ADVANCED FUNCTIONAL MATERIALS

Supporting Information

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Enhancing Photovoltaic Performance Using an All-Conjugated Random Copolymer to Tailor Bulk and Interfacial Morphology of the P3HT:ICBA Active Layer

*Anton Li, Jojo Amonoo, Bingyuan Huang, Peter K. Goldberg, Anne J. McNeil, and Peter F. Green**

((Supporting Information can be included here using this template))

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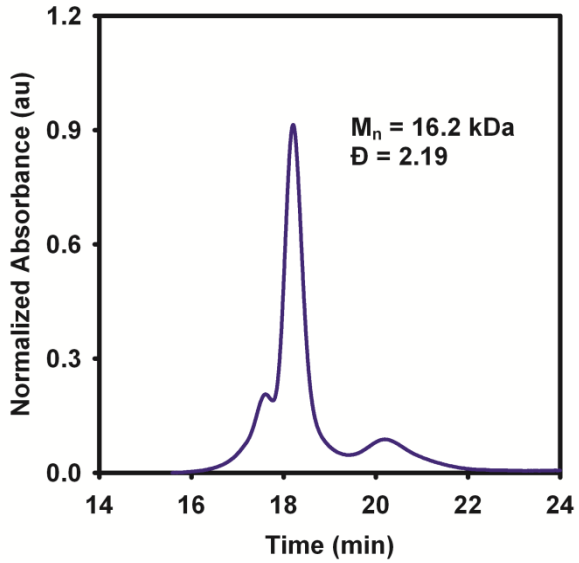

Figure S1. GPC of P3HOMT.

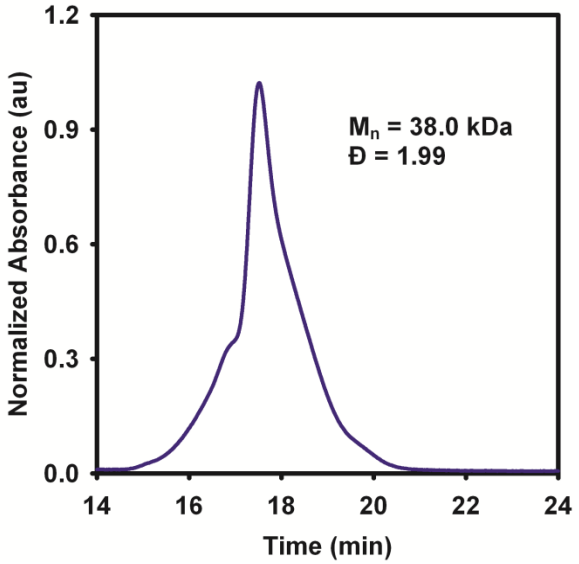

Figure S2. GPC of P(3HT-*r*-3HOMT).

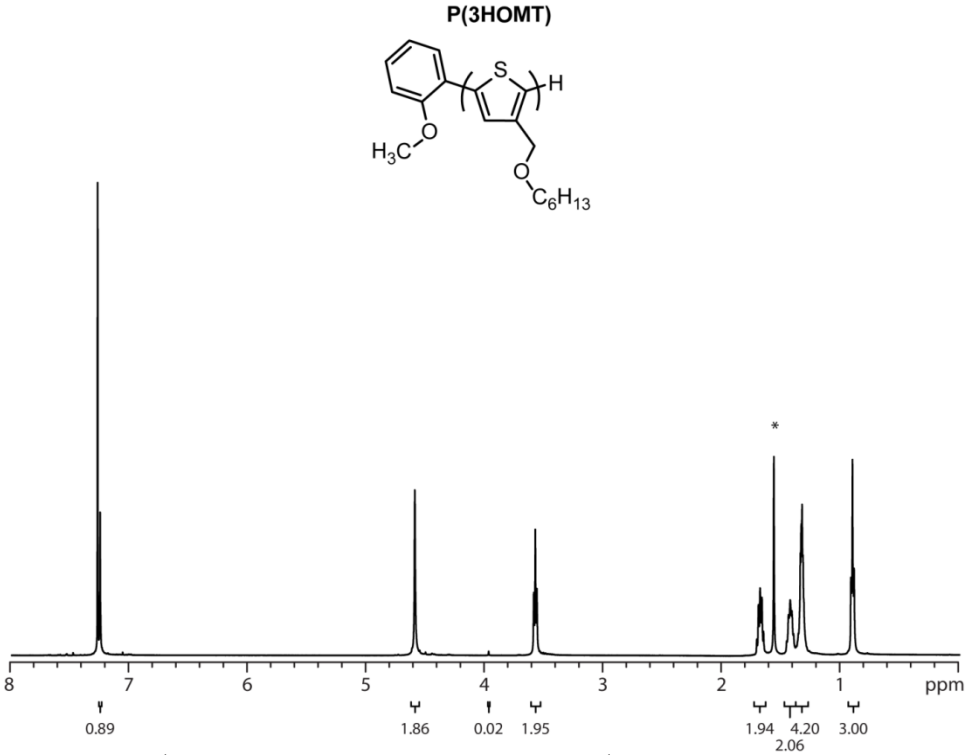

Figure S3. ^{1}H NMR spectrum of P3HOMT: ^{1}H (500 MHz, $CDCl_3$) δ 7.24 (s, 1H), 4.58 (s, 2H), 3.98 (s, 0.02H), 3.57 (t, 2H), 1.68 (m, 2H), 1.42 (m, 2H), 1.32 (m, 4H), 0.89 (br, 3H). * denotes residual H_2O

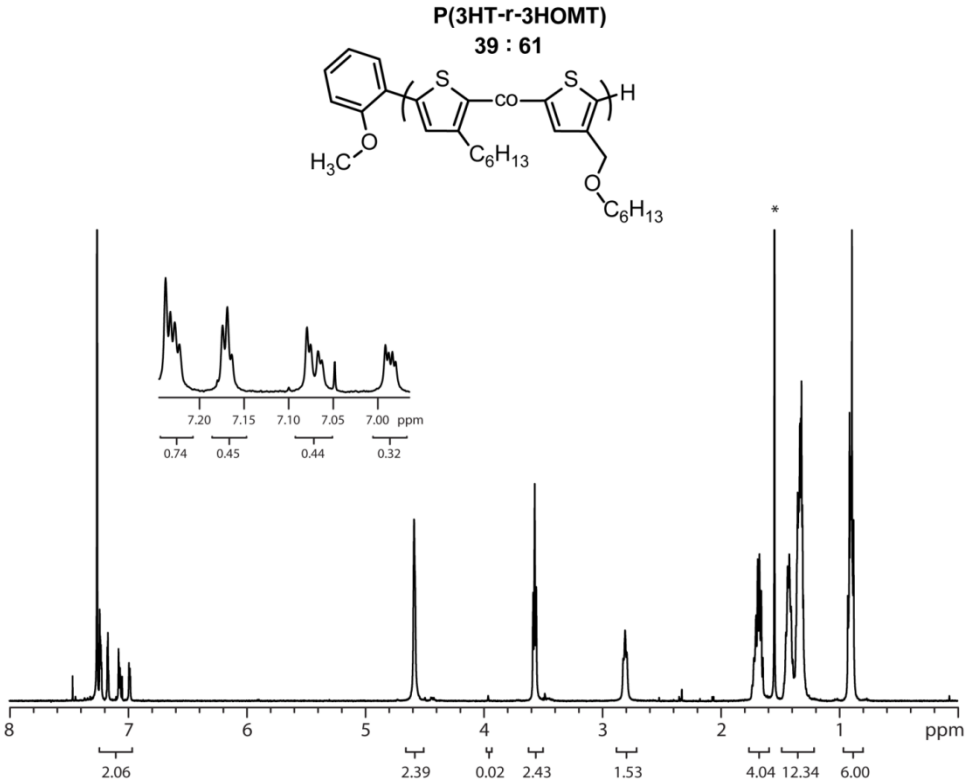

Figure S4. ^{1}H NMR spectrum (bottom) of P(3HT-*r*-3HOMT): ^{1}H (500 MHz, $CDCl_3$) δ 7.24-6.98 (m, 2H), 4.58 (s, 2.4H), 3.98 (s, 0.02H), 3.57 (t, 2.4H), 2.81 (t,1.6H), 1.68 (m, 4H), 1.55-1.30 (br m, 12H), 0.90 (br, 6H), * denotes residual H_2O

Table S1. Summary of P(3HT-*r*-3HOMT) and P3HOMT chemical information

species	M_n [kDa]	PDI	x_{3HT} [%]	x_{3HOMT} [%]	regioregularity [%]
P3HOMT	16.2	2.19	0	100	97
P(3HT-*r*-3HOMT)	38.0	1.99	39	61	98

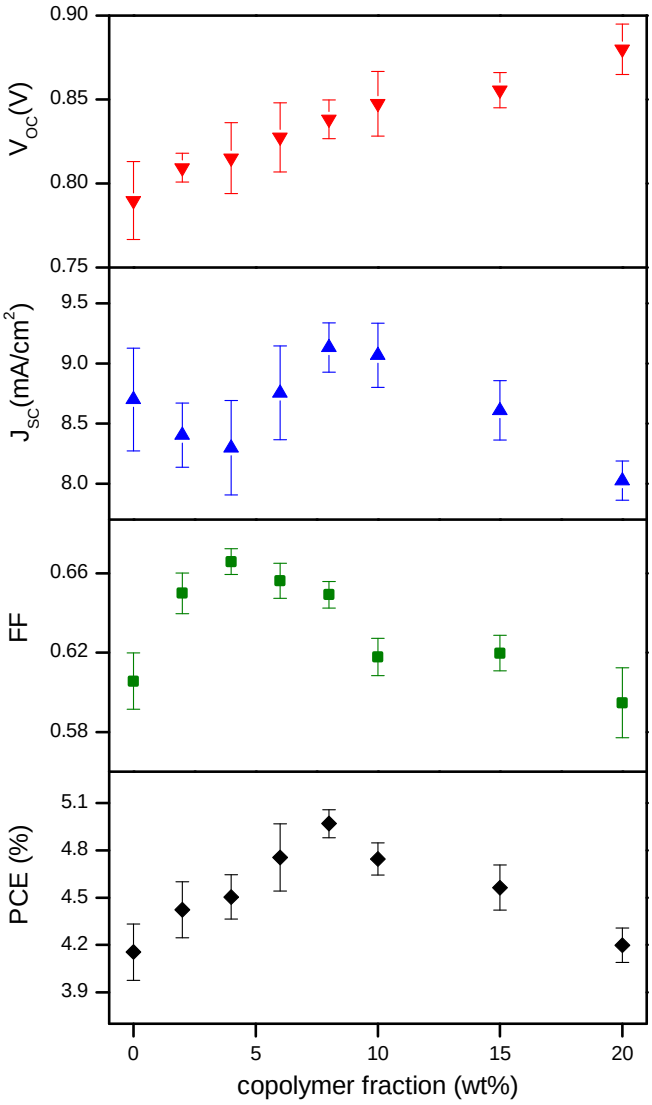

Figure S5. Plots showing the four macroscopic device performance metrics (V_{OC}, J_{SC}, FF, and PCE) for the range of copolymer loading fractions screened in this study.

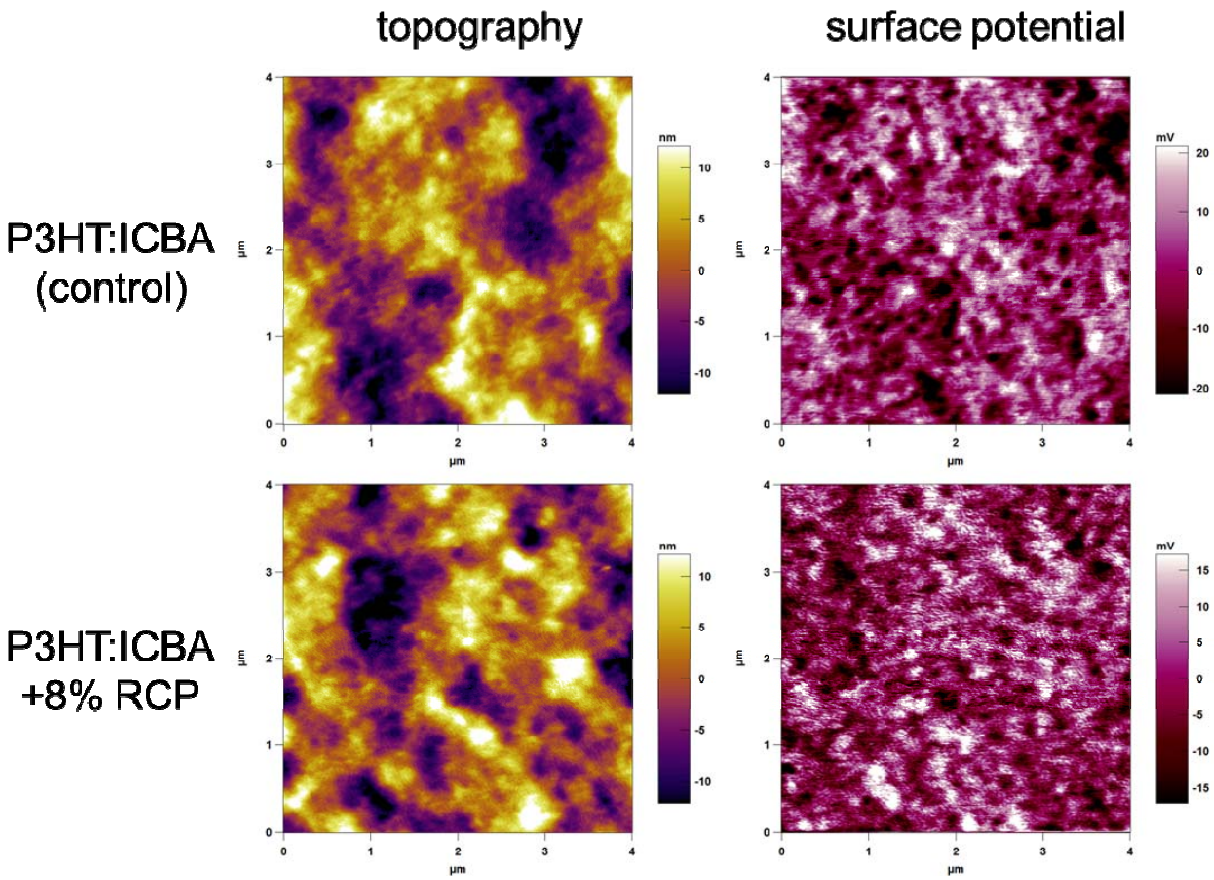

Figure S6. AFM topography and KPFM surface potential maps (4 µm x 4 µm) of reference (0% RCP) and optimized (8% RCP) samples. The samples were prepared on a high work function ITO/PEDOT:PSS substrate; KPFM measurements give surface potential values corresponding to the averaged HOMO energies of the blend.

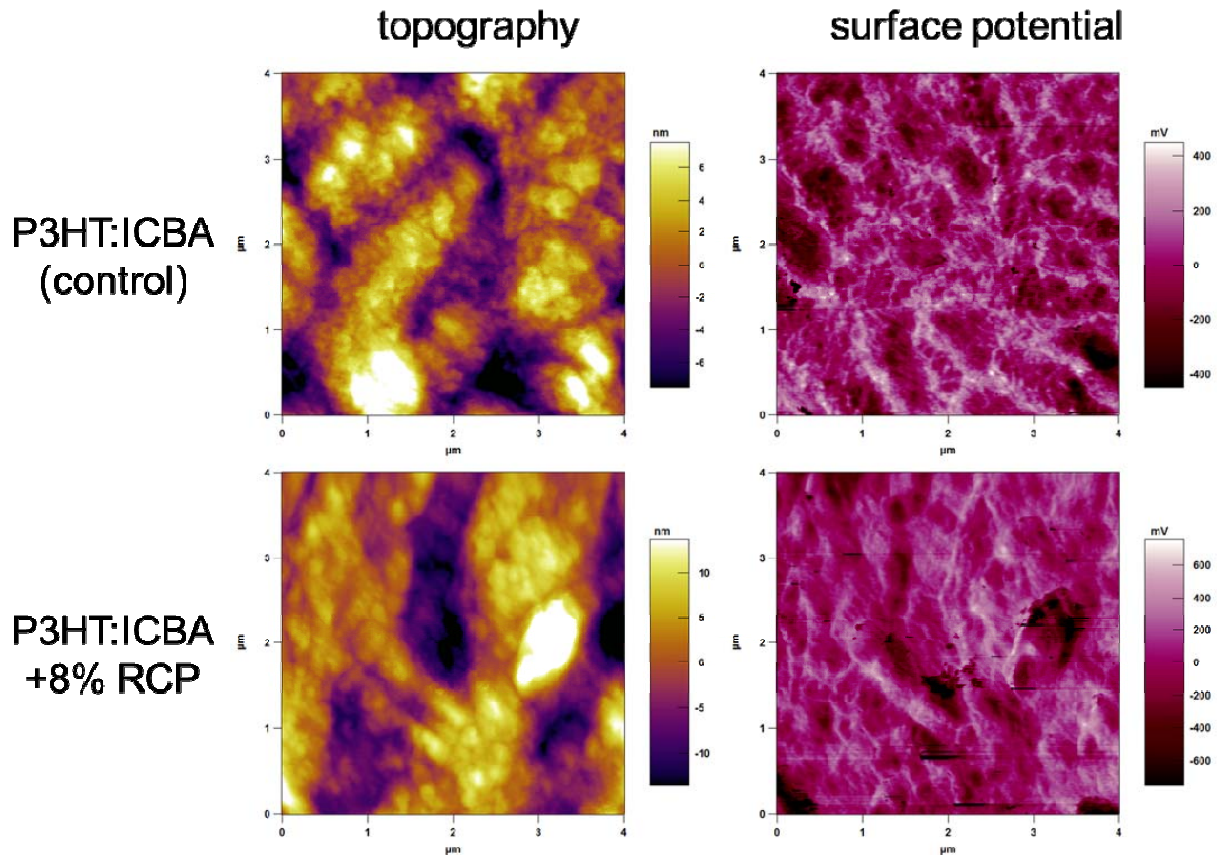

Figure S7. AFM topography and KPFM surface potential maps (4 µm x 4 µm) of reference (0% RCP) and optimized (8% RCP) samples. The samples were prepared on a low work function ITO/PEIE substrate; KPFM measurements give surface potential values corresponding to the averaged LUMO energies of the blend.