Supporting information

Cooperative Effects of Solvent and Polymer Acceptor Co-additives in P3HT:PDI Solar Cells: Simultaneous Optimization in Lateral and Vertical Phase Separation

Mingguang Li, Lei Wang, Jiangang Liu, Ke Zhou, Xinhong Yu, Rubo Xing, Yanhou Geng and Yanchun Han*

The electrochemical behaviors of EP-PDI and PCPDI

The electrochemical behaviors of EP-PDI and PCPDI were investigated by cyclic voltammetry (CV). CV experiments of the drop-casted films were performed on a CHI660b electrochemical workstation with a platinum (Pt) working electrode and Pt wire counter electrode at a scan rate of 50 mV/s against an Ag/AgCl reference electrode with an argon-saturated anhydrous solution of 0.1 mol/L n-Bu₄NClO₄. Ferrocene was used for potential calibration.

Surface energy of P3HT, EP-PDI and PCPDI

The surface energy (γ) of P3HT, EP-PDI and PCPDI were determined from a geometric mean equation using the contact angles of deionized water and ethylene glycol. The droplet volume was 2 μ L. The average contact angle value was obtained by measuring each sample at five different positions.

Figure captions

Fig. S1 a) Normalized absorption spectra and b) GIXD of the P3HT:EP-PDI (1:1wt/wt) blend films prepared by using different concentrations of CN in CB solution.

Fig. S2 Current density-Voltage curves of P3HT:EP-PDI (1:1 wt/wt) blend solar cells fabricated with different

concentrations of CN additive.

Fig. S3 Current density-Voltage curves of P3HT:EP-PDI:PCPDI ternary-blend solar cells fabricated with different

blend ratios.

Fig. S4 Cyclic voltammograms of EP-PDI and PCPDI drop-casted films

Table caption

Table S1 Contact angle (CA) measurements of active layer/air interface for pure P3HT, pure EP-PDI and pure

PCPDI films, respectively.





Fig. S3







Sample	Solvent	CA (degree)					Average CA (degree)	Surface energy (mN m ⁻¹)
РЗНТ	Water	99.4	99.6	100.2	99.7	99.1	99.6	26.35
	Ethylene glycol	73.5	71.0	74.9	72.5	70.1	72.4	
EP-PDI	Water	75.2	76.3	74.6	72.4	75.0	74.7	50.40
	Ethylene glycol	28.1	23.7	27.5	26.2	29.5	27.0	
PCPDI	Water	98.9	96.5	96.2	99.0	98.9	97.9	25.01
	Ethylene glycol	73.2	71.5	74.8	71.0	70.1	72.1	