Supplementary Information

Photo-patternable, stretchable and electrically conductive graft copolymers of poly(3-hexylthiophene)

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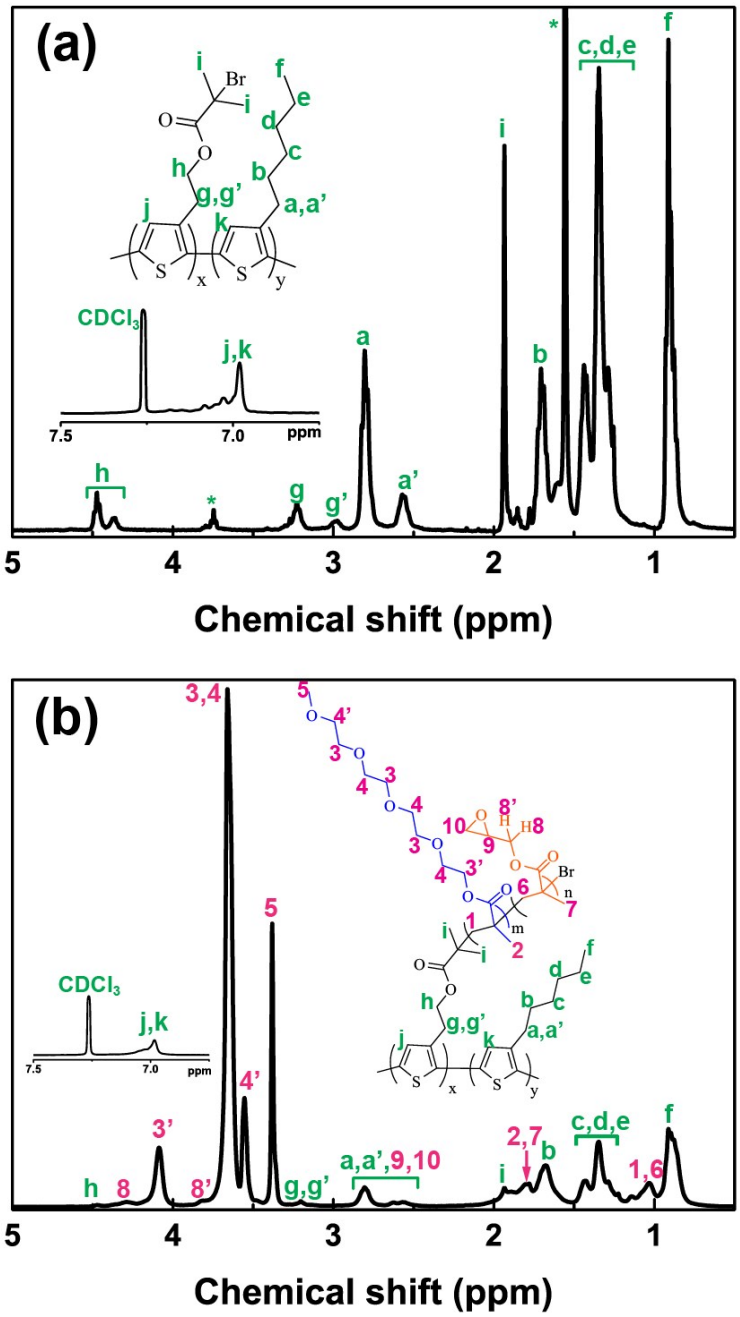

Fig. S1 ^{1}H NMR spectra of polymer P1 and P2 in $CDCl_3$.

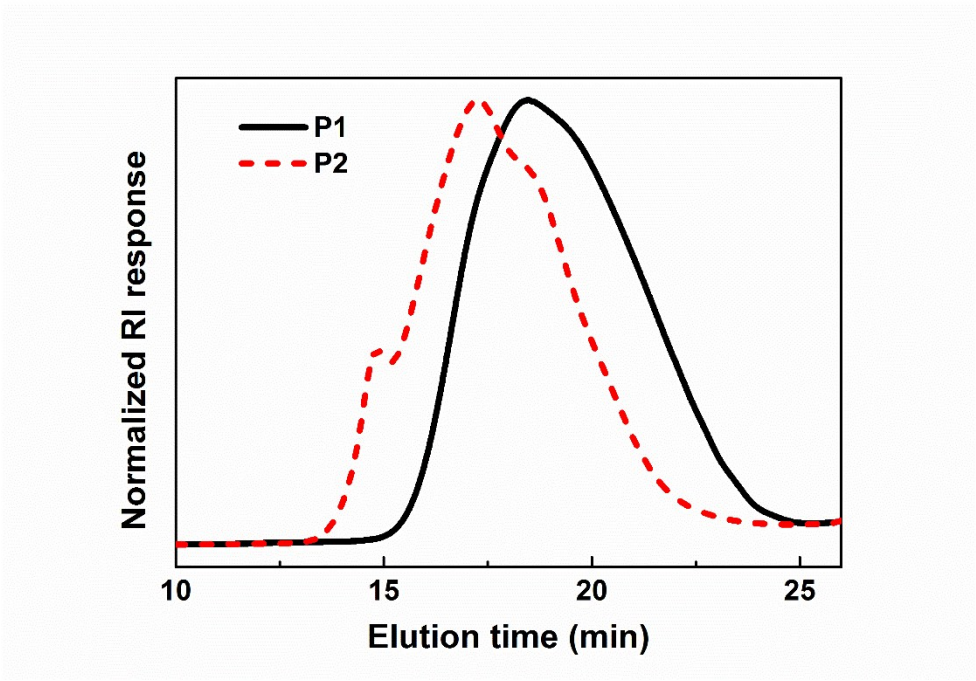

Fig. S2 GPC traces for polymer P1 and P2 in THF.

Table S1. GPC data of polymer P1 and P2.

Sample	M_n (kDa)	M_w (kDa)	$Đ$
P1	21.3	42.0	1.97
P2	42.7	123.7	2.90

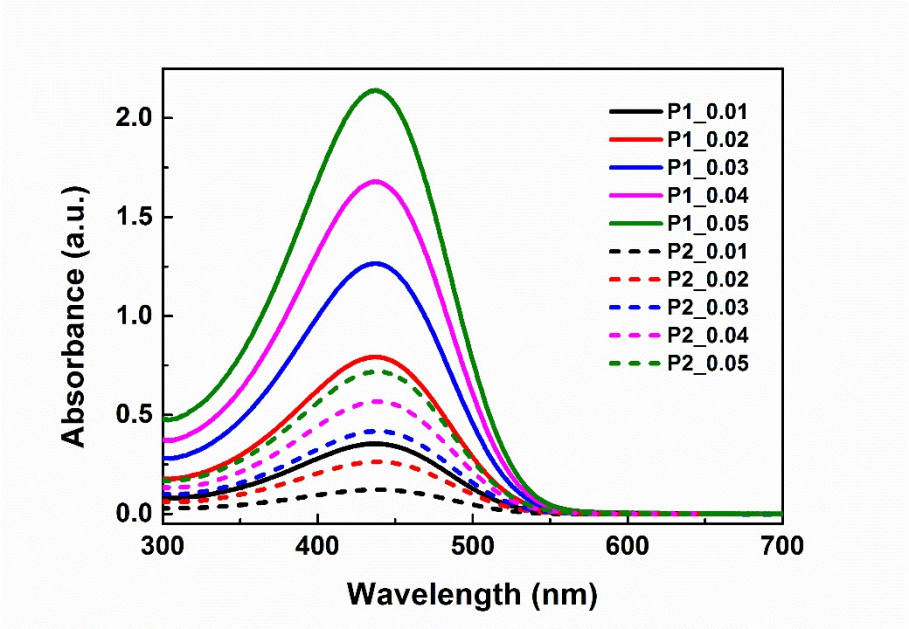

Fig. S3 UV-Vis absorption spectra of polymer P1 and P2 at different concentrations (from 0.01 to 0.05 mg mL^{-1}) in CF.

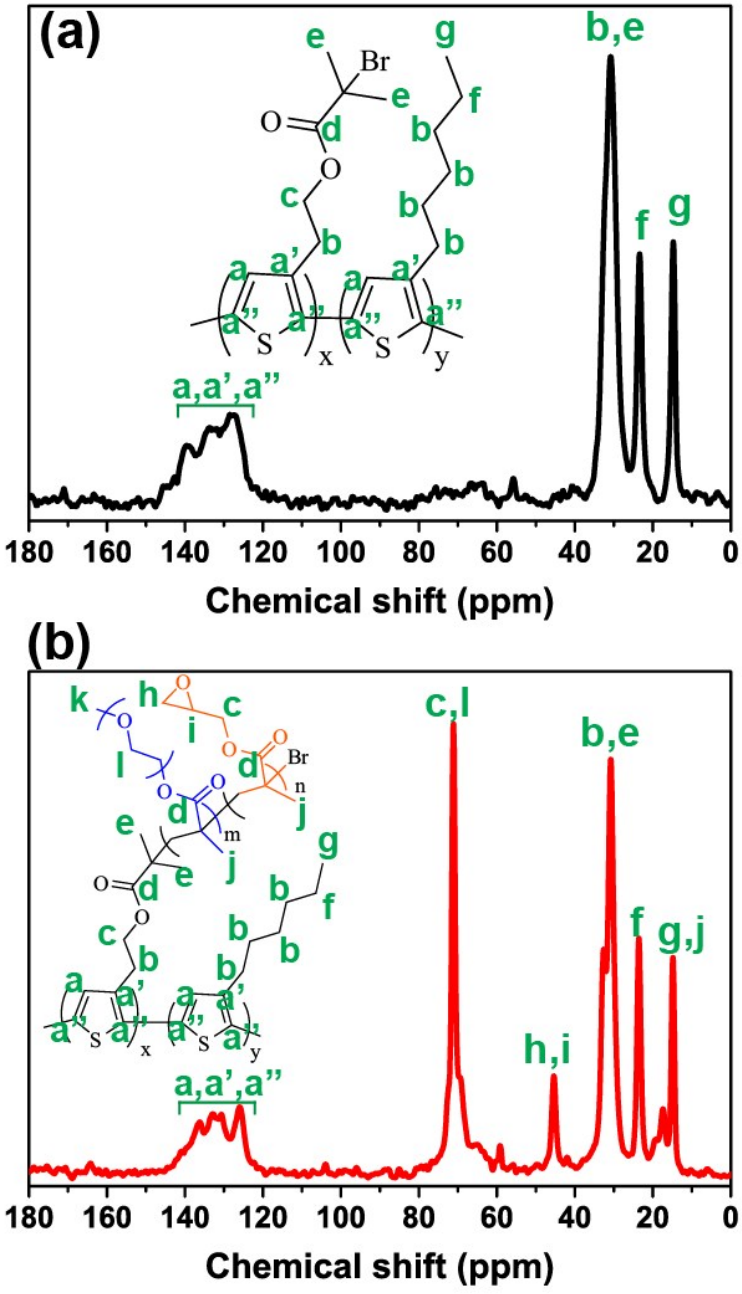

Fig. S4 Solid-state ^{1}H-^{13}C CP-MAS spectra of the (a) P1 and (b) P2 samples.

Table S2. Optical characteristics of polymer P1 and P2 in solutions and as thin films.

Sample	UV Abs in solution λ_{max} (nm)	UV Abs in film λ_{max} (nm)	FL in solution λ_{max} (nm)	FL in film λ_{max} (nm)	QY (%)
P1	437	495	573	646	10
P2	438	499	572	648	12

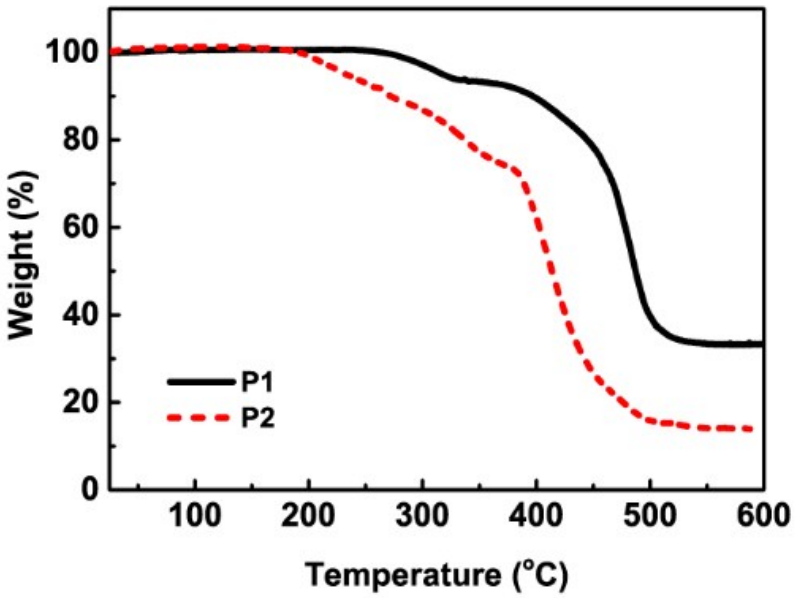

Fig. S5 TGA curves of polymer P1 and P2.

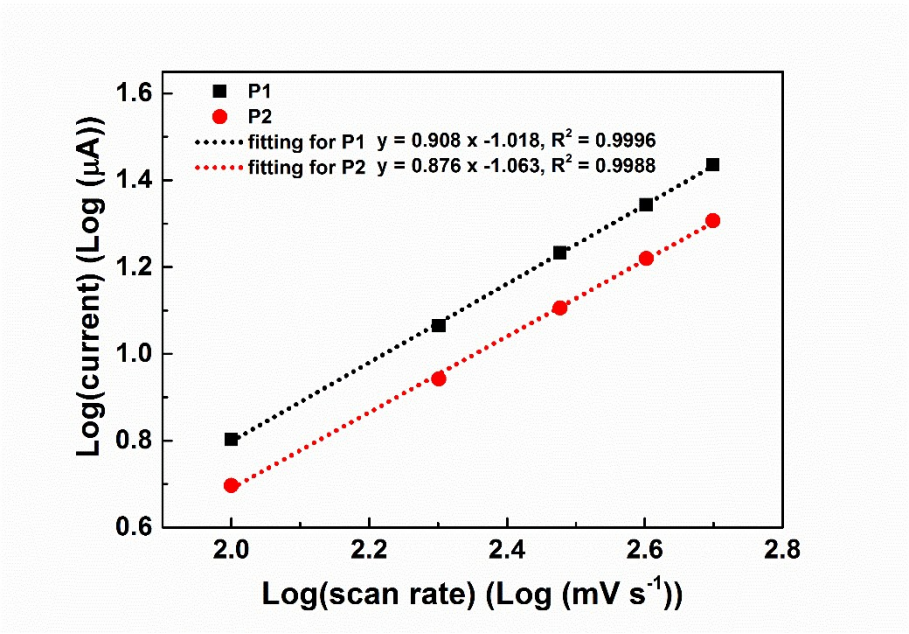

Fig. S6 The linear relationship between log (peak anodic current) versus log (scan rate) for P1 and P2.

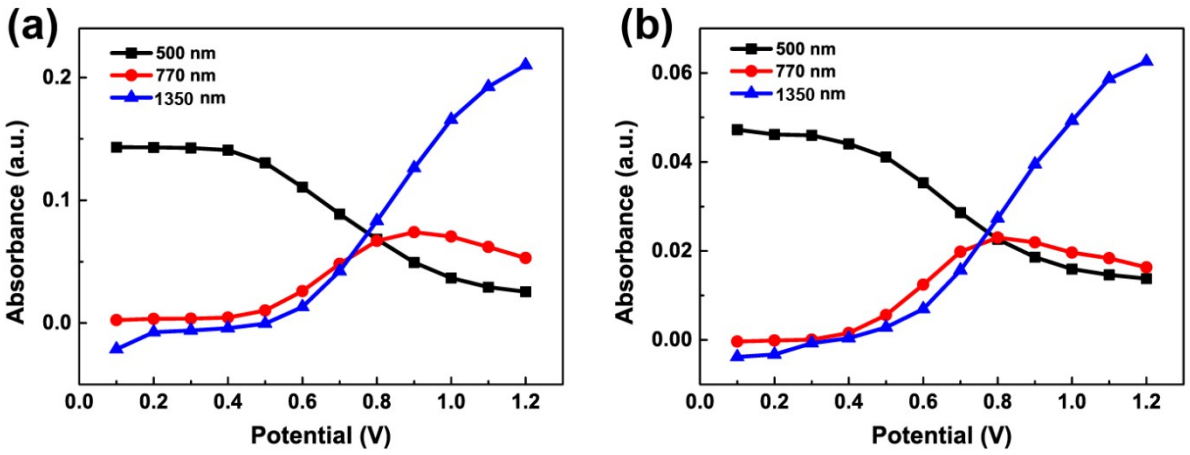

Fig. S7 The evolution curves of the optical absorbance as a function of applied potential at wavelengths of 500, 770, and 1350 nm of (a) P1 and (b) P2 films (data extracted from the spectroelectrochemical spectra).

Table S3. Summary of the electrical parameters for polymer P1 and P2.

Sample	**Average thickness (μm)**	***I* (μA)**	**V (mV)**	**σ (S m^{-1})**
P1	26.99	10	0.16	510.9
		10	0.17	480.9
		10	0.15	545.0
P2	0.83	10	126.52	21.1
		10	124.04	21.5
		10	121.70	21.9

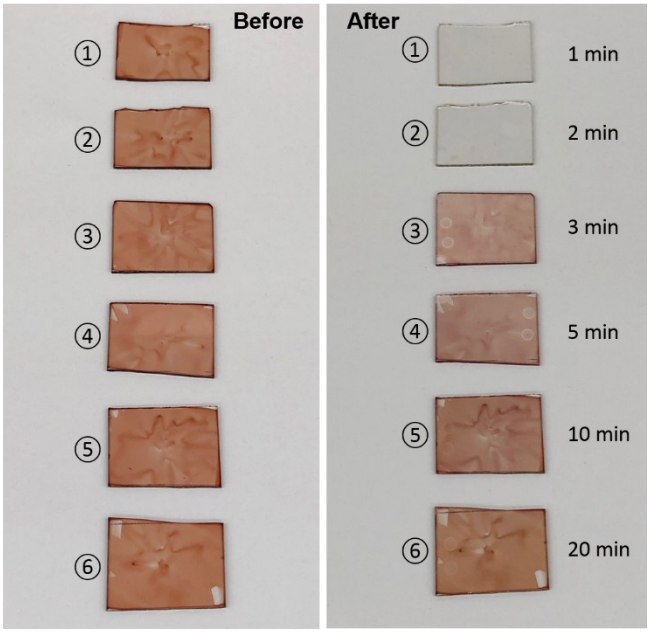

Fig. S8 Photographs of spin-coated P2 (added with photo-crosslinker) films before and after UV irradiation for different exposure times. All films were washed with THF to remove the uncrosslinked materials.

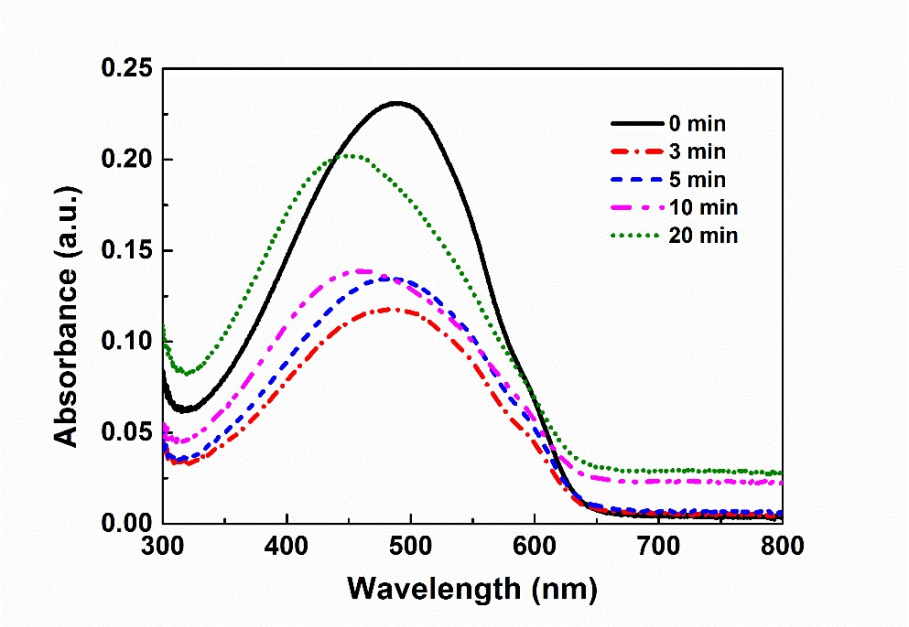

Fig. S9 UV-Vis absorption spectra of spin-coated P2 (added with photo-crosslinker) thin films on glass slides at different exposure times after washing with THF. The sample of 0 min refers to the pristine polymer film without UV irradiation.

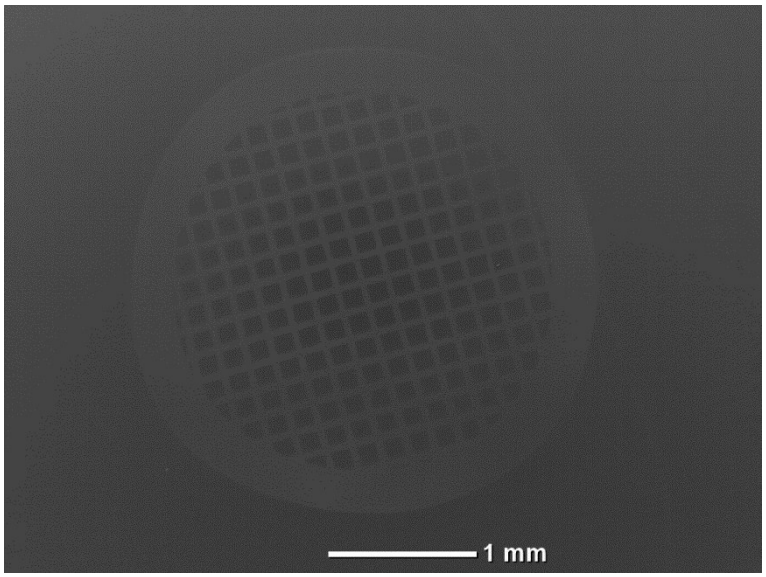

Fig. S10 SEM image for the patterned P2 film (non-swollen) on Si wafer.