Supporting Information

A block copolymer enhances the efficiency of small-molecule bulk-heterojunction photovoltaics

Hsiu-Cheng Chen, Yu-Wei Su and Kung-Hwa Wei*

Table S1 Parameters of devices incorporating p-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM active layers spin-cast from chlorobenzene solutions containing different amounts of PS-*b*-PEO, with or without the additive DIO, drying for 30 min, and then heating at 80 °C for 10 min under an inert atmosphere to drive off residual solvent.

p-DTS(FBTTh2)2:PC71BM	Voc [V]	Jsc [mA cm–2]	FF [%]	η [%]
Control	0.80 ± 0.01	11.5 ± 0.13	36.9 ± 0.4	3.4 ± 0.11
PS-b-PEO (0.5wt%)	0.80 ± 0.02	12.7 ± 0.08	37.9 ± 0.3	3.8 ± 0.13
DIO-processed	0.78 ± 0.02	16.4 ± 0.07	54.7 ± 0.2	7.0 ± 0.12
0.1wt% PS-b-PEO (DIO)	0.77 ± 0.02	16.5 ± 0.11	48.6 ± 0.3	6.1 ± 0.10
0.5wt% PS-b-PEO (DIO)	0.76 ± 0.01	17.7 ± 0.12	50.9 ± 0.4	6.8 ± 0.11
1.0wt% PS-b-PEO (DIO)	0.77 ± 0.01	16.8 ± 0.10	43.9 ± 0.3	5.6 ± 0.13

V_{oc}: Open-circuit voltage; J_{sc}: short-circuit density; FF: fill factor ; η: power conversion efficiency.

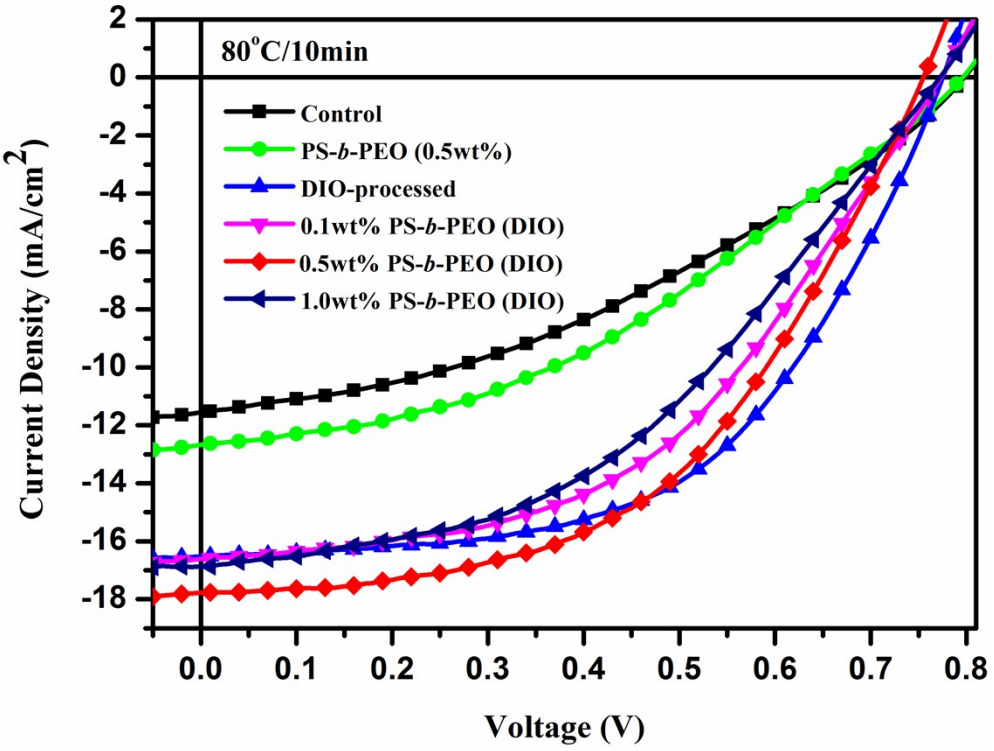

Fig. S1 J–V characteristics of inverted small-molecule solar cells incorporating p-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM active layers containing various weight fractions of PS-*b*-PEO, processed with and without the additive DIO, drying for 30 min, and then heating at 80 °C for 10 min under an inert atmosphere to drive off residual solvent.

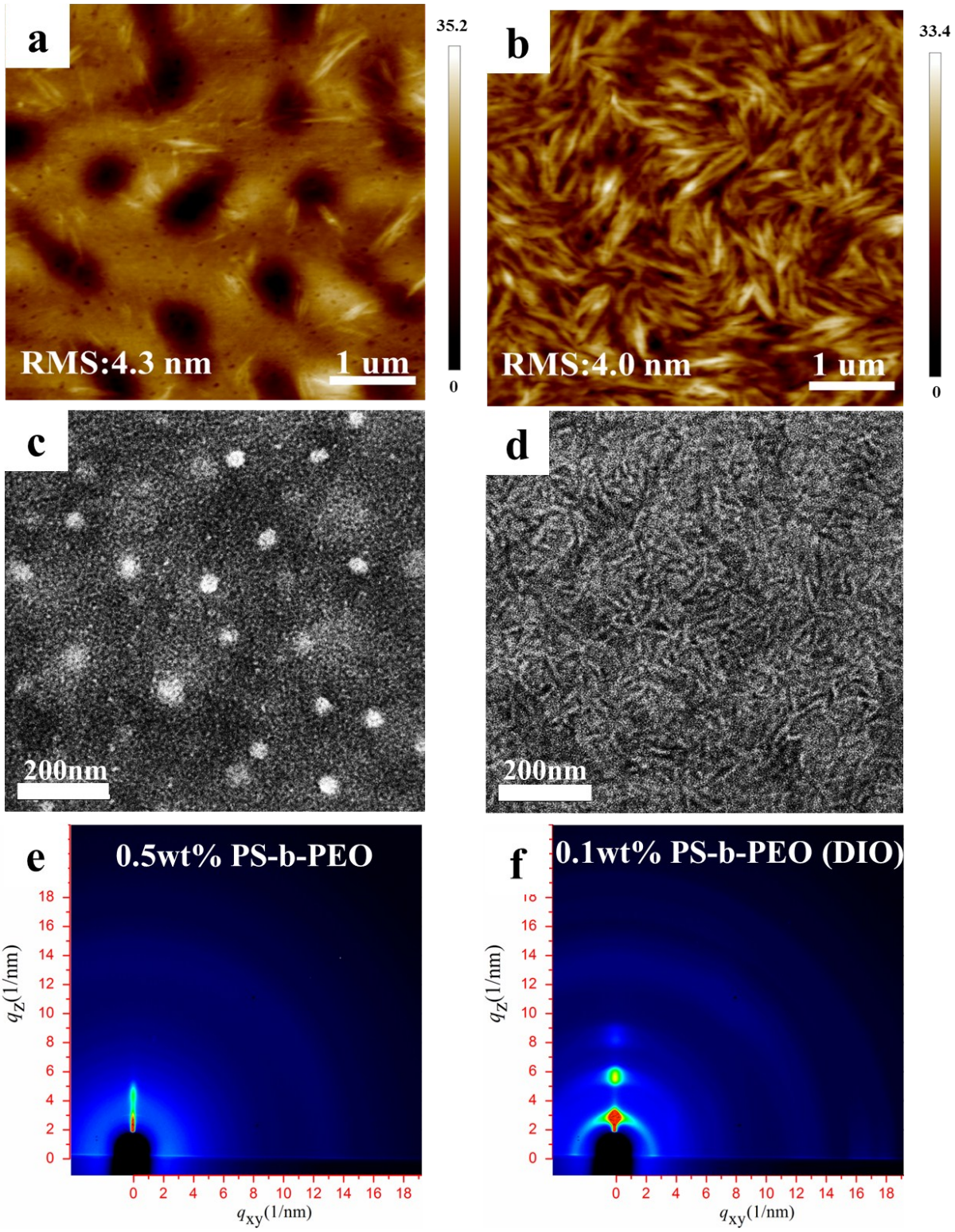

Fig. S2 (a–b) AFM topographic, (c–d) TEM images and (e–f) 2D GIWAXS patterns of p-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM films; (a, c, e) 0.5 wt % PS-*b*-PEO without DIO; (b, d, f) 0.1 wt % PS-*b*-PEO with DIO-process.

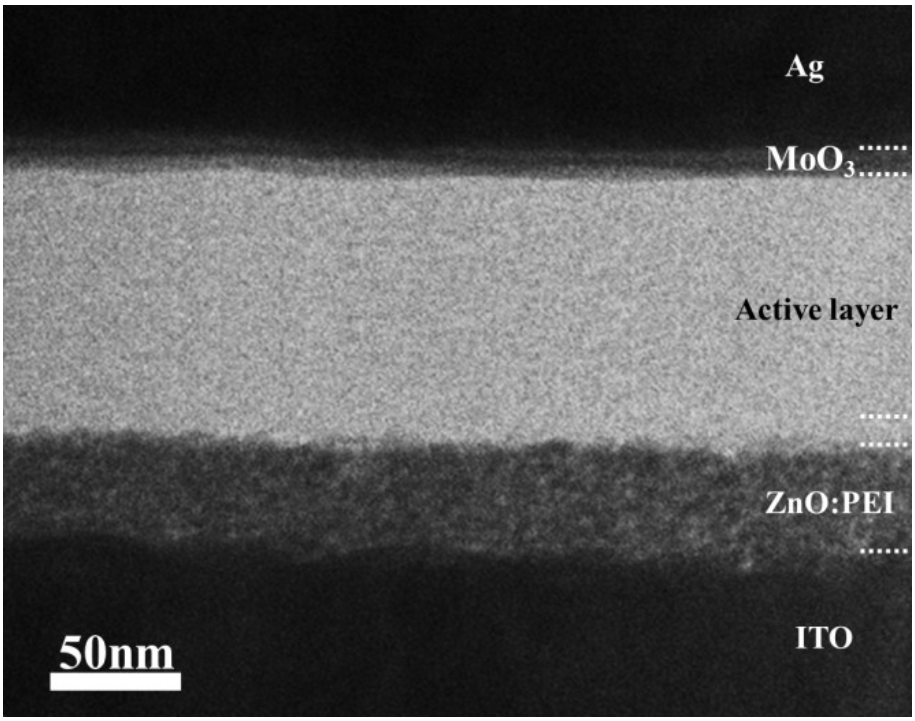

Fig. S3 The high-resolution TEM image of the cross-sectional area of the ITO/ZnO:PEI/p-DTS(FBTTh$_2$)$_2$:PC$_{71}$BM(1.5: 1, w:w):PS-*b*-PEO (0.5 wt %)/MoO_3/Ag inverted solar cell device structure.

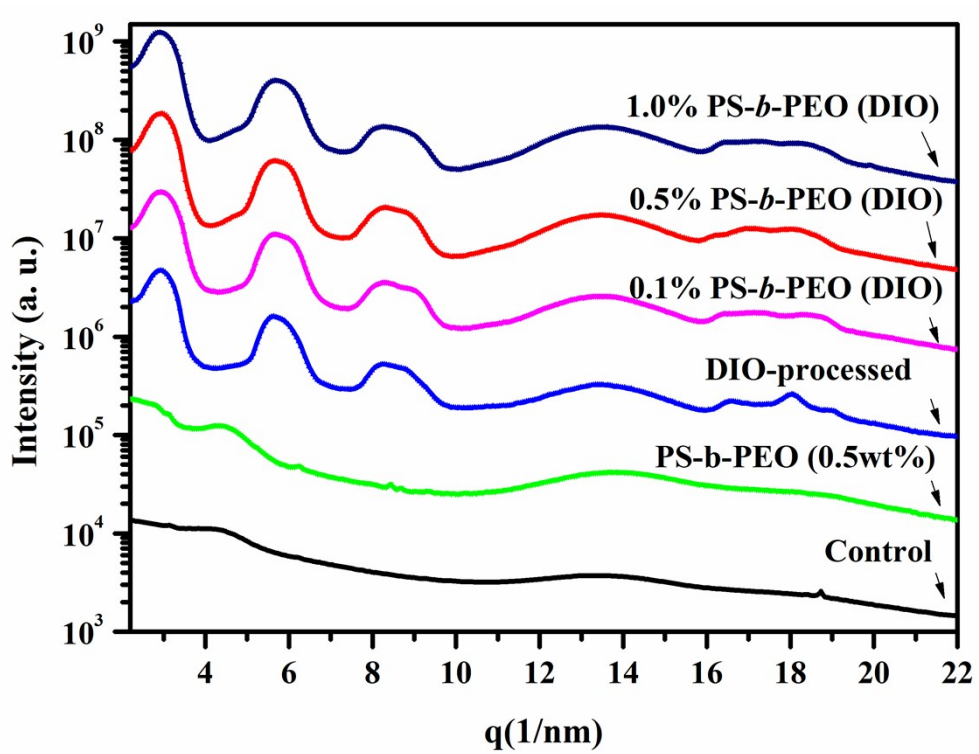

Fig. S4 GIWAXS out-of-plane profiles of control; 0.5 wt % PS-*b*-PEO; DIO-processed; 0.1 wt % PS-*b*-PEO (DIO); 0.5 wt % PS-*b*-PEO (DIO); 1.0 wt % PS-*b*-PEO (DIO).

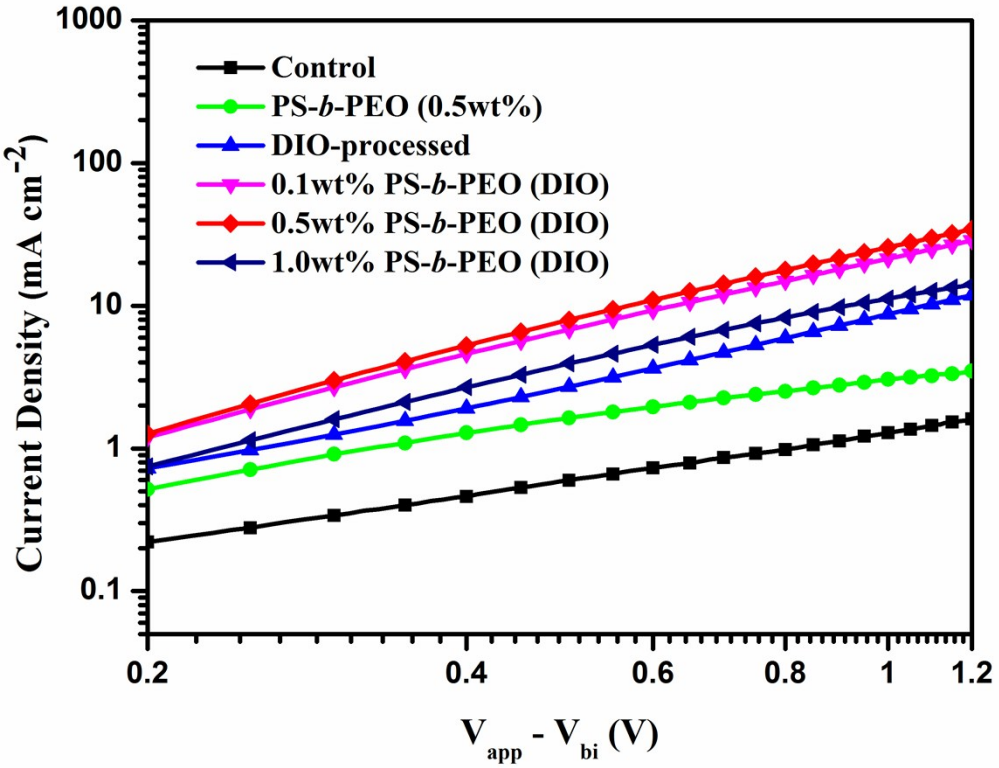

Fig. S5 Current density–electric field log-log plots for hole-only diodes (configuration: ITO/PEDOT:PSS/SMBHJ/MoO_3/Ag) containing films prepared with or without DIO and PS-*b*-PEO.