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Supplementary Information

New conjugated molecules with four DPP (diketopyrrolopyrrole) moieties linked by [2,2]paracyclophane as electron acceptors for organic photovoltaic cells

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1. TGA analysis of 1 and 2



Figure S1. TGA curves of 1 and2.

2. IPCE spectra of blending films of P3HT/1 and P3HT/2



^{a)} Without thermal annealing; ^{b)} after thermal annealing at 110 °C for 10 min..

Figure S2. IPCE spectra for blending thin films of P3HT/1 (a) and P3HT/2 (c) at different weight ratios, and the corresponding absorption spectra of P3HT/1 (b) and P3HT/2 (d)at weight ratio of 2:1 after thermal annealing at 110 °C for 10 min.

3.Hole and electron mobilities for blending films of P3HT/1 and P3HT/2

Table S1. The hole/electron mobilities and ratios of hole mobility to electron mobility of P3HT/1 (2:1, w/w) and P3HT/2 (2:1, w/w) without or with thermal annealing.

donor:acceptor	annealing [°C]	$\mu_{\rm h} \ [{\rm cm}^2 {\rm V}^{-1} {\rm s}^{-1}]$	μ_{e} [cm ² V ⁻¹ s ⁻¹]	μ_h/μ_e
P3HT/1	as casted 110	1.68×10 ⁻⁴ 2.26×10 ⁻⁴	1.16×10 ⁻⁷ 5.64×10 ⁻⁷	1.44×10 ³ 0.40×10 ³
P3HT/ 2	as casted 110	1.87×10 ⁻⁴ 3.48×10 ⁻⁴	4.48×10 ⁻⁷ 1.30×10 ⁻⁶	4.17×10 ² 2.95×10 ²

4. XRD patterns of P3HT/1 and P3HT/2 thin films



Figure S3. XRD patterns of P3HT/1 (2:1, w/w) (a) and P3HT/2 (2:1, w/w) (b) blending films on glass/ITO/PEDOT:PSS substrate before and after thermal annealing.



6. ¹H NMR and ¹³C NMR spectra

¹H NMR of 1



