

Supplementary Materials

Optimization of charge carrier transport balance for performance improvement of PDPP3T-based polymer solar cells prepared from hot solution

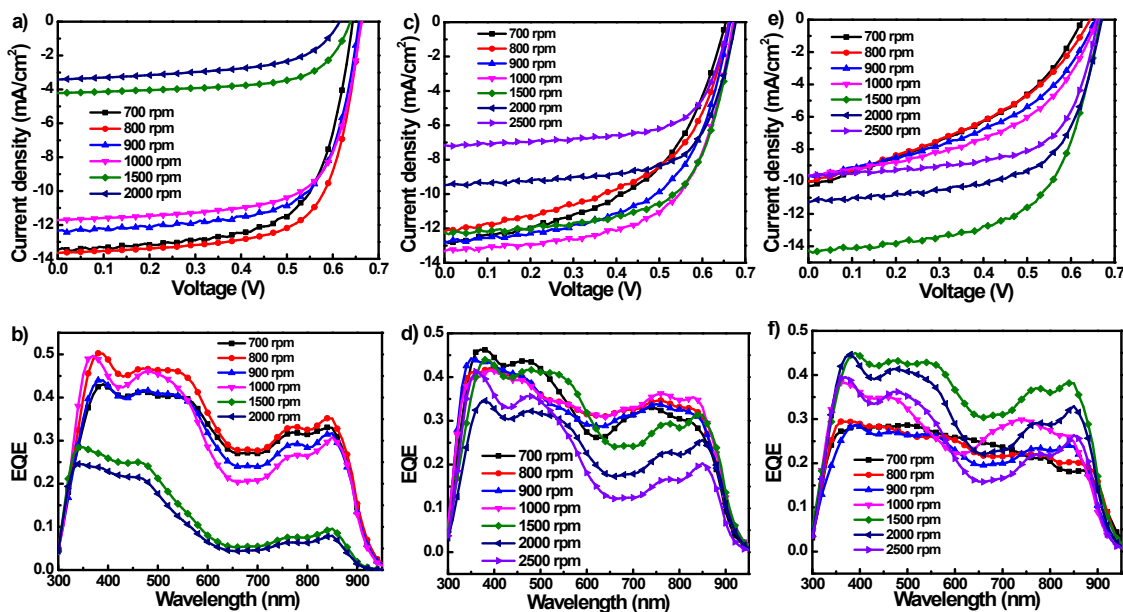
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A conventional PSCs structure of ITO/PEDOT:PSS/PDPP3T:PC₇₁BM/LiF (1 nm)/Al (100 nm) was used in this work. The PDPP3T:PC₇₁BM (1:2, Wt/Wt) active layers were prepared from cool solution, cool solution processed with DIO (5%, v/v) and hot solution (70 °C), respectively. The thickness of PDPP3T:PC₇₁BM blend films was adjusted by changing spin-coating speed to obtain the optimized PCE of each kind of PSCs. The *J-V* characteristics curves of the all PSCs prepared from different solutions and spin-coating speeds were measured under AM 1.5 illumination at 100 mW/cm² and are shown in Fig. S1. The key photovoltaic parameters of PSCs according to the *J-V* curves were summarized and are shown in Table S1.



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Fig.S1 J - V curves and EQE spectra of the PSCs prepared from different solutions: a), b) hot solution (70 °C); c), d) cool solution; e), f) cool solution processed with DIO (5%, v/v).

Table S1 Key performance parameters of PSCs prepared from different solutions

Rpm	Solution	V_{oc} (V)	J_{sc} (mA/cm²)	FF (%)	PCE (%)
700	Cool	0.65	12.75	51.8	4.29
	DIO	0.63	10.28	39.1	2.53
	Hot	0.65	12.99	66.4	5.61
800	Cool	0.66	12.16	52.6	4.22
	DIO	0.64	9.98	39.4	2.52
	Hot	0.66	13.65	69.0	6.22
900	Cool	0.66	12.82	58.4	4.94
	DIO	0.66	9.66	43.6	2.78
	Hot	0.66	12.33	67.3	5.48
1000	Cool	0.67	13.32	62.0	5.54
	DIO	0.66	9.62	48.3	3.07
	Hot	0.66	11.71	68.9	5.32
1500	Cool	0.68	12.24	64.5	5.37
	DIO	0.67	14.27	61.2	5.85
	Hot	0.64	4.22	64.3	1.74
2000	Cool	0.65	9.64	66.7	4.18
	DIO	0.64	12.22	65.4	5.12
	Hot	0.62	3.42	55.8	1.18
2500	Cool	0.64	8.49	68.0	3.64
	DIO	0.64	10.4	66.1	4.40
	Hot	-	-	-	-