

Supporting Information

Corannulene-Based Donor-Acceptor-Type Conjugated Polymers with Electrochromic Properties

Jing-Ju Huang,[‡] Hsing-An Lin,^{‡,*} Chi Chen, Po-Wen Tang, and
Shyh-Chyang Luo*

Prof. H.-A. Lin,
School of Materials Science and Engineering
Shanghai University
99 Shangda Road, Baoshan, Shanghai 200444
E-mail: halin@shu.edu.cn

J.-J. Huang, Prof. S.-C. Luo
Department of Materials Science and Engineering
National Taiwan University
No.1, Sec. 4, Roosevelt Road, Taipei 10617
E-mail: shyhchyang@ntu.edu.tw

Dr. P.-W. Tang, Dr. C. Chen
Research Center for Applied Science
Academic Sinica
128 Sec. 2, Academia Rd., Nankang, Taipei, 115

Prof. Shyh-Chyang Luo
Advanced Research Center for Green Materials Science and Technology, National
Taiwan University, Taipei, 10617

[‡] Jing-Ju Huang and Hsing-An Lin contributed equally to this work.

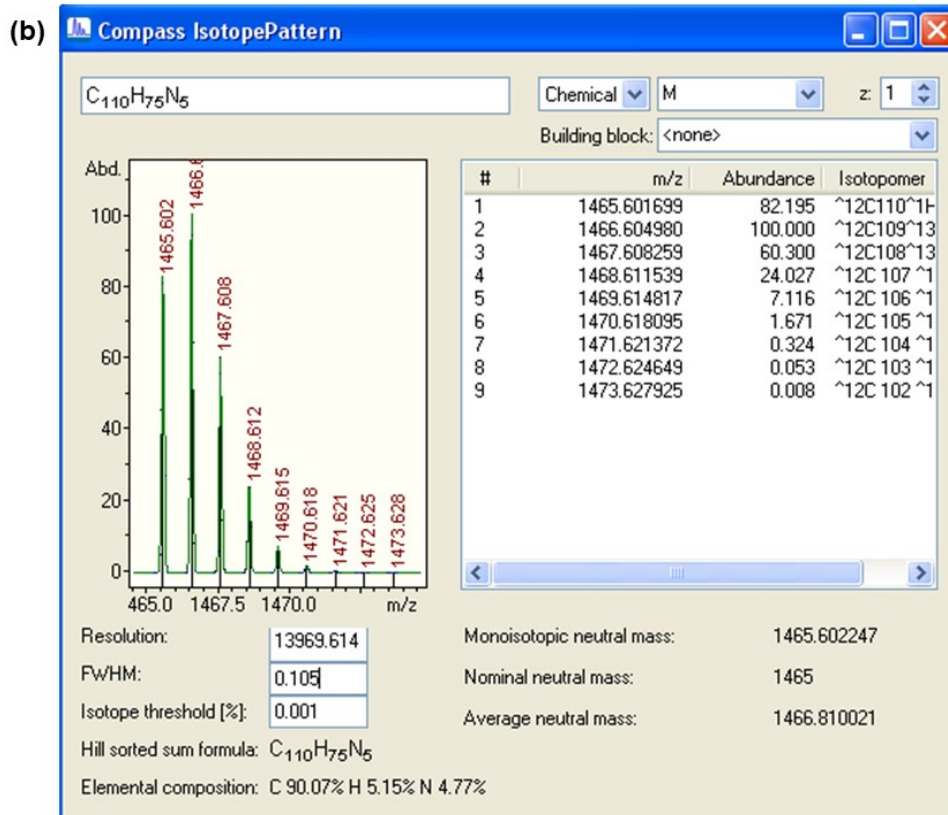
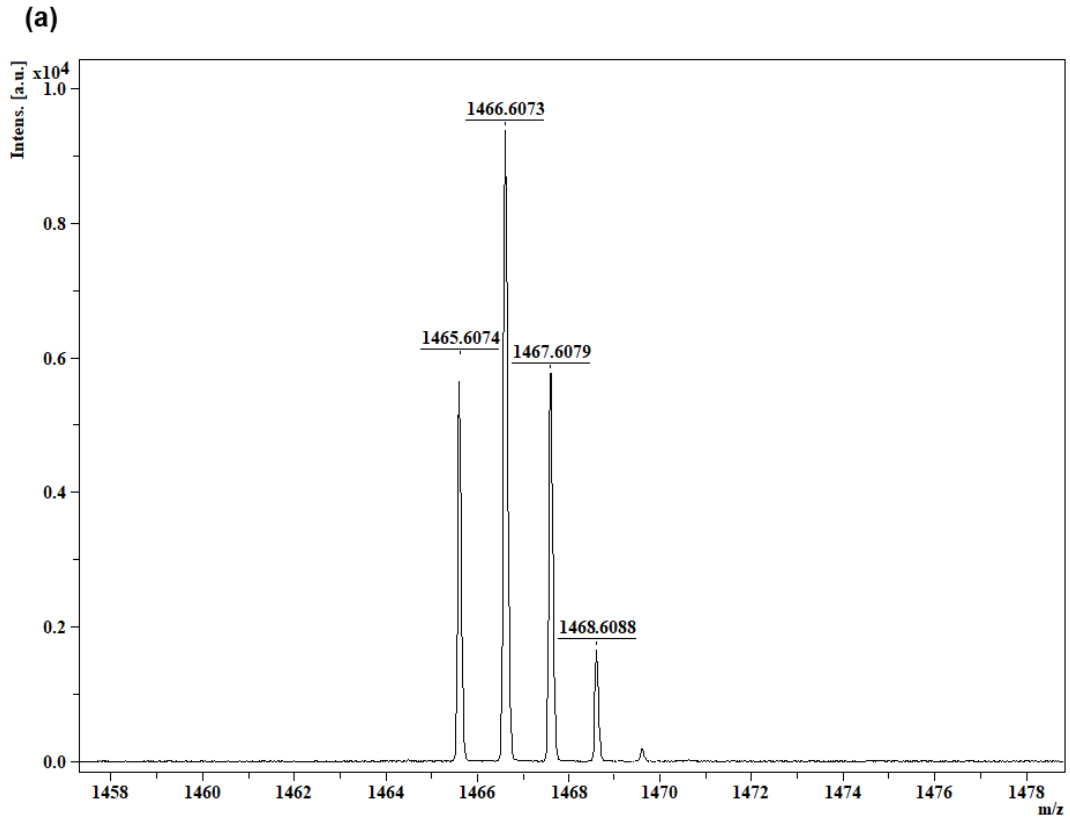


Fig. S1 MALDI-TOF mass spectrum of CT. (a) Observed. (b) Simulated.

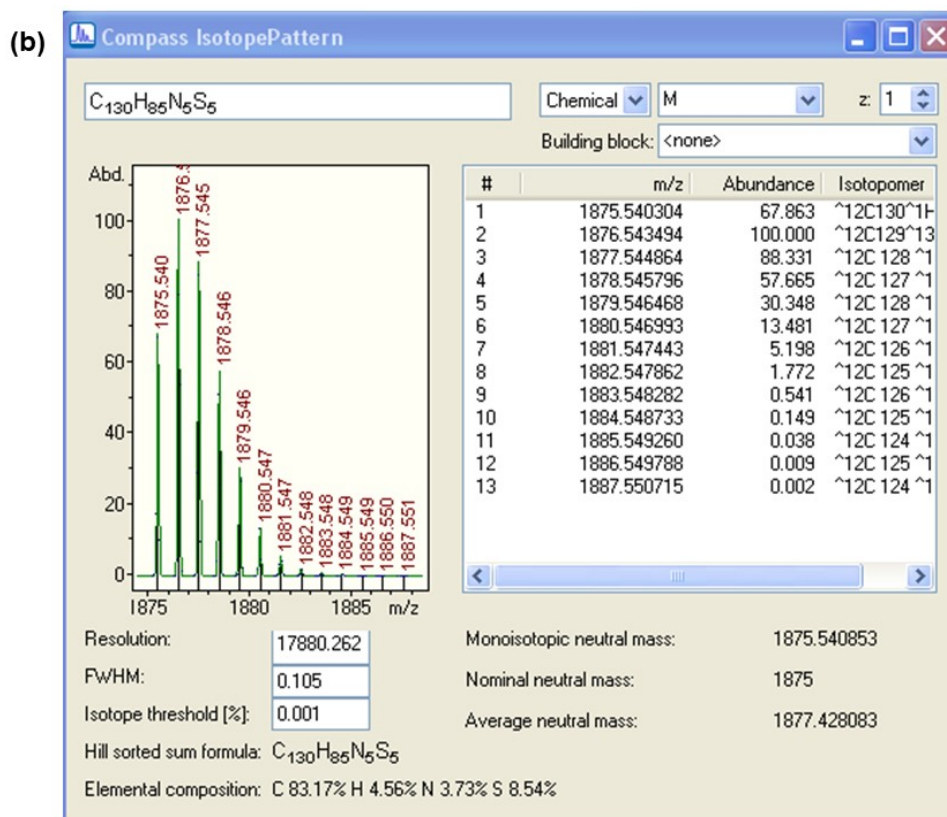
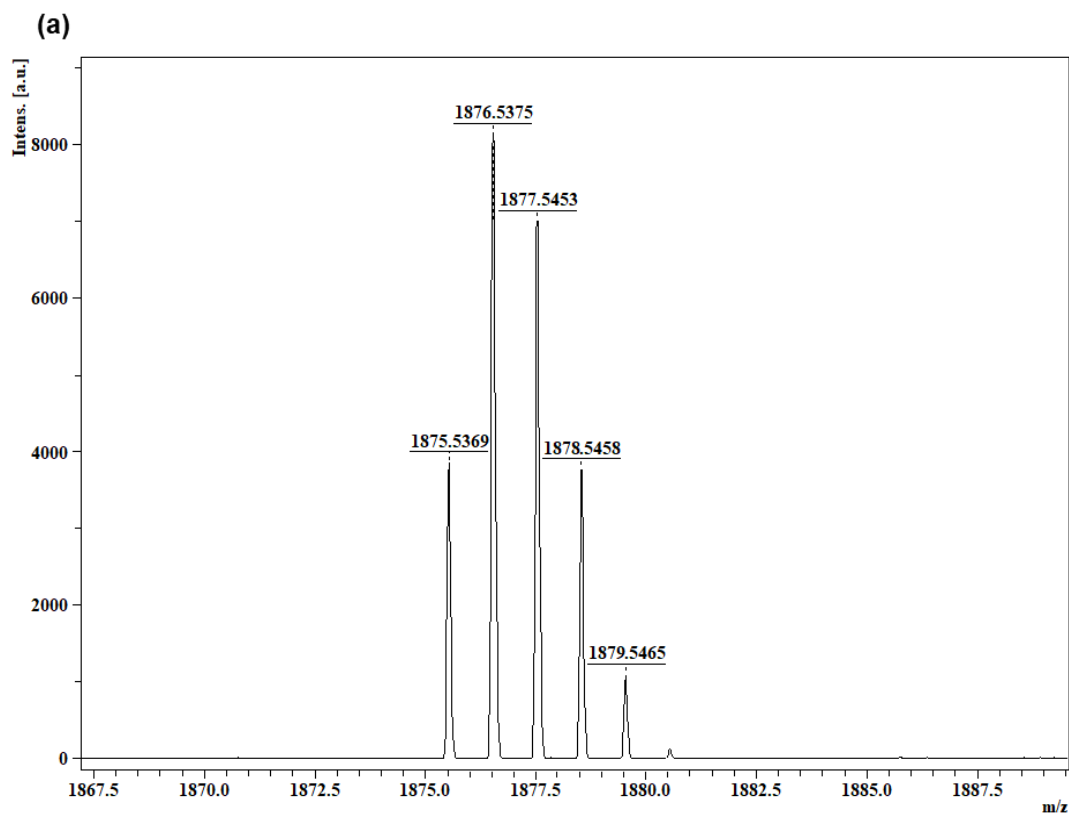


Fig. S2 MALDI-TOF mass spectrum of CTT. (a) Observed. (b) Simulated.

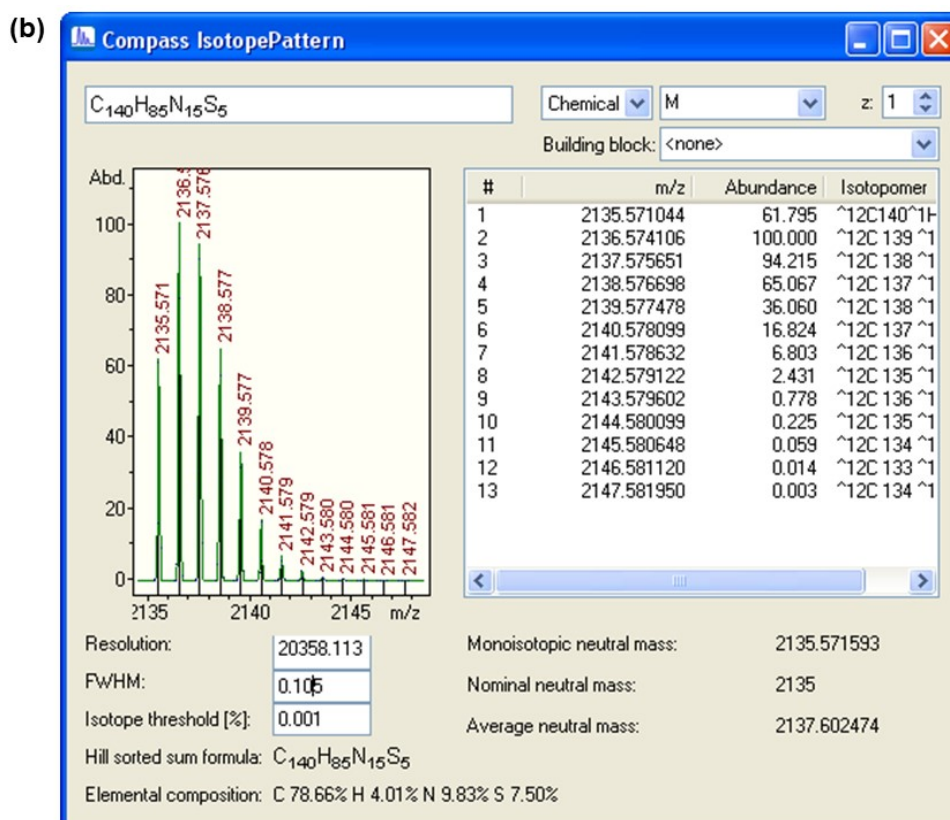
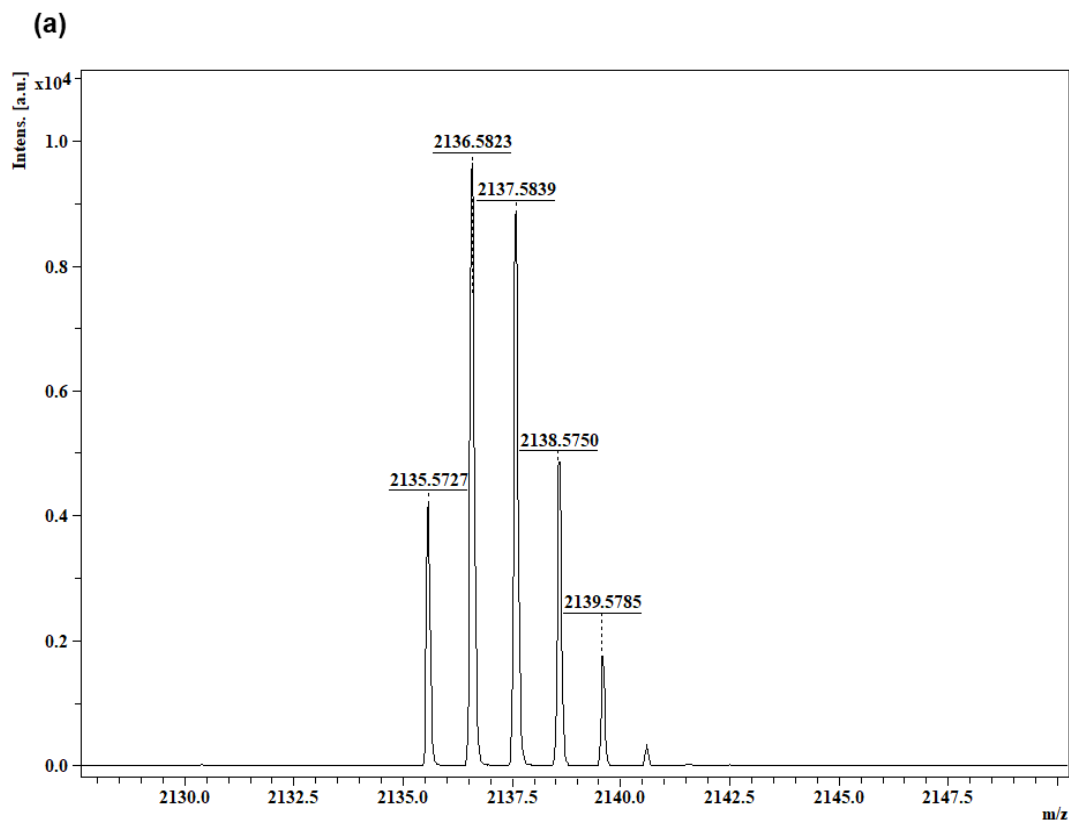


Fig. S3 MALDI-TOF mass spectrum of CBT. (a) Observed. (b) Simulated.

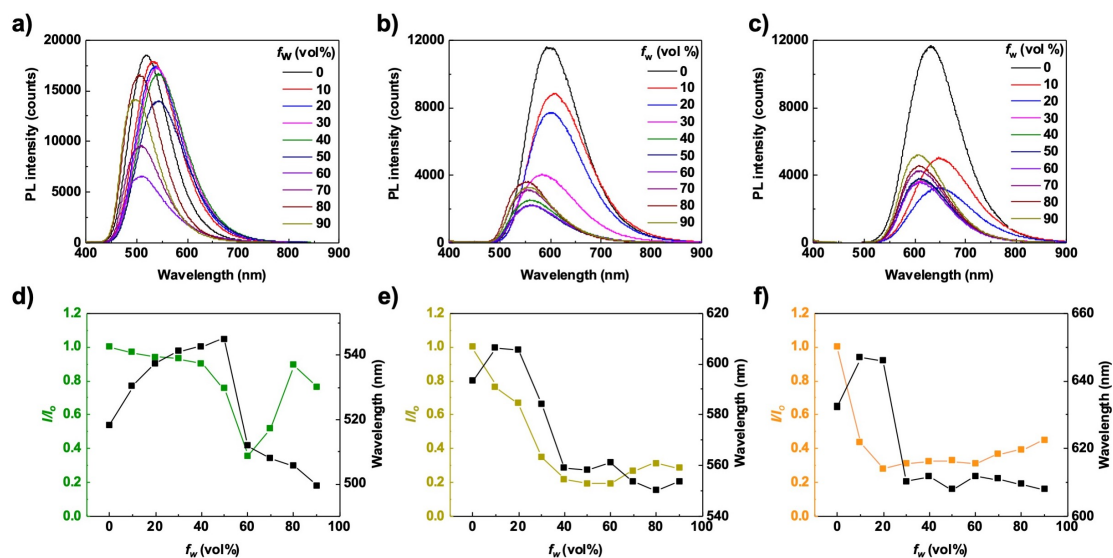


Fig. S4 Fluorescence spectra of (a) CT, (b) CTT, (c) CBT in THF/water mixture with different water fraction (f_w). Variation in fluorescent intensity (I/I_0) of (d) CT, (e) CTT, (f) CBT with different f_w where I and I_0 were the maximum fluorescent intensity. ($[CT]$, $[CTT]$, or $[CBT] = 1 \times 10^{-6}$ M; λ_{ex} : 365 nm for all monomers).

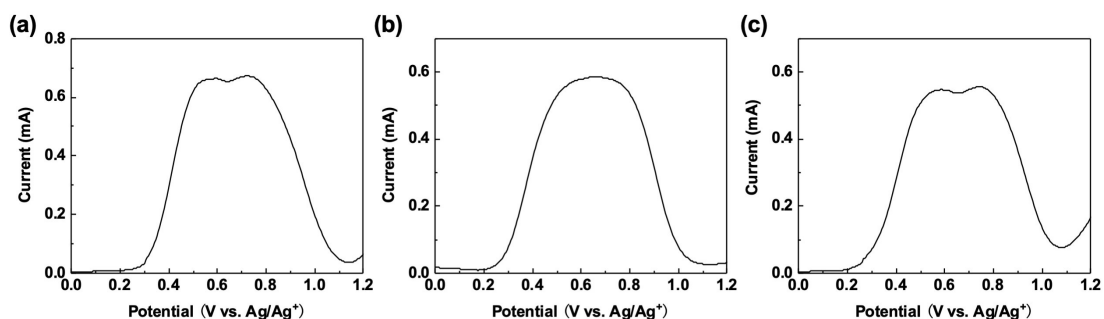


Fig. S5 Differential pulse voltammetry of (a) PCT, (b) PCTT, and (c) PCBT polymer films upon scanning at an amplitude of 0.05 V and pulse of 0.03 s.

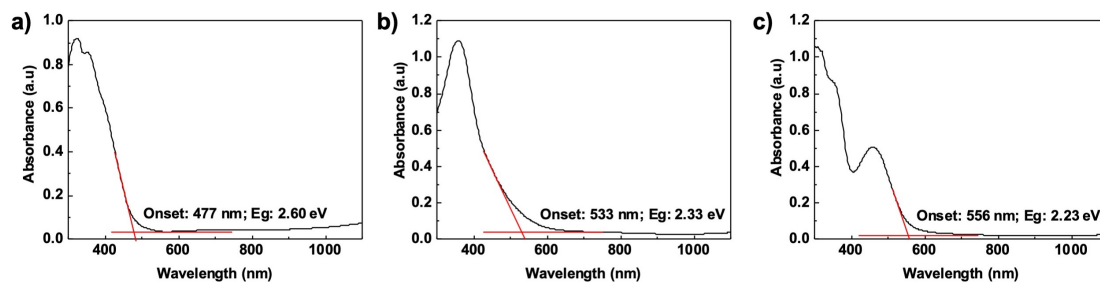


Fig. S6 UV-vis spectra of (a) PCT, (b) PCTT, and (c) PCBT films.

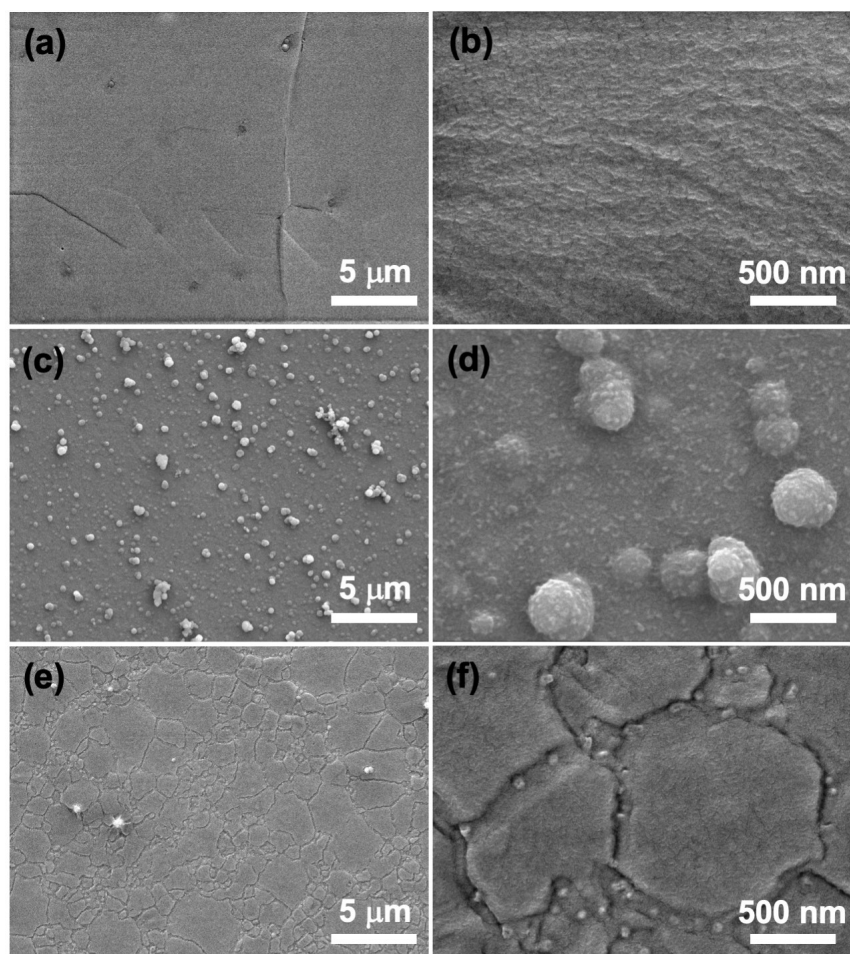


Fig. S7 Surface morphology of (a, b) PCT, (c, d) PCTT, and (e, f) PCBT polymer films.

The images were captured using a scanning electron microscope.

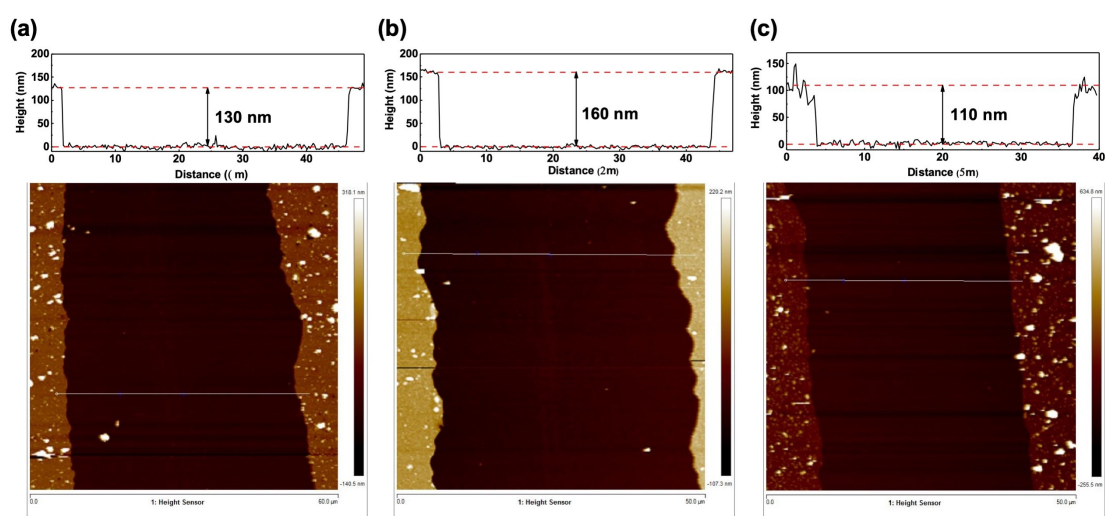


Fig. S8 Thickness of (a) PCT, (b) PCTT, and (c) PCBT films measured by atomic force microscopy.

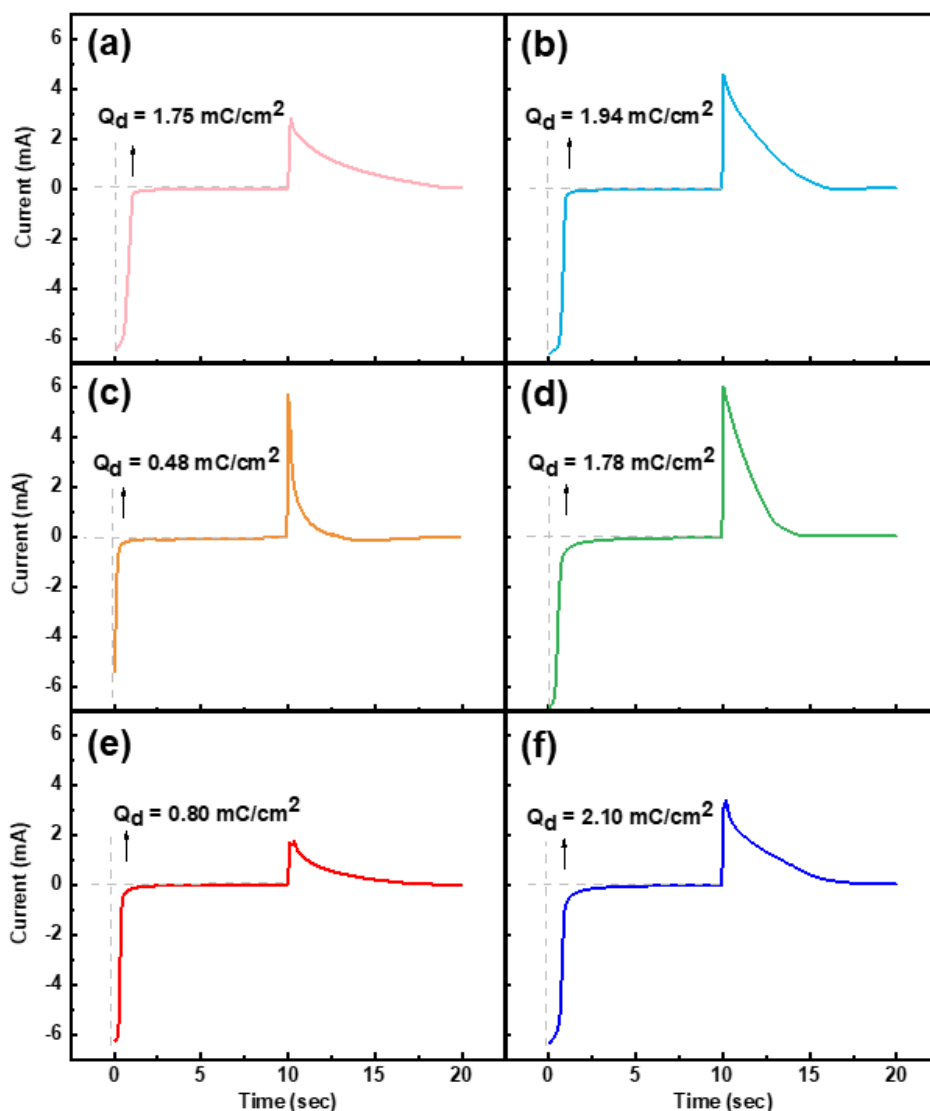


Fig. S9 Switching current of (a,b) **PCT**, (c,d) **PCTT**, (e,f) **PCBT** films in PC solution with 100 mM TBAP as supporting electrolyte and Ag/AgCl as reference electrode: (a) the switching current of **PCT** film monitored at 350 nm as applied the potential between 0 V and 0.92 V; (b) the switching current of **PCT** film monitored at 800 nm as applied the potential between 0 V and 1.10 V; (c) the switching current of **PCTT** film monitored at 360 nm as applied the potential between 0 V and 0.95 V; (d) the switching current of **PCTT** film monitored at 750 nm as applied the potential between 0 V and 1.14 V; (e) the switching current of **PCBT** film monitored at 350 nm as applied the potential between 0 V and 0.92 V; (f) the switching current of **PCBT**

film monitored at 840 nm as applied the potential between 0 V and 1.10 V.

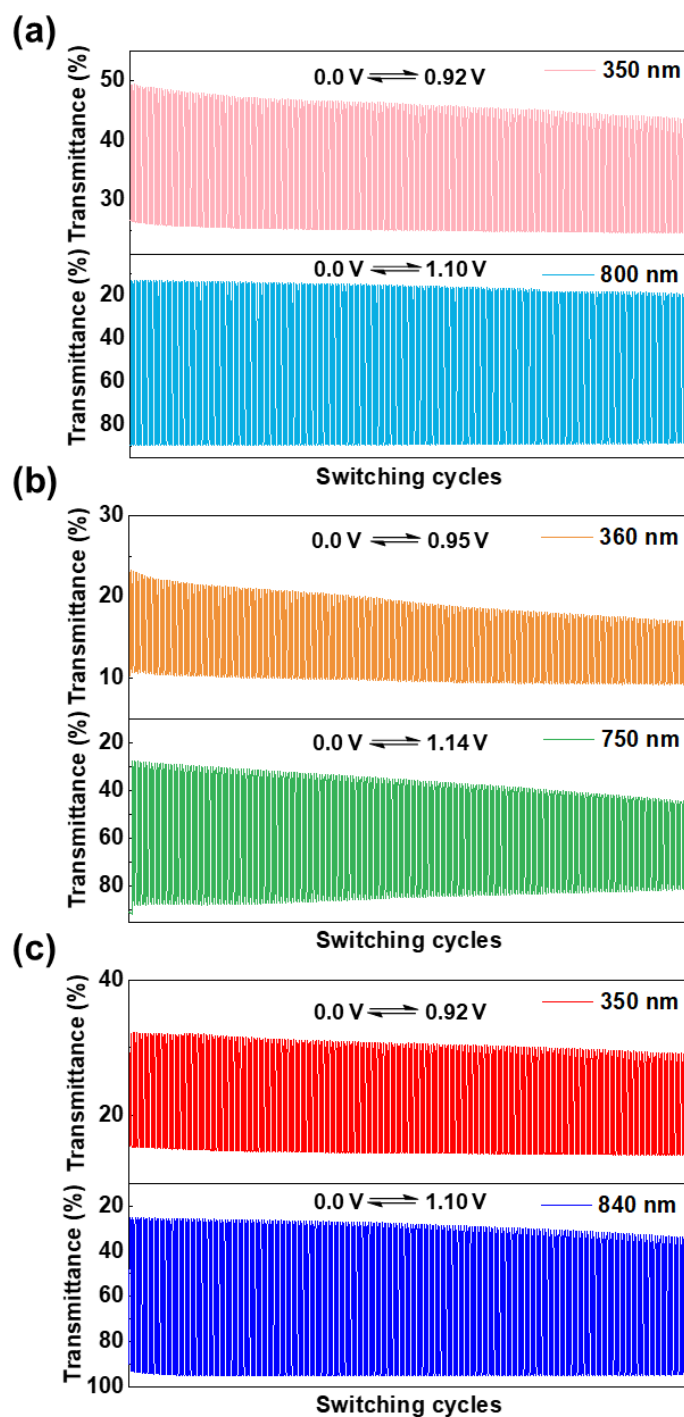


Fig. S10 Electrochromic switching of the polymer films in PC solution with 100 mM TBAP under square-wave potential sweeps with a pulse time of 10 s for 200 continuous cycles: (a) the optical transmittance of **PCT** film was monitored at 350 and 800 nm, (b) the optical transmittance of **PCTT** film was monitored at 360 and 750

nm, and (c) the optical transmittance of **PCBT** film was monitored at 350 and 840 nm.

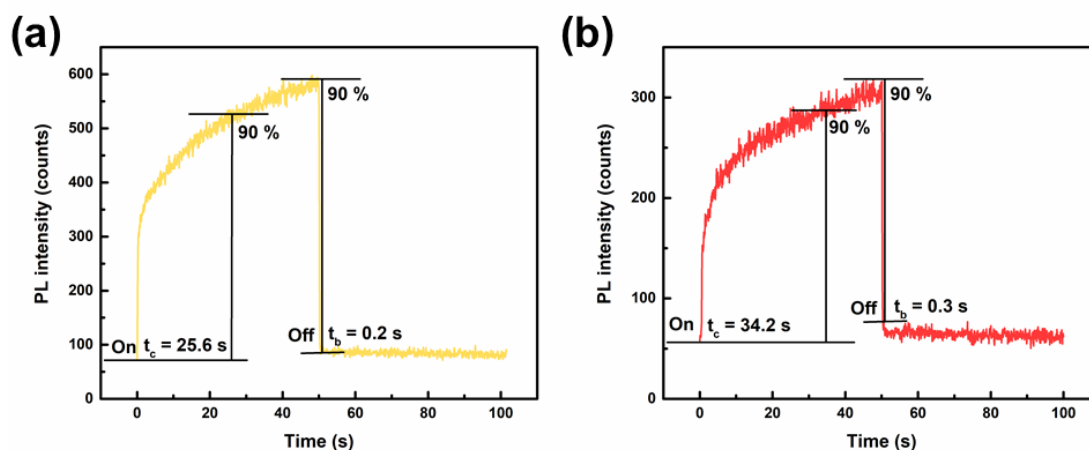


Fig. S11 Fluorescence spectroelectrochemistry of polymers (a) **PCT**, and (b) **PCBT** in PC containing 100 mM TBAP with applied potentials from 0.0 to 1.1 V versus Ag/AgCl.

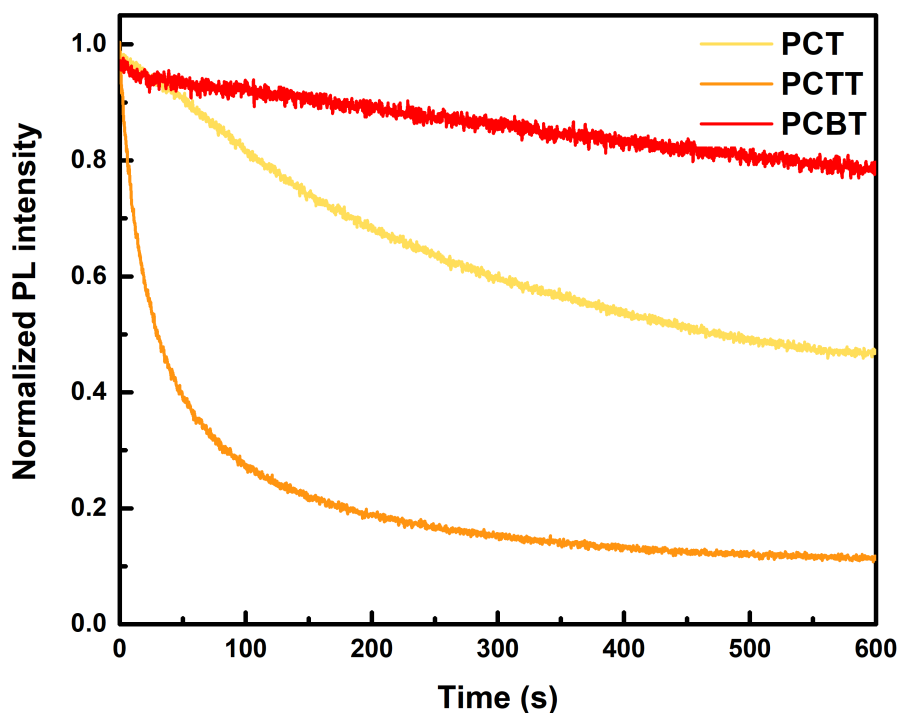
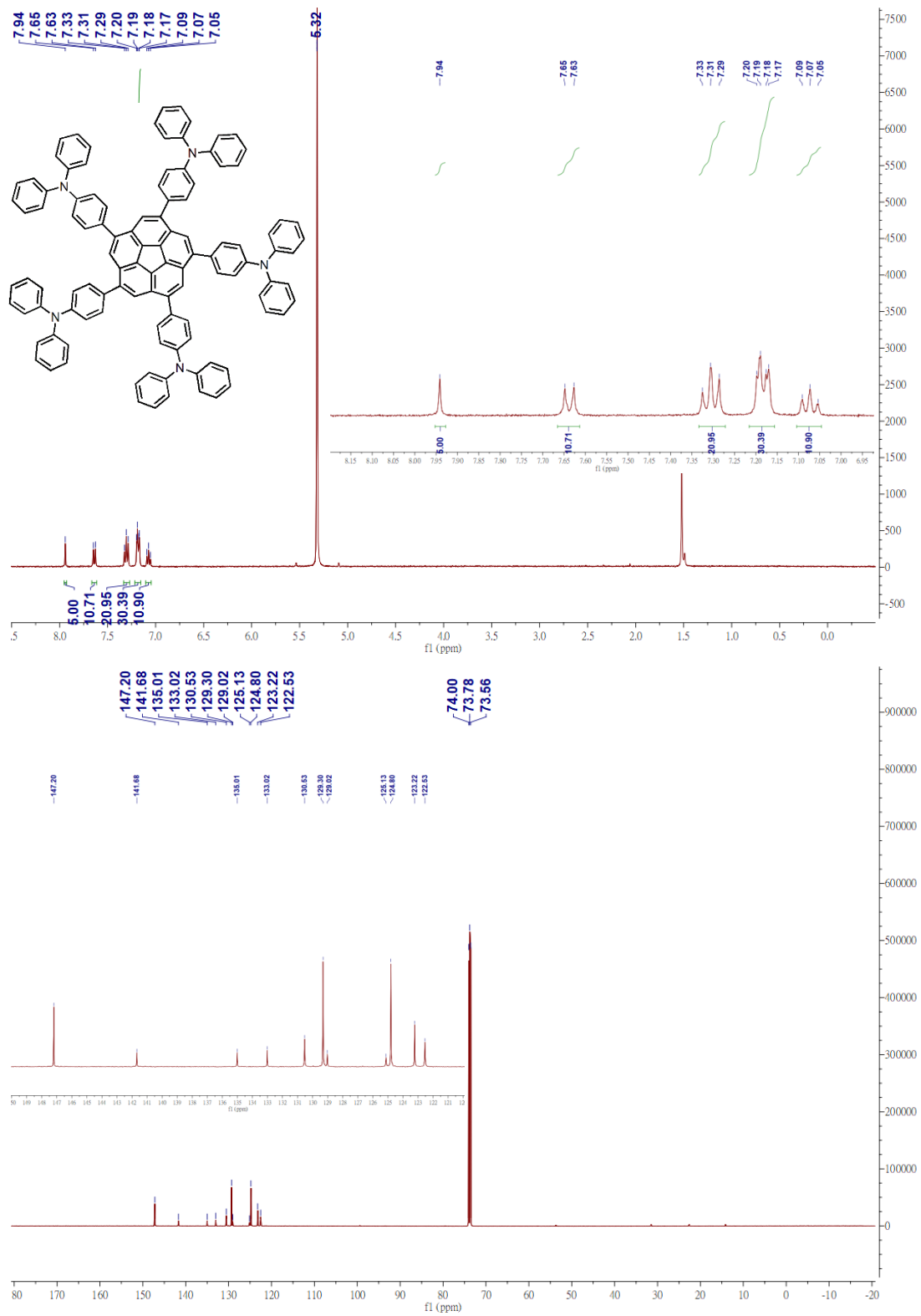


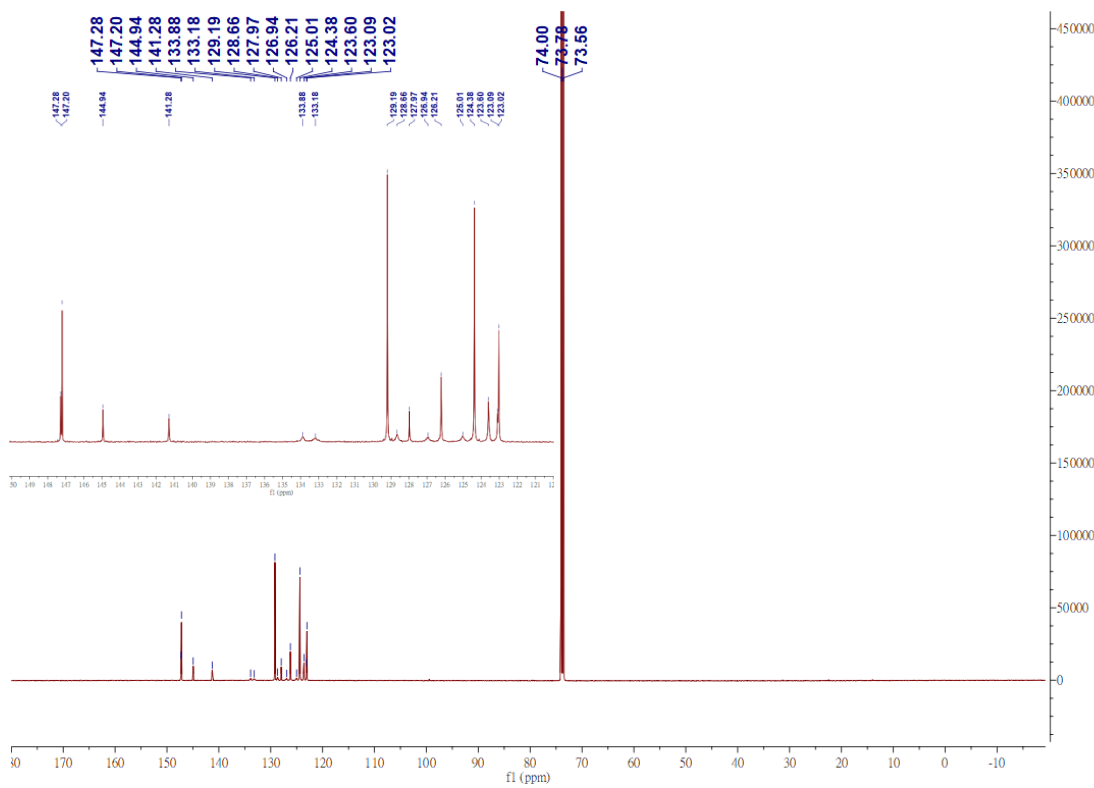
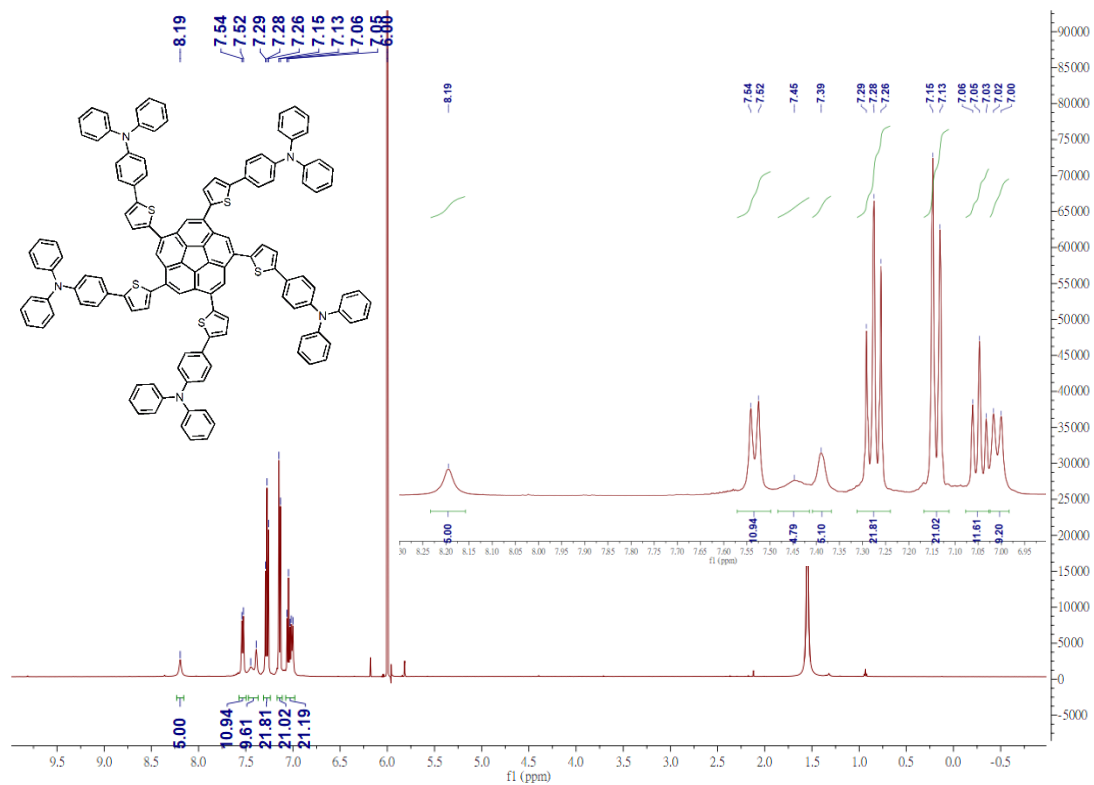
Fig. S12 The time-dependent fluorescence decay of **PCT**, **PCTT**, and **PCBT** films as exposed to 365 nm UV light for a continuous 10 min.

^1H and ^{13}C NMR spectra of new compounds

CT ^1H NMR (CD_2Cl_2 , r.t.); ^{13}C NMR ($\text{C}_2\text{D}_2\text{Cl}_4$, r.t.)



CTT ^1H NMR ($\text{C}_2\text{D}_2\text{Cl}_4$, 70°C); ^{13}C NMR ($\text{C}_2\text{D}_2\text{Cl}_4$, 70°C)



CBT ¹H NMR (C₂D₂Cl₄, 70 °C); ¹³C NMR (C₂D₂Cl₄, 70 °C)

