Supporting Information

Understanding the Morphology of High-performance Solar Cells Based on a Low Cost Polymer Donor

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Table S1 Charge transport properties of PTQ10 based devices

Sample Number[a]	μ_h ($\times 10^{-4}$ cm^2 V^{-1} s^{-1})	μ_e ($\times 10^{-4}$ cm^2 V^{-1} s^{-1})	μ_e/μ_h	Charge dissociation probability[b]
1	0.381	4.94	13.0	96.0%
2	1.53	6.76	4.42	98.2%
3	0.178	4.80	27.0	95.2%
4	0.840	6.11	7.27	95.8%
5	0.956	1.11	1.17	87.2%
6	1.13	1.84	1.62	97.4%

[a]Sample numbers that correspond to the devices are the same as that shown in **Table 1** in the main manuscript.

[b]Under the short-circuit conditions.

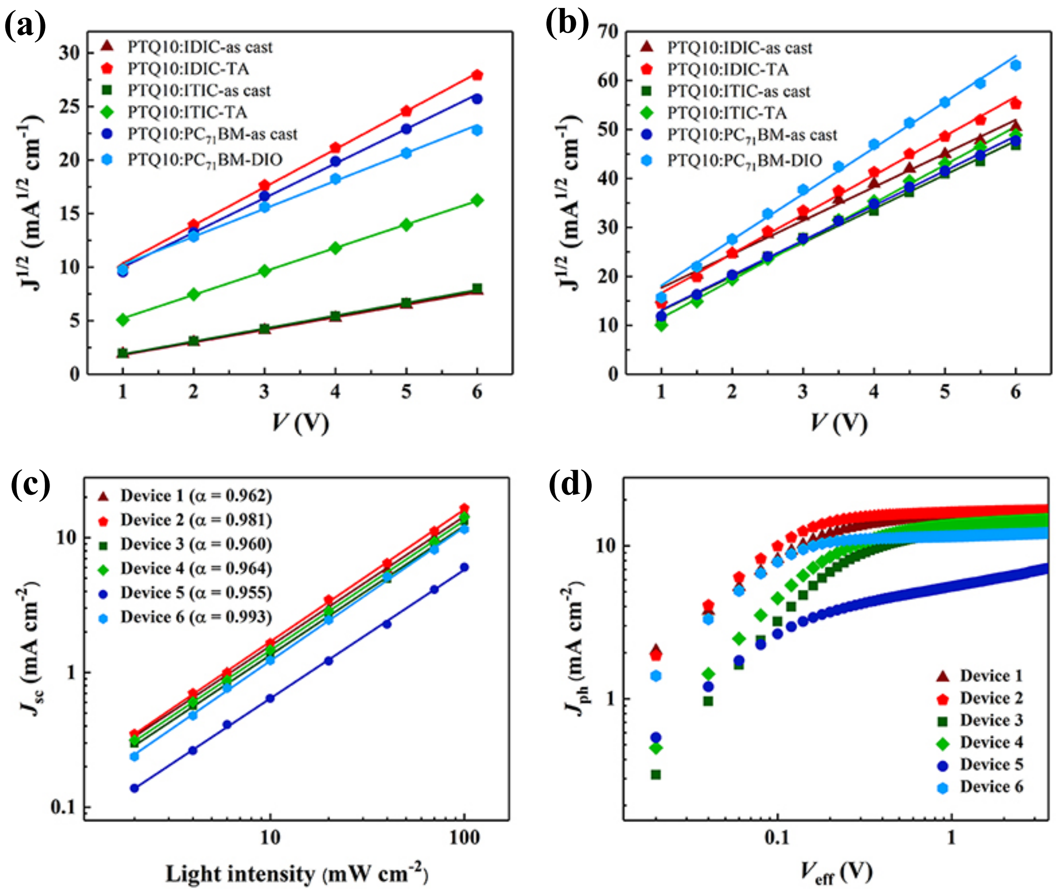

Figure S1. $J^{1/2}$ vs. V plots of PTQ10 based hole-only devices (a) and electron-only devices (b). (c) J_{sc} dependence on light intensity and (d) J_{ph} vs. V_{eff} plots of PTQ10-based devices.

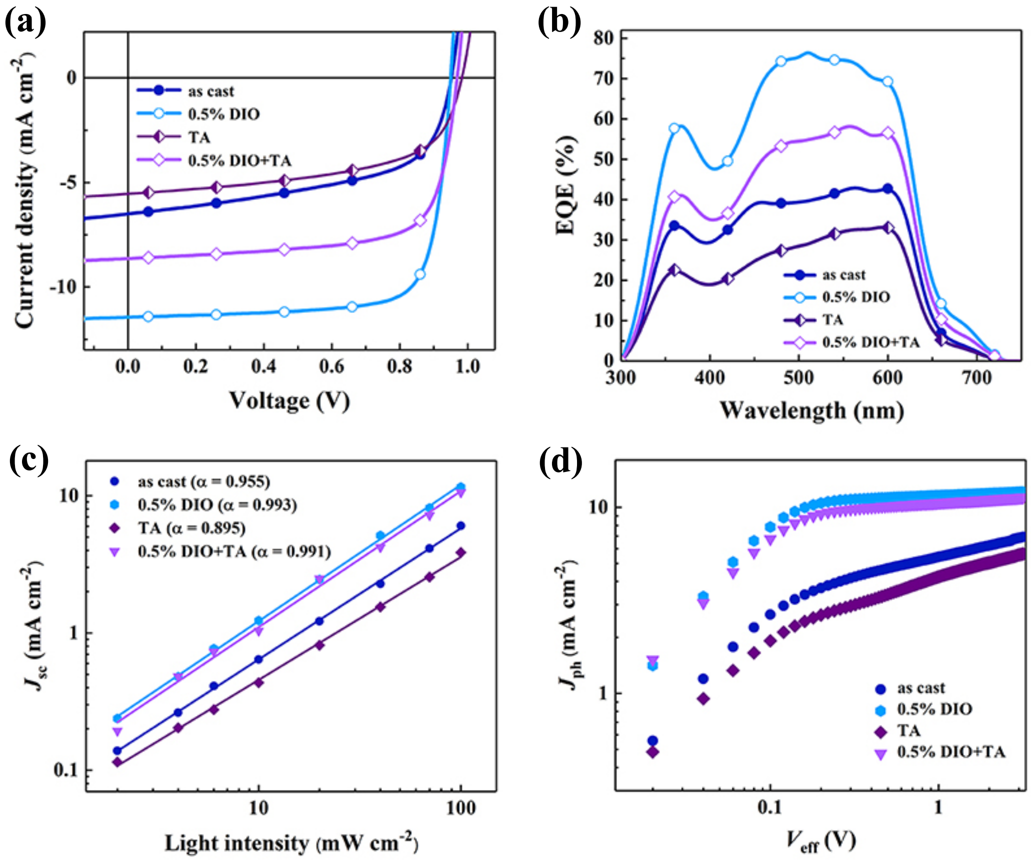

Figure S2. (a) J-V curves, (b) EQE spectra, (c) the dependence of J_{sc} on light intensity and (d) J_{ph} versus V_{eff} plot of PTQ10:$PC_{71}BM$-based devices.

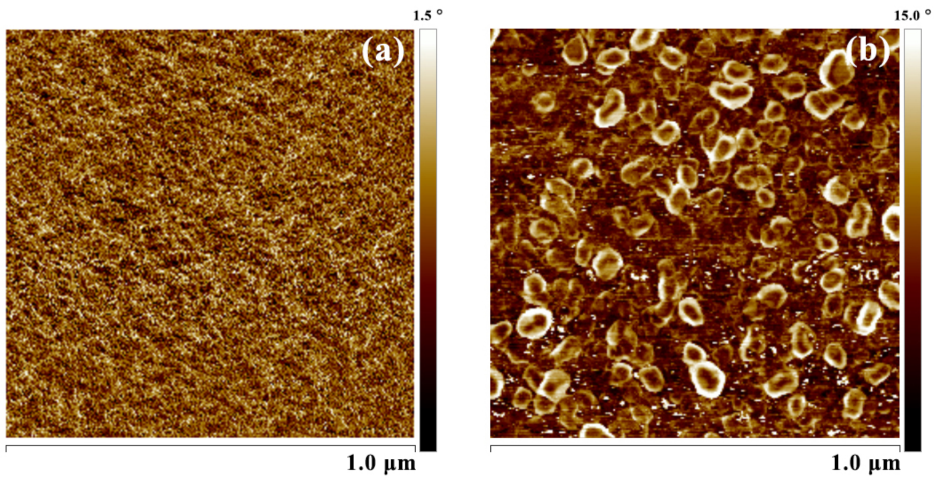

Figure S3. AFM phase images of (a) PTQ10:IDIC-as cast films and (b) PTQ10:IDIC-TA films. TA treatments were performed at 140 °C for 5 min.

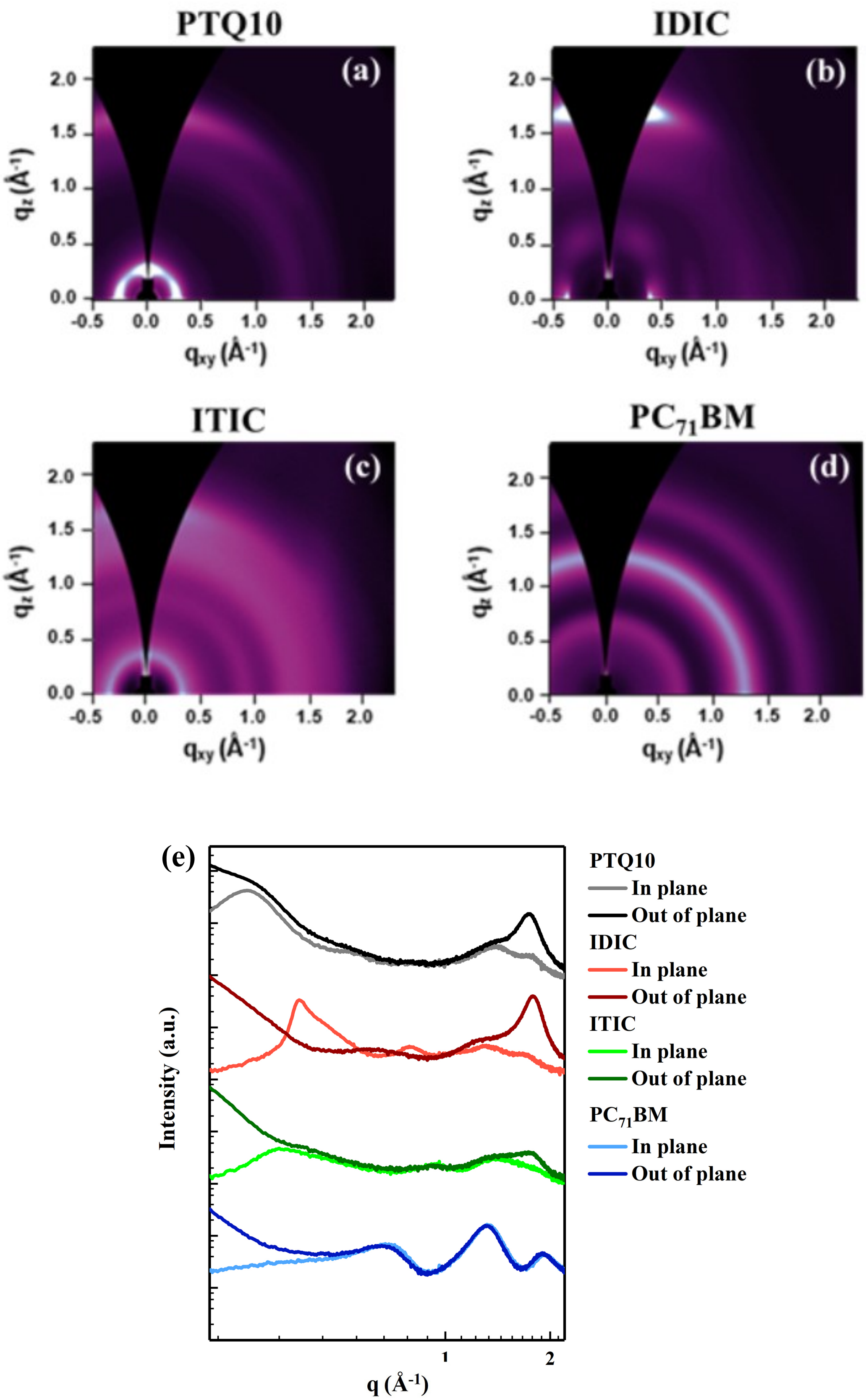

Figure S4. GIWAXS images of neat PTQ10 (a), IDIC (b), ITIC (c), and $PC_{71}BM$ (d) films and (e) corresponding line cut profiles.

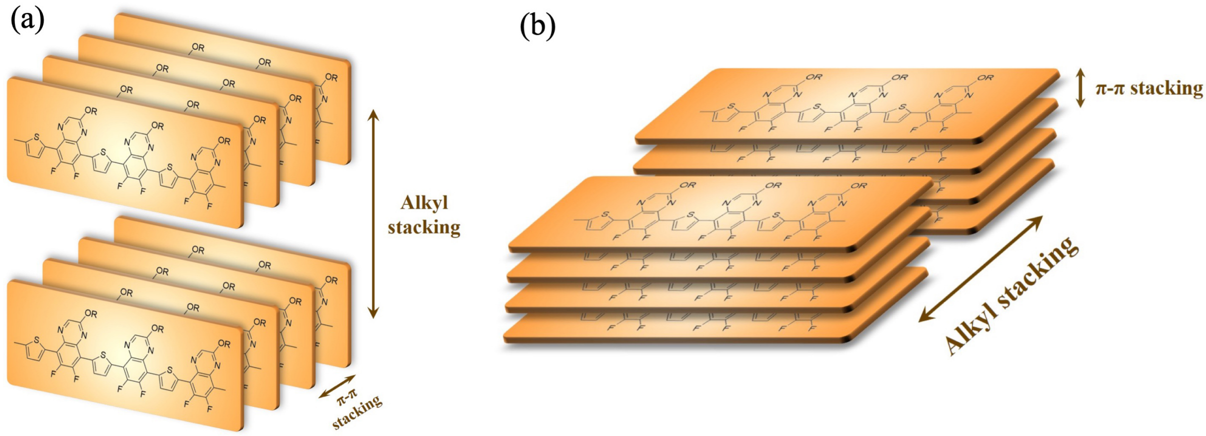

Figure S5. Schematic illustration of the PTQ10 crystallite oriented (a) edge-on and (b) face-on.