Supporting Information:

Synthesis and Characterization of All-conjugated Graft Copolymers Comprised of *n*-Type or *p*-Type Backbones and Poly(3-hexylthiophene) Side Chains

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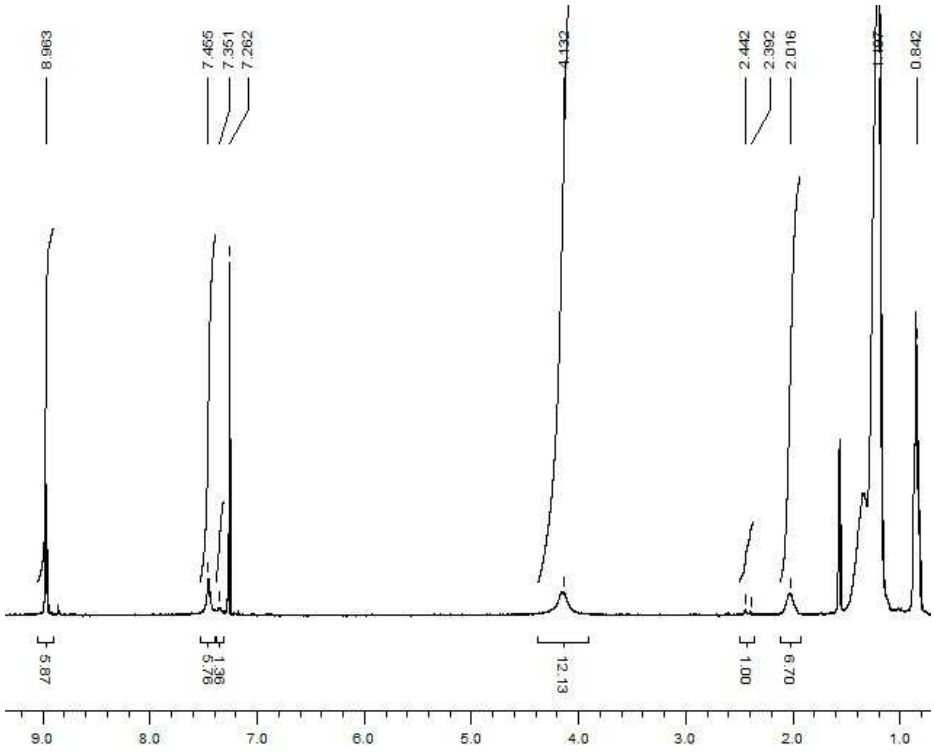

Figure S1. ^{1}H NMR spectrum of PNDICTT$_{91}$ in $CDCl_3$.

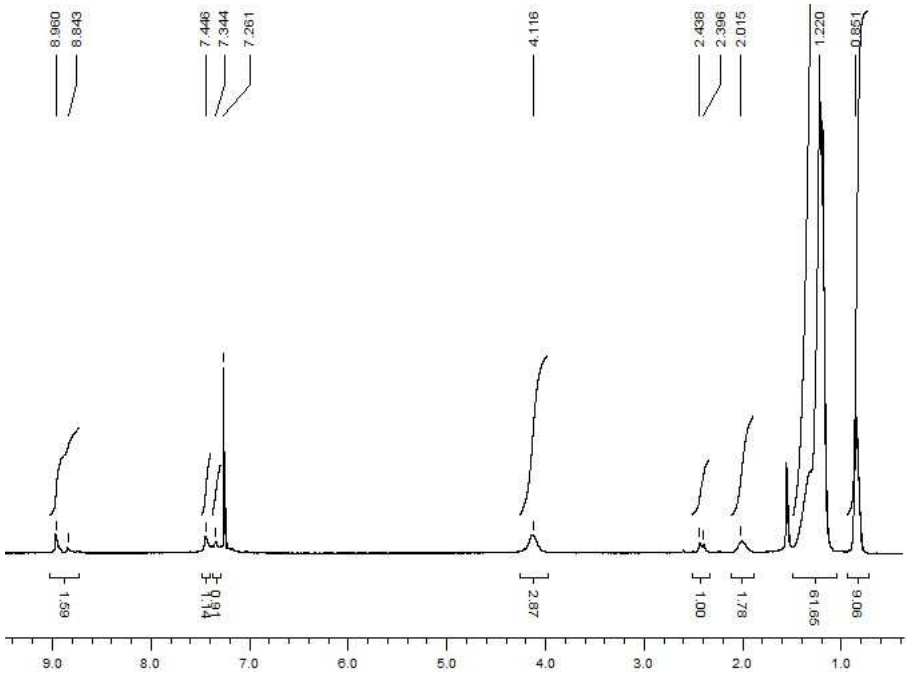

Figure S2. ^{1}H NMR spectrum of PNDICTT$_{73}$ in $CDCl_3$.

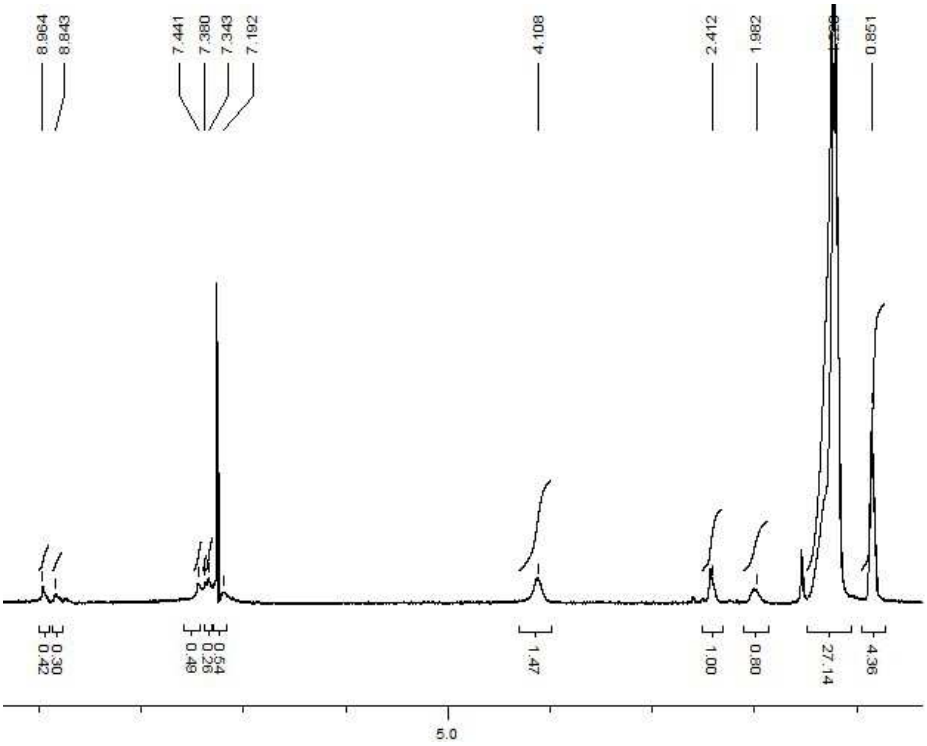

Figure S3. ^{1}H NMR spectrum of PNDICTT$_{55}$ in $CDCl_3$.

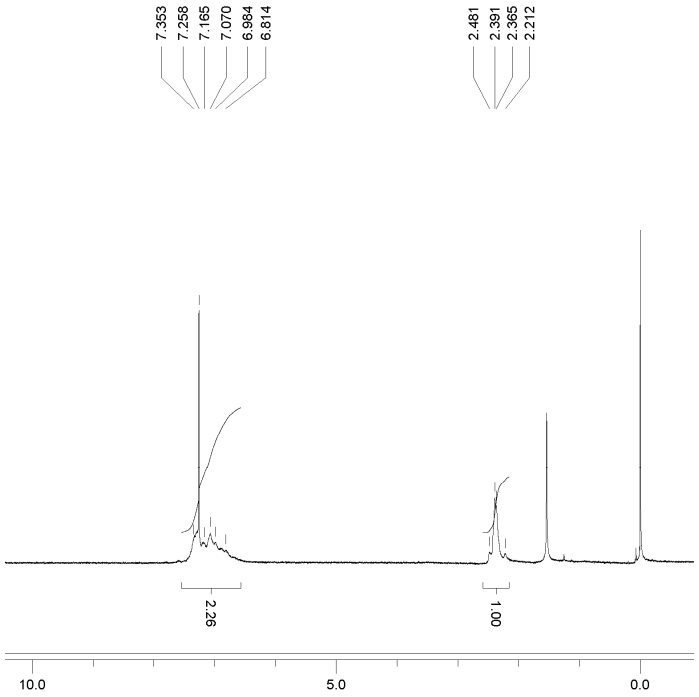

Figure S4. ^{1}H NMR spectrum of PCTT in $CDCl_3$.

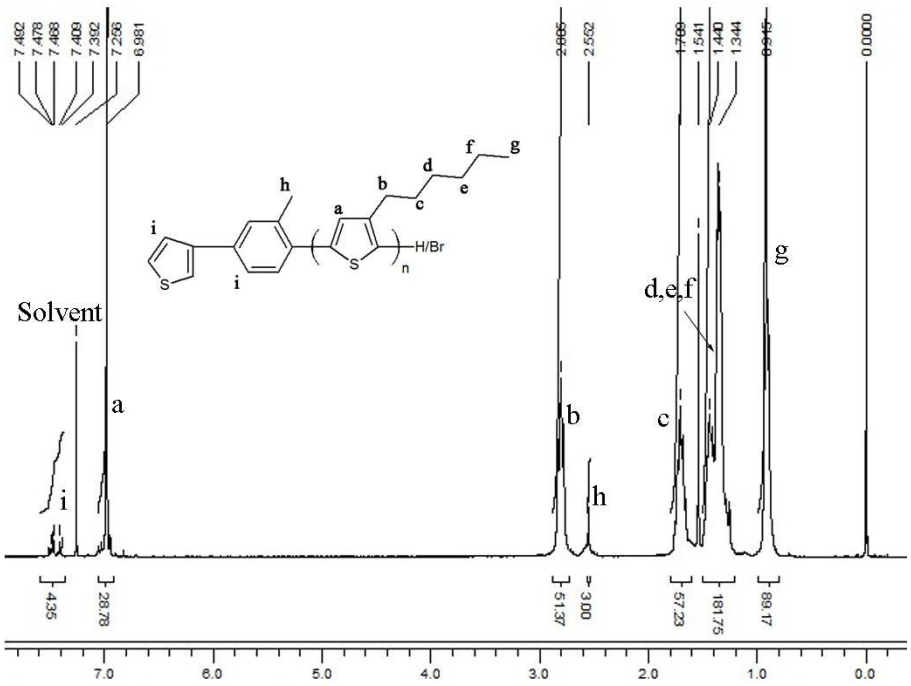

Figure S5. ^{1}H NMR spectrum of CTT-P3HT prepared in model reaction *via* externally initiated KCTP.

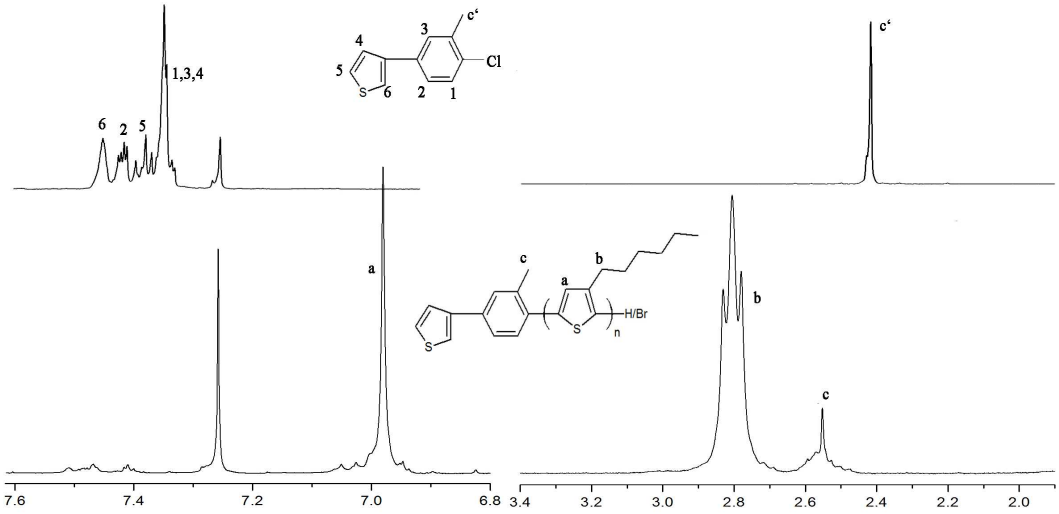

Figure S6. ^{1}H NMR spectra of CTT (above) and CTT-P3HT (below) in $CDCl_3$.

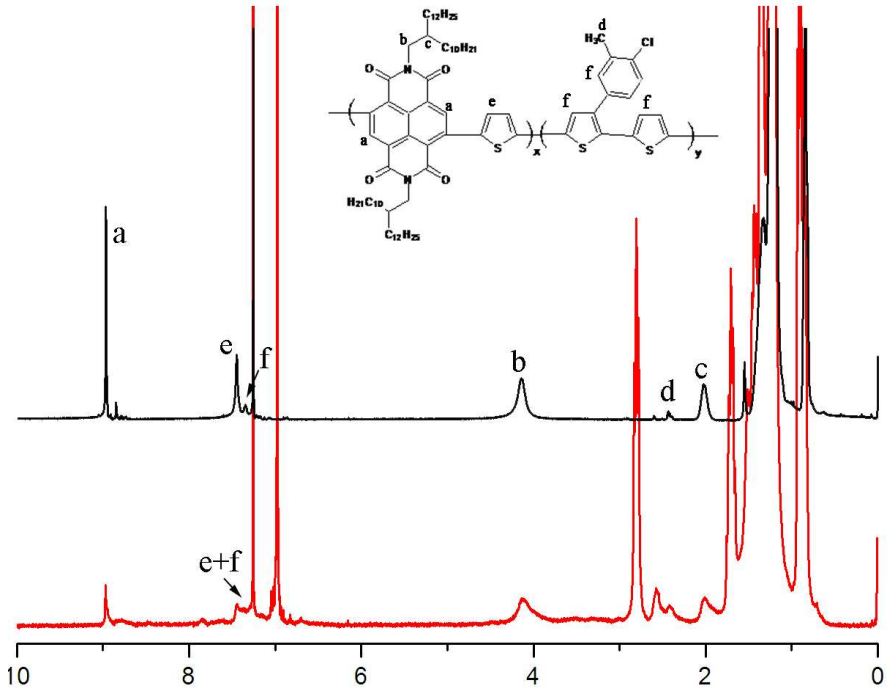

Figure S7. ^{1}H NMR spectra of PNDICTT$_{91}$(black) and PNDICTT$_{91}$-*g*-P3HT (red) in $CDCl_3$.

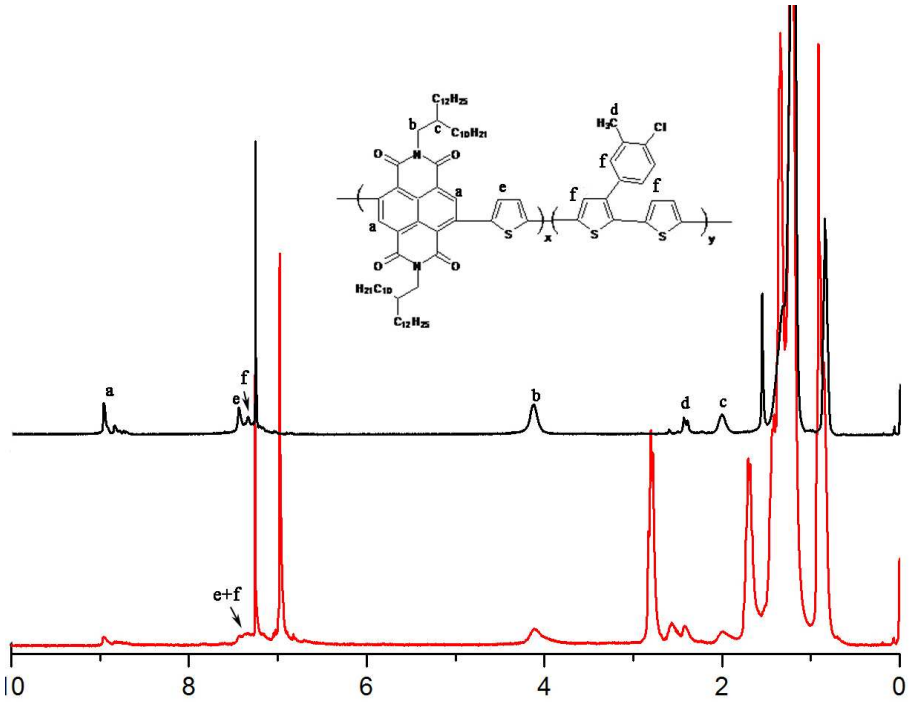

Figure S8. ^{1}H NMR spectra of PNDICTT$_{73}$ (black) and PNDICTT$_{73}$-*g*-P3HTa (red) in $CDCl_3$.

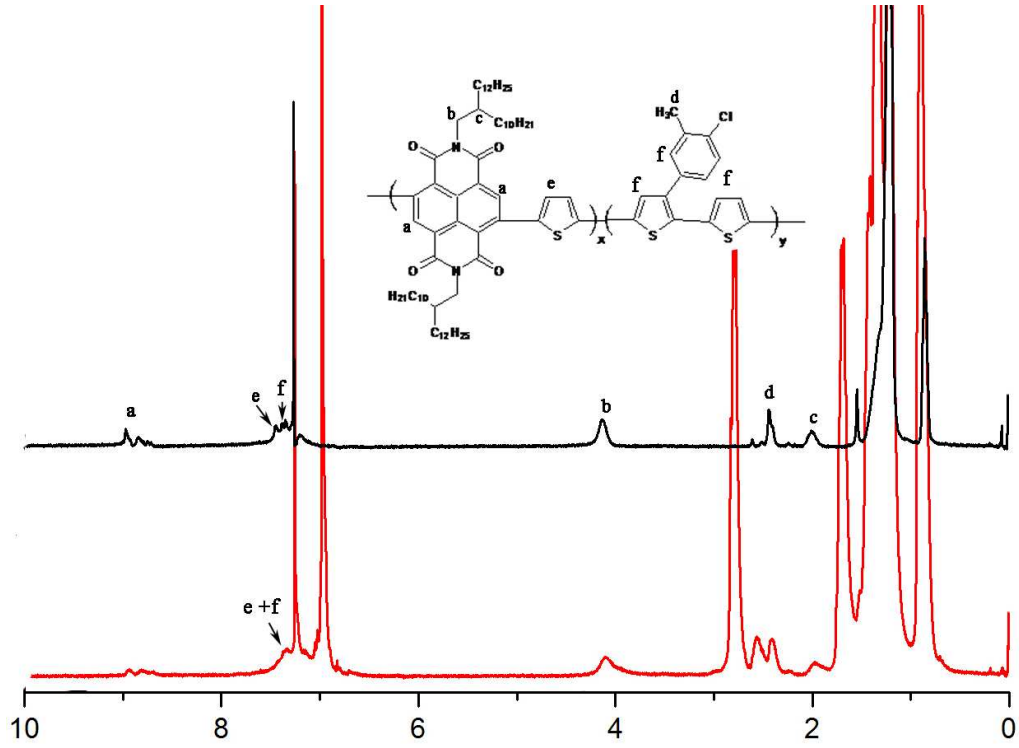

Figure S9. ^{1}H NMR spectra of PNDICTT$_{55}$ (black) and PNDICTT$_{55}$-*g*-P3HT (red) in $CDCl_3$.

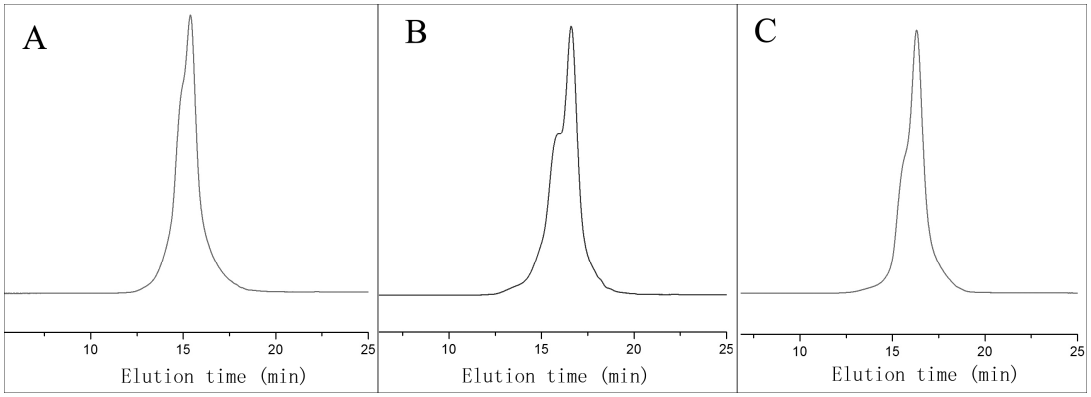

Figure S10. SEC traces of (A) PNDICTT$_{91}$-*g*-P3HT; (B) PNDICTT$_{73}$-*g*-P3HTa; and (C) PNDICTT$_{55}$-*g*-P3HT.

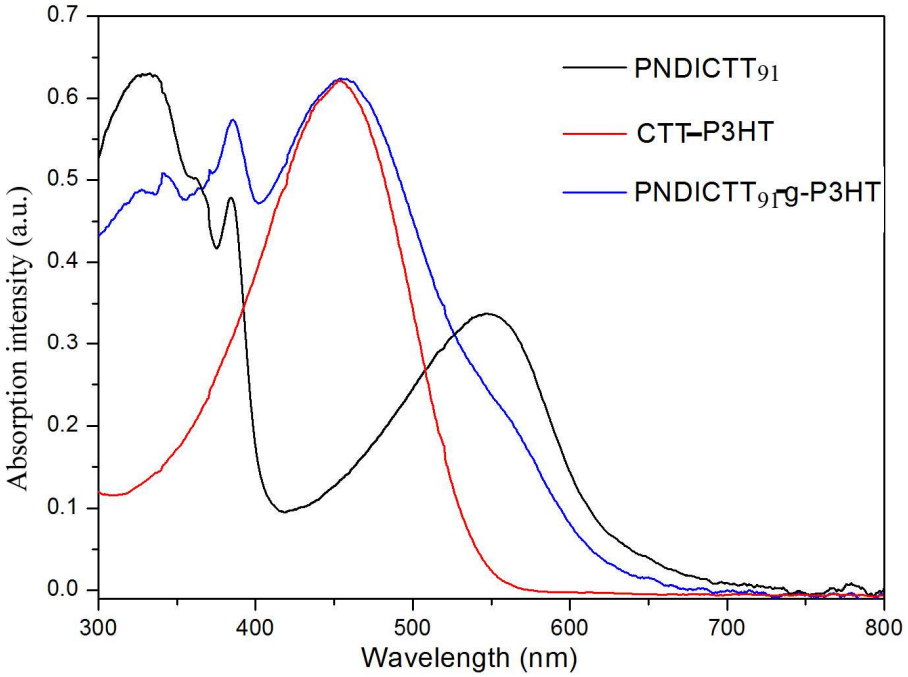

Figure S11. UV-vis spectra of product as indicated in $CHCl_3$.

Table S1. Electrical parameters of bottom-gate FETs based graft polymers.

CF:CB[a] 8 mg/ml	nonanneal			Annealing[b]		
	μ [c] ($cm^2V^{-1}S^{-1}$)	I_{on}/I_{off}	V_{th}	μ[c] ($cm^2V^{-1}S^{-1}$)	I_{on}/I_{off}	V_{th}
$PNDICTT_{91}$	1.08×10^{-3}	3.82×10^{6}	30.50	2.66×10^{-3}	8.96×10^{7}	33.07
PCTT-*g*-P3HT	2.46×10^{-3}	1.14×10^{2}	-2.07	7.91×10^{-3}	8.12×10^{2}	11.90
$PNDICTT_{91}$-*g*-P3HT	8.76×10^{-4}	2.22×10^{0}	127.67	9.87×10^{-4}	1.86×10^{0}	256.03
$PNDICTT_{73}$-*g*-P3HTa	2.78×10^{-4}	1.78×10^{0}	263.77	3.47×10^{-4}	2.24×10^{0}	131.71
$PNDICTT_{55}$-*g*-P3HT	5.53×10^{-4}	2.48×10^{0}	157.81	6.03×10^{-4}	2.07×10^{0}	218.14

[a] device were fabricated from chloroform and chlorobenzene (95:5 in v/v) with a concentration of 7.5 mg/ml. [1]annealing at 140 ℃ for 1 hour. [c] charge mobility of $PNDICTT_{91}$ shows a *n*-type while the other samples show *p*-type molility.

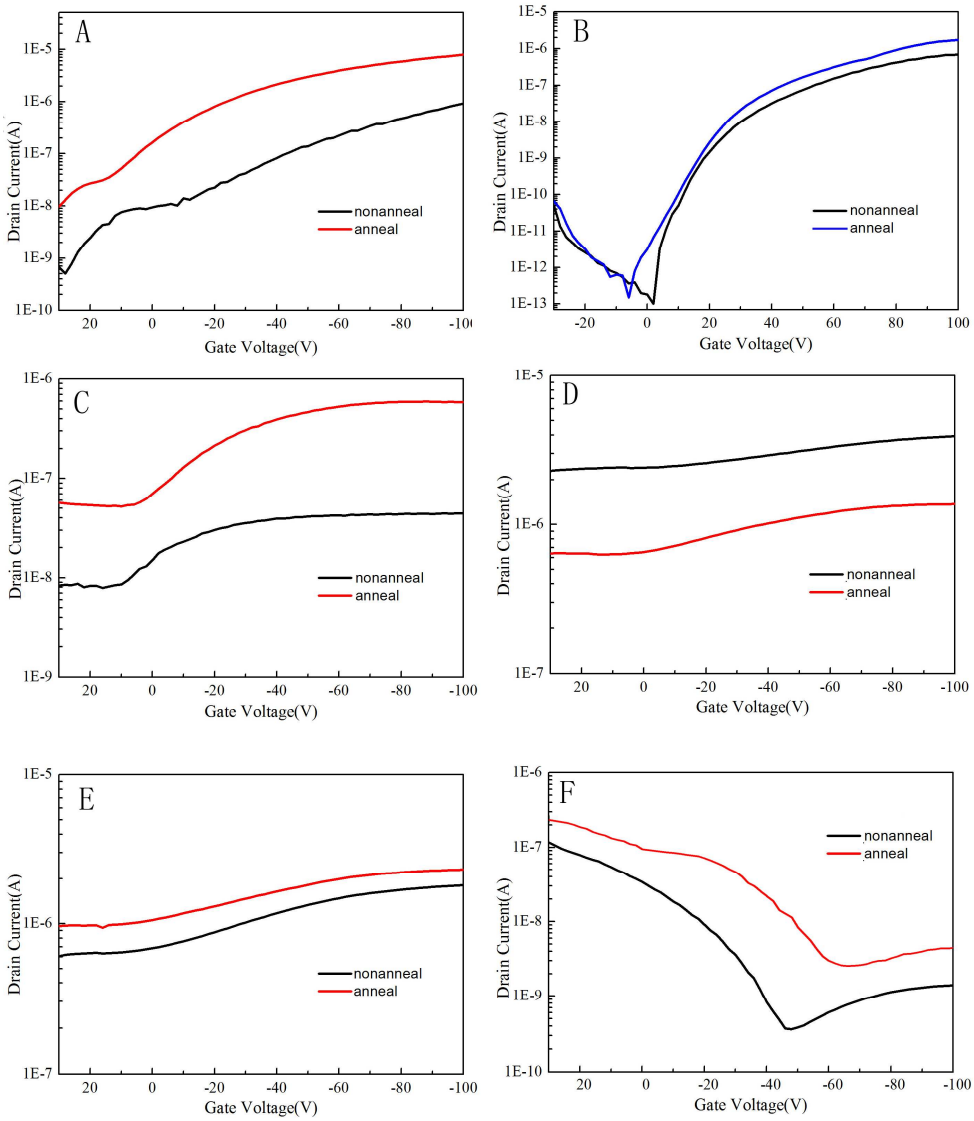

Figure S12. The transfer characteristic of PCTT-*g*-P3HT (A), $PNDICTT_{91}$ (B), $PNDICTT_{91}$-*g*-P3HT(C), $PNDICTT_{73}$-*g*-P3HTa(D), $PNDICTT_{55}$-*g*-P3HT (E), and physical blend of PCTT-*g*-P3HT and PNDICTT91 (F).

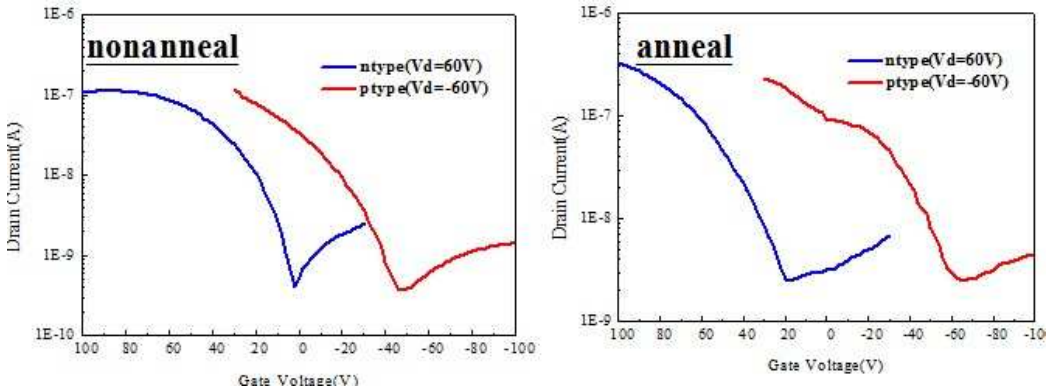

Figure S13. The transfer characteristic of physical blend of PCTT-*g*-P3HT and $PNDICTT_{91}$.

Table S2. Electrical parameters of bottom-gate FETs based blends of PCTT-*g*-P3HT and $PNDICTT_{91}$.

CF	10mg/ml	μ ($cm^2V^{-1}s^{-1}$)	I_{on}/I_{off}	V_{th}
nonanneal	p	4.74E-07	3.8E+00	75.37
	n	1.66E-04	1.1E+02	0.70
anneal	p	2.85E-06	9.3E+01	27.48
	n	1.33E-05	1.0E+03	1.71