficient polymer solar cells based on a new benzo[1,2-*b*:4,5-*b'*]dithiophene derivative with fluorinated alkoxyphenyl side chain**

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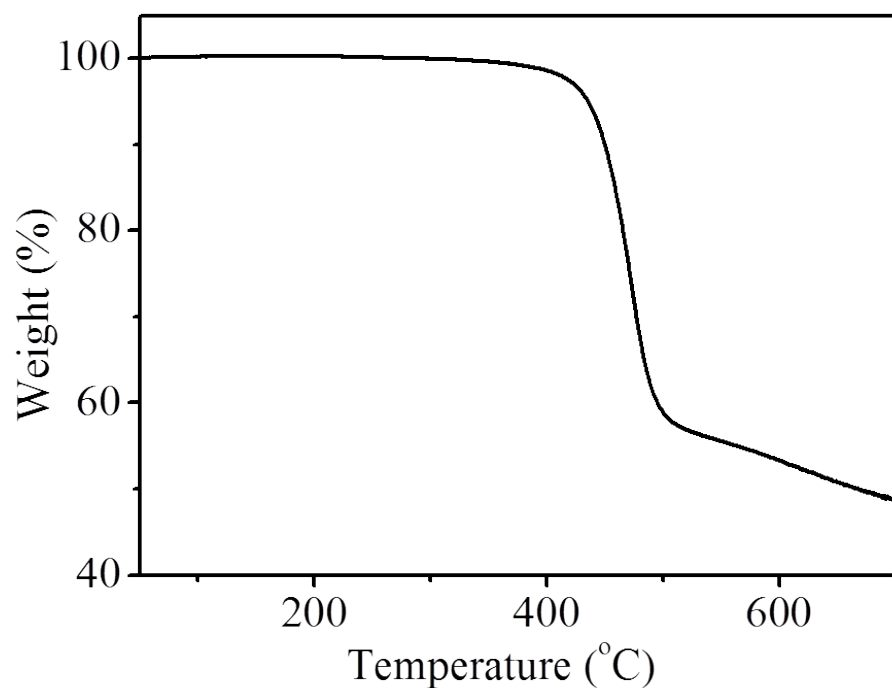


Fig. S1. TGA plot of PBDTPF-DTBT with a heating rate of  $10\text{ }^{\circ}\text{C min}^{-1}$  under inert atmosphere.

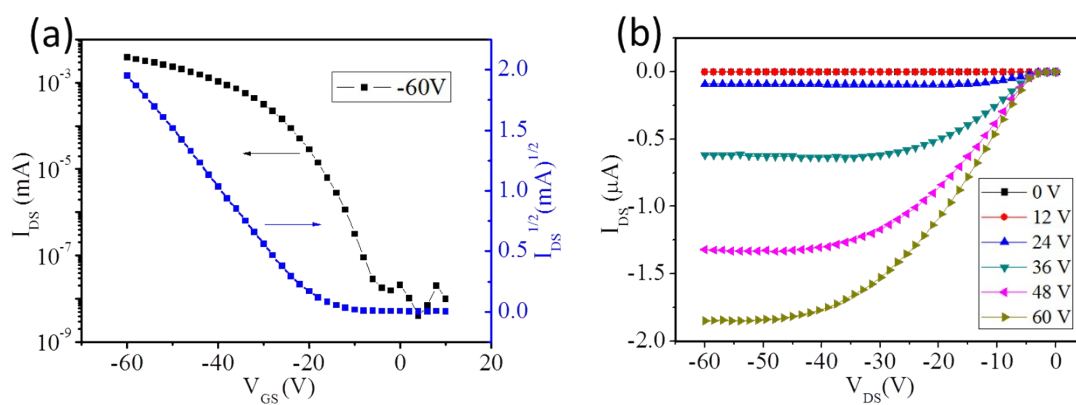


Fig. S2 (a) Transfer ( $V_{DS} = -60\text{ V}$ ) and (b) output characteristics for a typical PBDTPF-DTBT-based OTFT device.

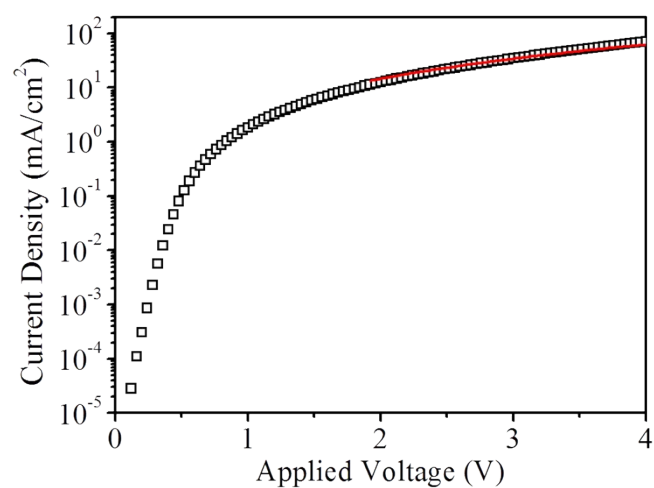


Fig. S3  $J$ - $V$  curves of vertical diode with the device structure of ITO/PEDOT:  
PSS/PBEDTPF-DTBT/Au

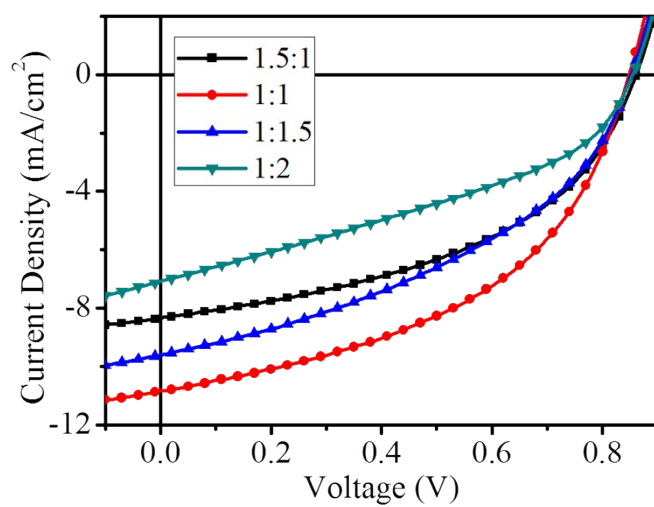


Fig. S4  $J$ - $V$  curves of devices with different ratio of PBDTPF-DTBT: PC<sub>71</sub>BM.

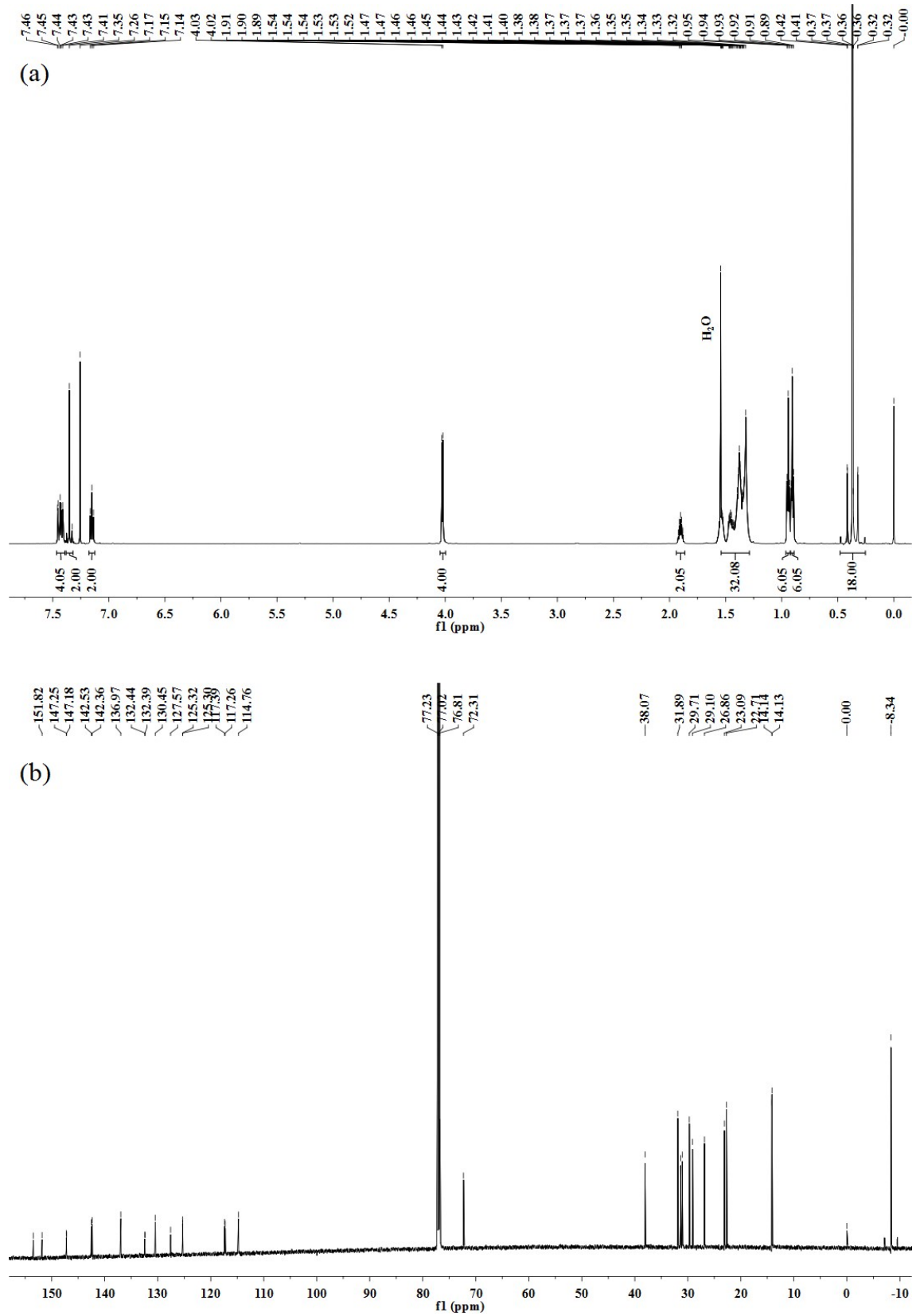


Fig. S5 (a)  $^1\text{H}$  NMR and (b)  $^{13}\text{C}$  NMR spectra of M1.