Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information for

High Performance Quinacridone-based Polymers in Film Transistors and Photovoltaics: Effect of Vinylene Linkage on Crystallinity and Morphology

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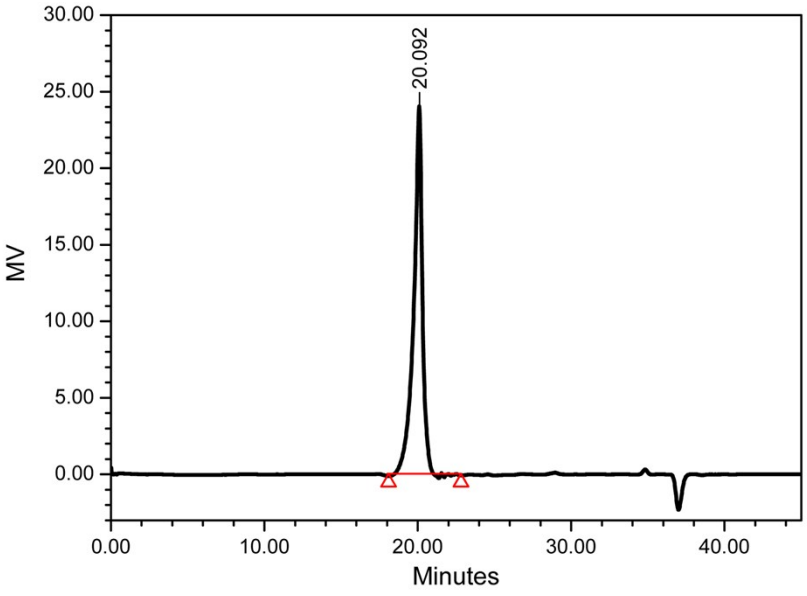
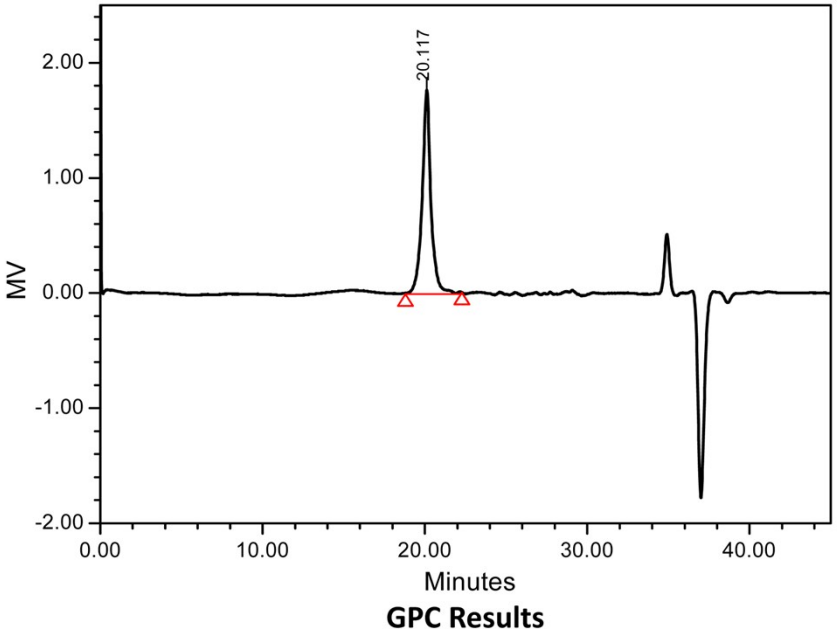


GPC Results

	Dist Name	Elution Volume (ml)	Retention Time (min)	Adjusted RT (min)	Mn	Mw	MP	Mz	Mz+1	Mz/Mw
1		20.092	20.092	20.092	20604	23694		24246	22097	1.023301

Fig. S1. GPC analysis of polymer **PQTE**.



GPC Results

	Dist Name	Elution Volume (ml)	Retention Time (min)	Adjusted RT (min)	Mn	Mw	MP	Mz	Mz+1	Mz/Mw
1		20.117	20.117	20.117	20106	22719		23338	31816	1.027229

Fig. S2. GPC analysis of polymer **PQ2T**.

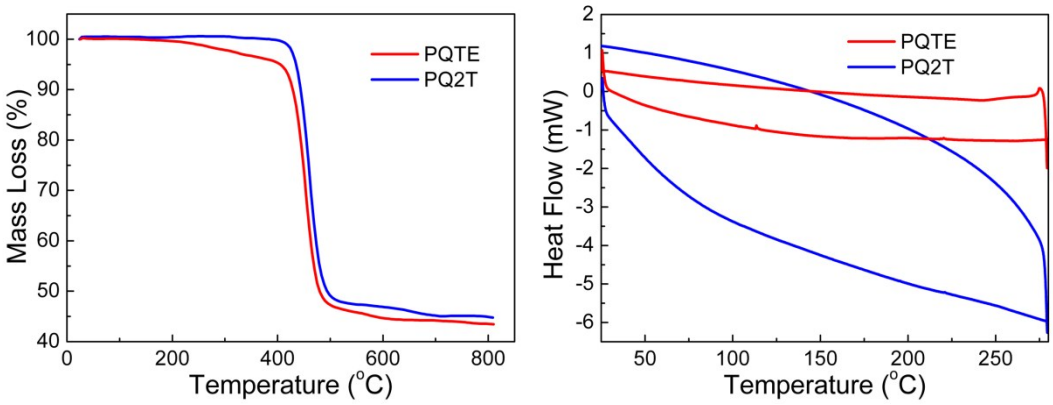


Fig. S3. TGA and DSC curves of two polymers determined under nitrogen atmosphere.

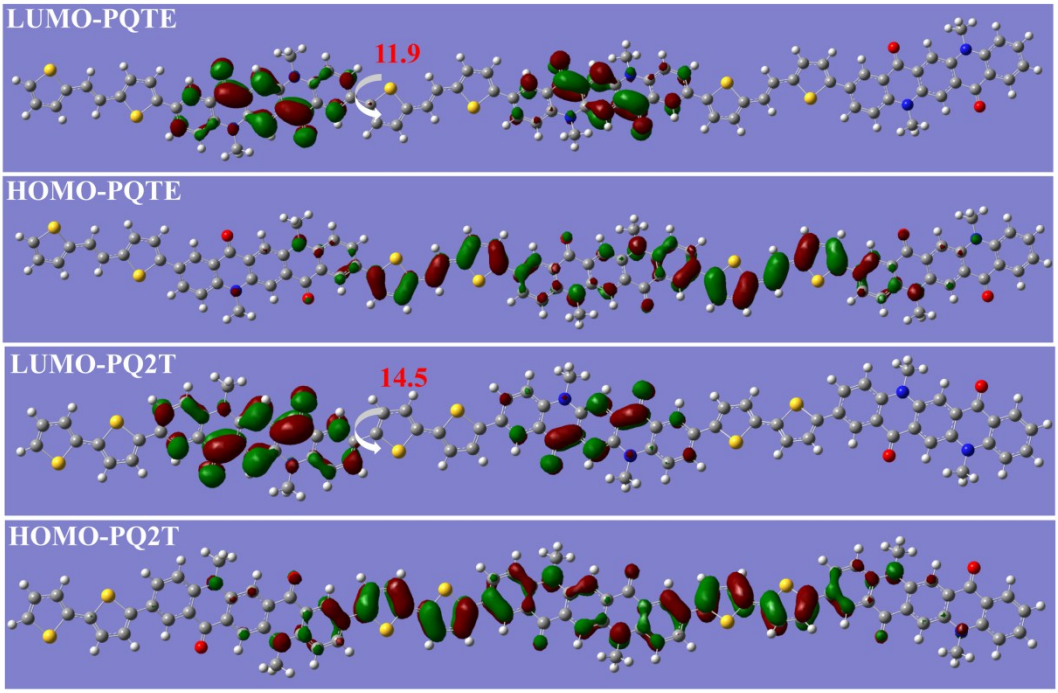


Fig. S4. Optimized trimers configuration and LUMO/HOMO orbitals by DFT calculation (B3LYP/6-31G). The alkyl substituents are replaced with the methyl group to simplify the calculation.

Table S1. The crystallographic parameters calculated from GIXRD profiles based on OFET devices.

polymer	out of plane		in plane	
	lamellar distance	π-π stacking	lamellar distance	π-π stacking
PQTE	21.62	—	22.15 (weak)	3.49
PQ2T	22.72	3.59	23.95	—

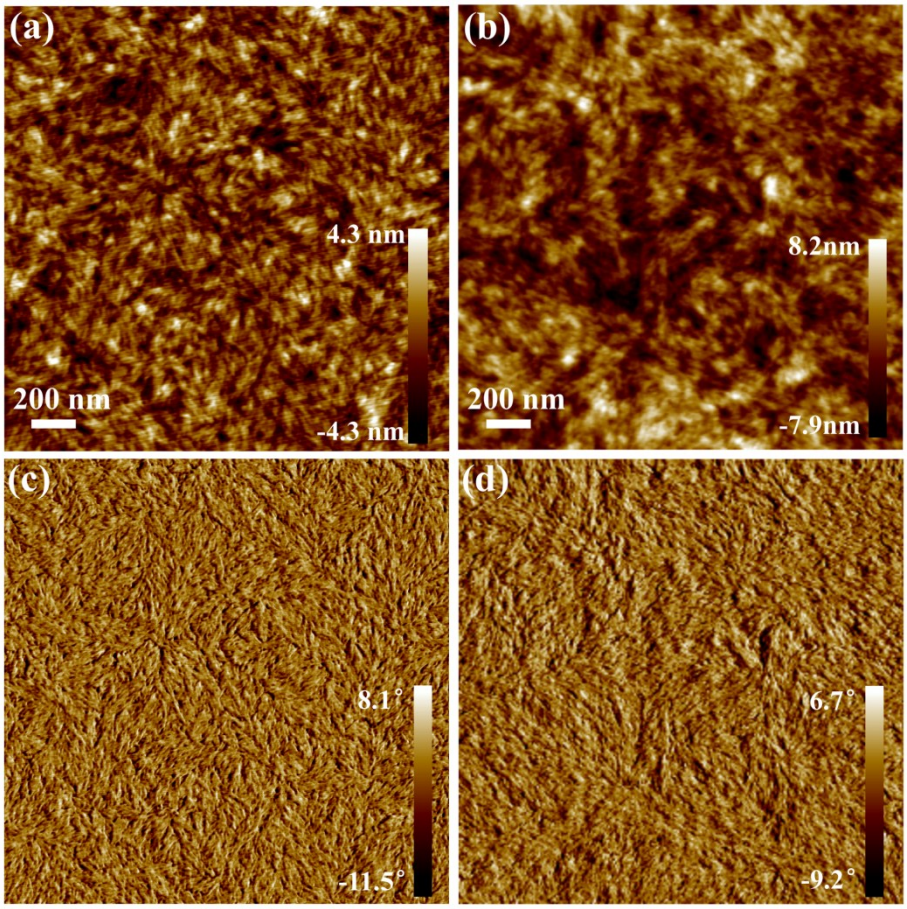


Fig. S5. AFM height and phase images of **PQTE** film (a, c) and **PQ2T** film (b, d) spin-coated from chlorobenzene solution on SiO_2/Si substrates, respectively.

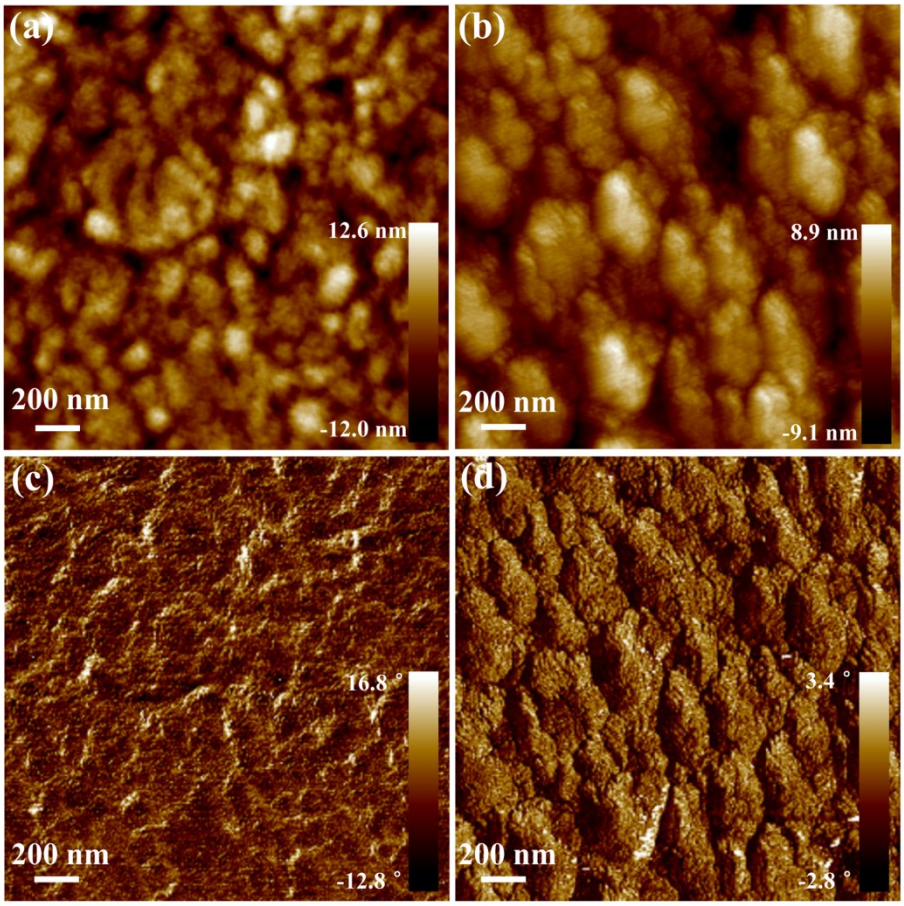


Fig. S6. AFM height images (a, b) and phase images (c, d) of the optimized solar cells based on **PQTE**/$PC_{71}BM$ blend film and **PQ2T**/$PC_{71}BM$ blend film, respectively.

Table S2. The parameters of solar cells based on different weight ratios of polymer and $PC_{71}BM$ for **PQTE** and **PQ2T**, respectively.

Polymer	D:A	V_{oc} (V)	J_{sc} (mA cm^{-2})	FF (%)	PCE[a] (%)
PQTE	1:1	0.71	7.09	52	2.50 (2.42±0.09)
	1:2	0.73	9.74	55	3.90(3.79±0.09)
	1:3	0.72	7.01	54	3.15 (3.10±0.03)
	1:4	0.73	7.14	54	3.21 (3.18±0.05)
PQ2T	1:1	0.75	4.39	53	1.78 (1.70±0.17)
	1:2	0.74	6.95	56	2.71 (2.62±0.12)
	1:3	0.73	5.96	51	2.55 (2.45±0.08)
	1:4	0.74	6.18	49	2.50 (2.39±0.11)

[a]The value out of brackets represents maximum PCE; The value in brackets represents average values of PCE collected more than 10 devices.

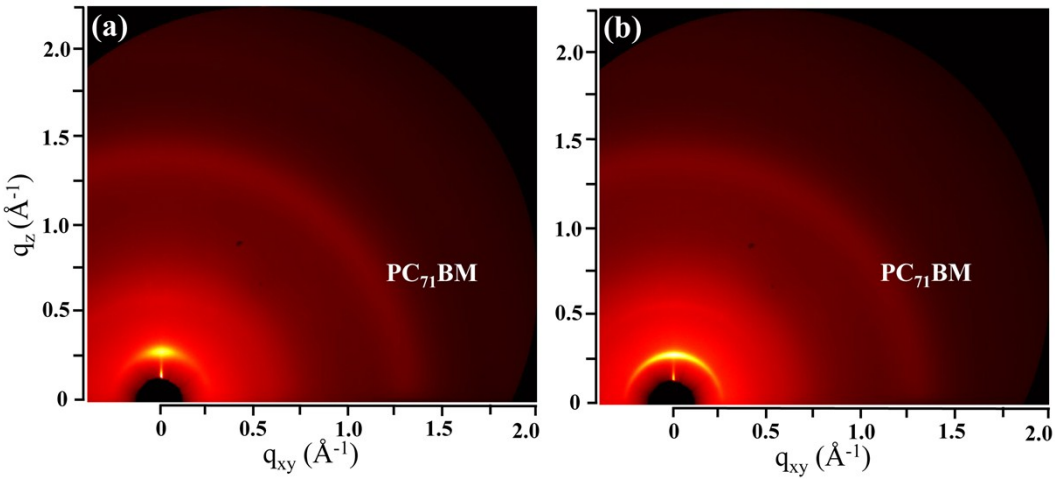


Fig. S7. 2D-GIXRD profiles of the optimized solar cells based on **PQTE**/$PC_{71}BM$ blend film (a) and **PQ2T**/$PC_{71}BM$ blend film (b).

Table S3. Lamellar distances of polymer-only films and polymer/$PC_{71}BM$ blend films calculated from GIXRD.

Polymer	lamellar distance (Å)		Δd^a (Å)
	polymer-only film	blend film	
PQTE	21.62	24.11	2.49
PQ2T	22.72	22.95	0.23

[a] Δd is the difference of lamellar distance between polymer-only film and blend film.