

SUPPORTING INFORMATION

Donor-Acceptor Polymer Electrochromes with Tunable Colors and Performance

Merve İçli,[†] Melek Pamuk,[‡] Fatih Algı,[‡] Ahmet M. Önal[†] and Atilla Cihaner,^{‡,*}

[†]Department of Chemistry, Middle East Technical University, TR-06531 Ankara, Turkey.

[‡] Laboratory of Organic Materials (LOM), Çanakkale Onsekiz Mart University, TR-17100 Çanakkale, Turkey.

[‡] Chemistry Group, Faculty of Engineering, Atılım University, TR-06836 Ankara, Turkey.

* Corresponding authors. Tel.: +903125868304; Fax: +903125868091; E-mail: cihaner@atilim.edu.tr

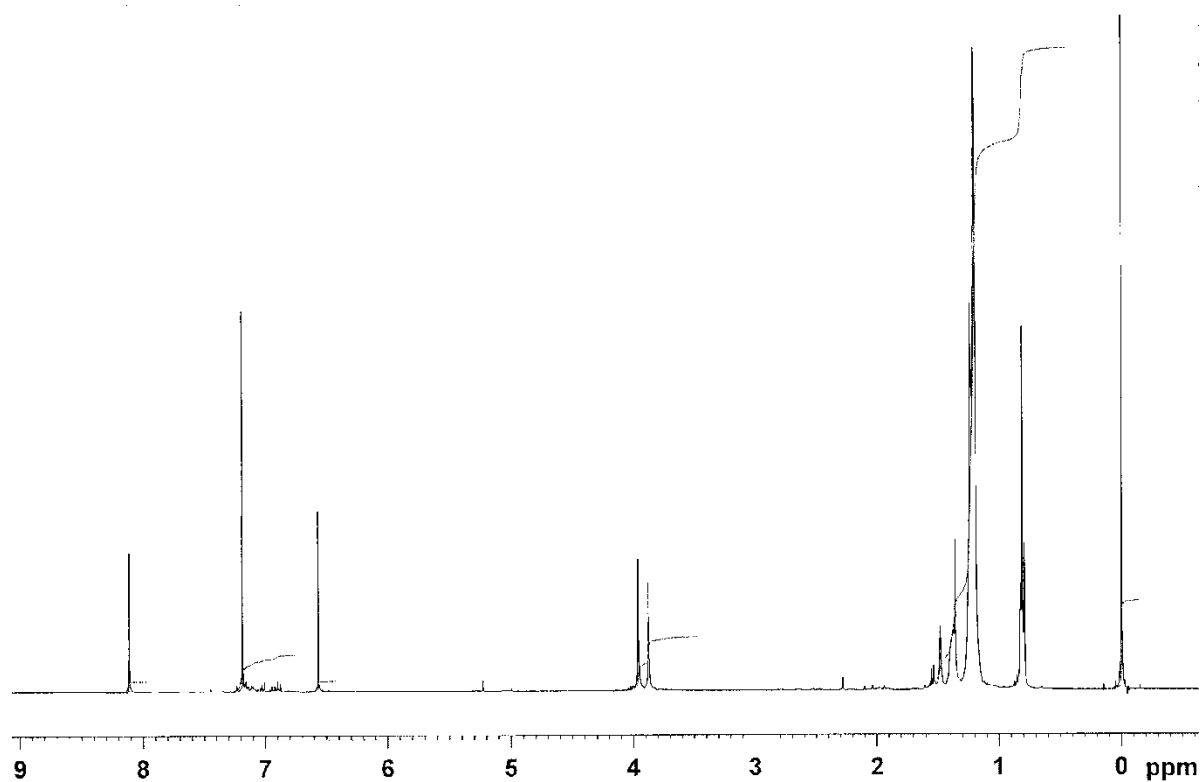


Figure S1. ^1H NMR Spectrum of **3** in CDCl_3 .

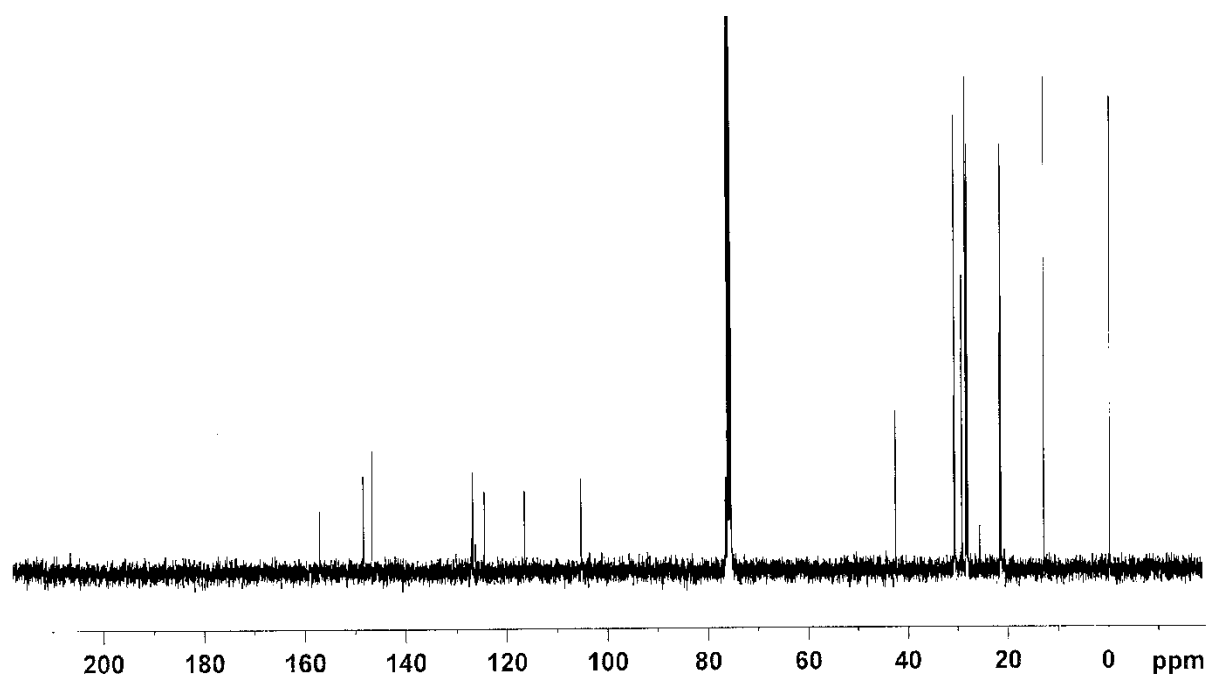


Figure S2. ^{13}C NMR Spectrum of **3** in CDCl_3 .

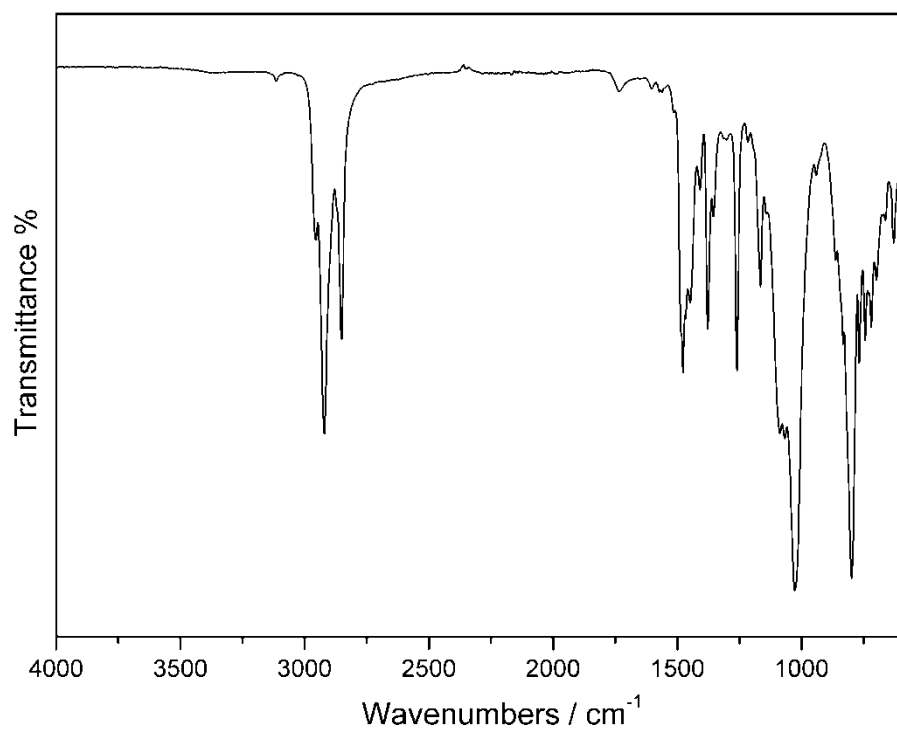


Figure S3. FTIR Spectrum of **3**.

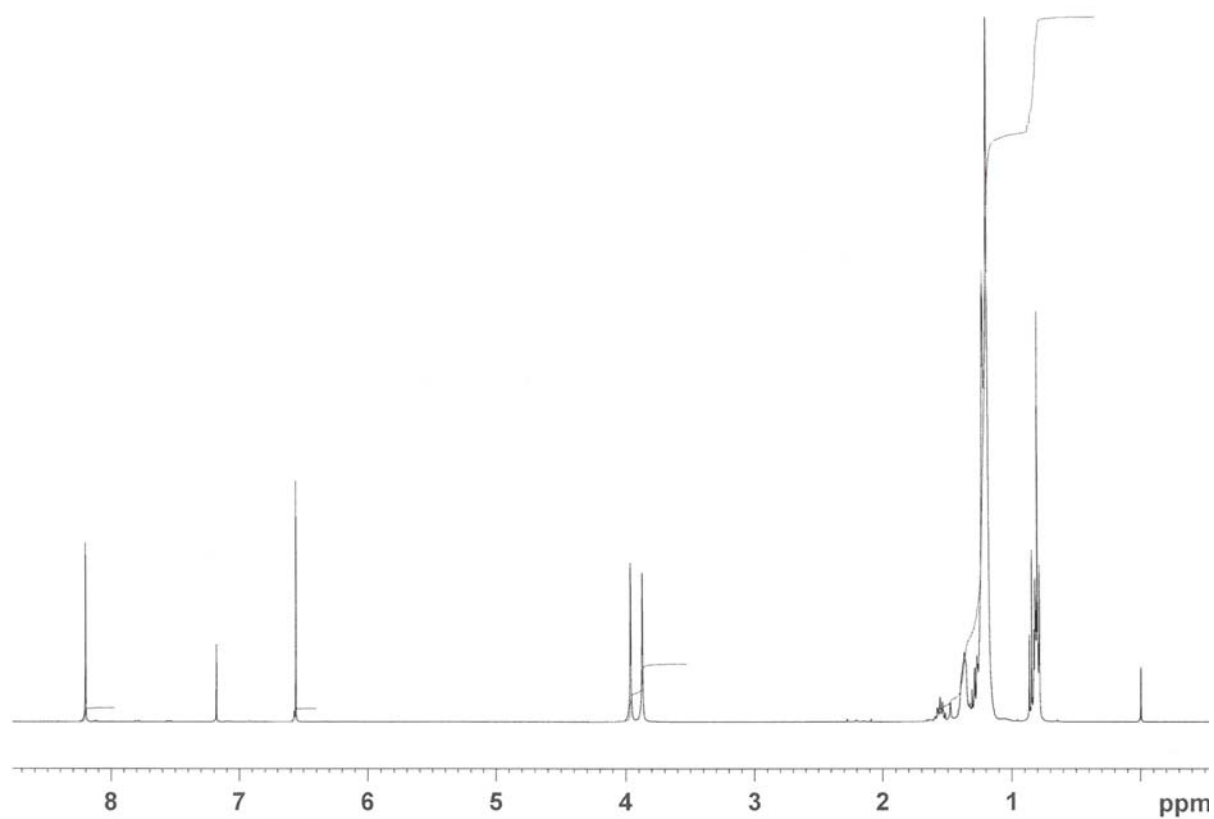


Figure S4. ¹H NMR Spectrum of **4** in CDCl₃.

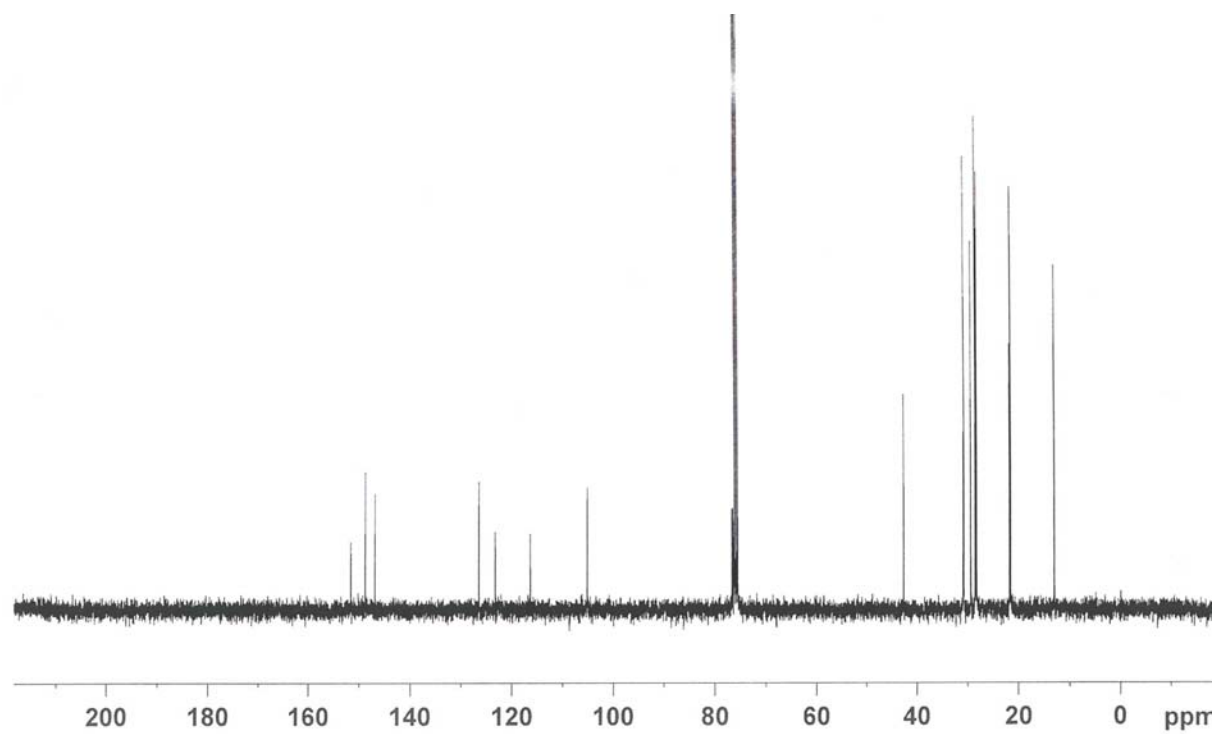


Figure S5. ^{13}C NMR Spectrum of **4** in CDCl_3 .

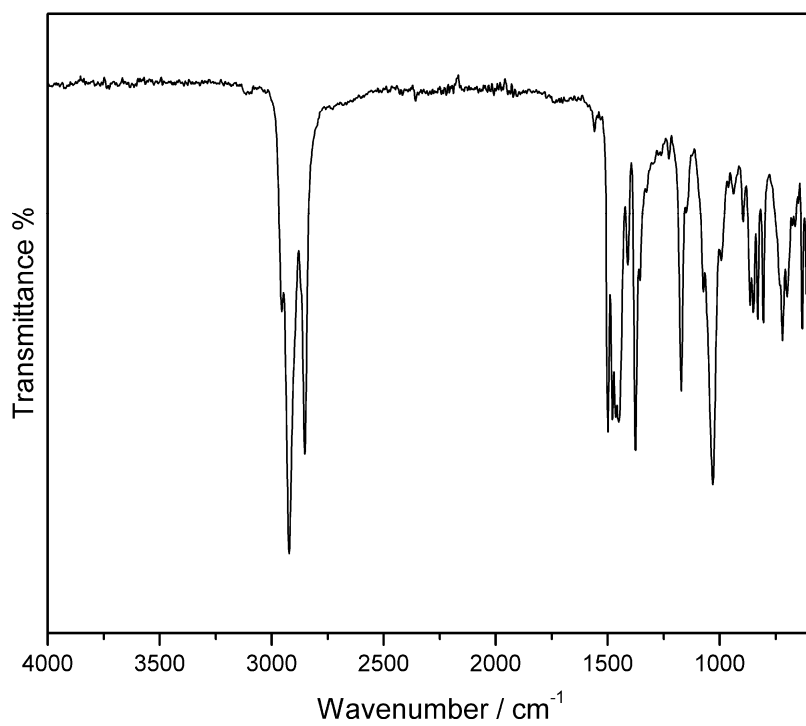


Figure S6. FTIR Spectrum of **4**.

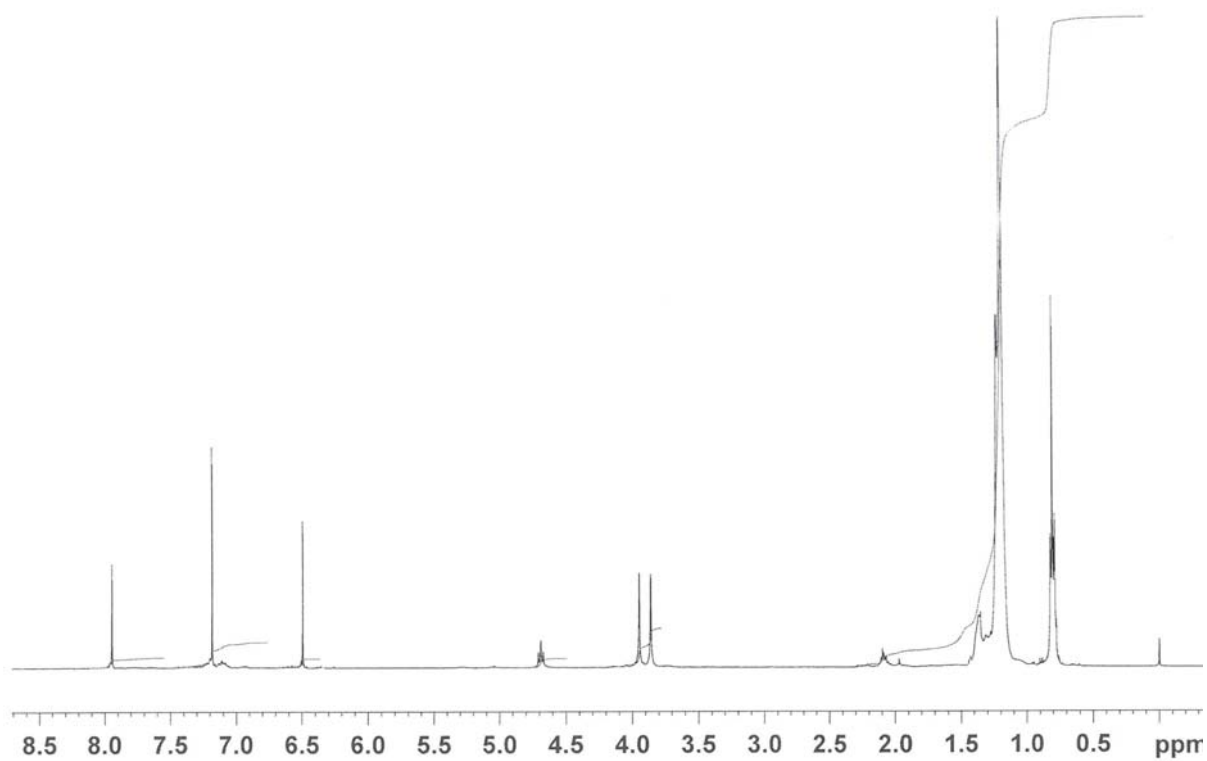


Figure S7. ^1H NMR Spectrum of **5** in CDCl_3 .

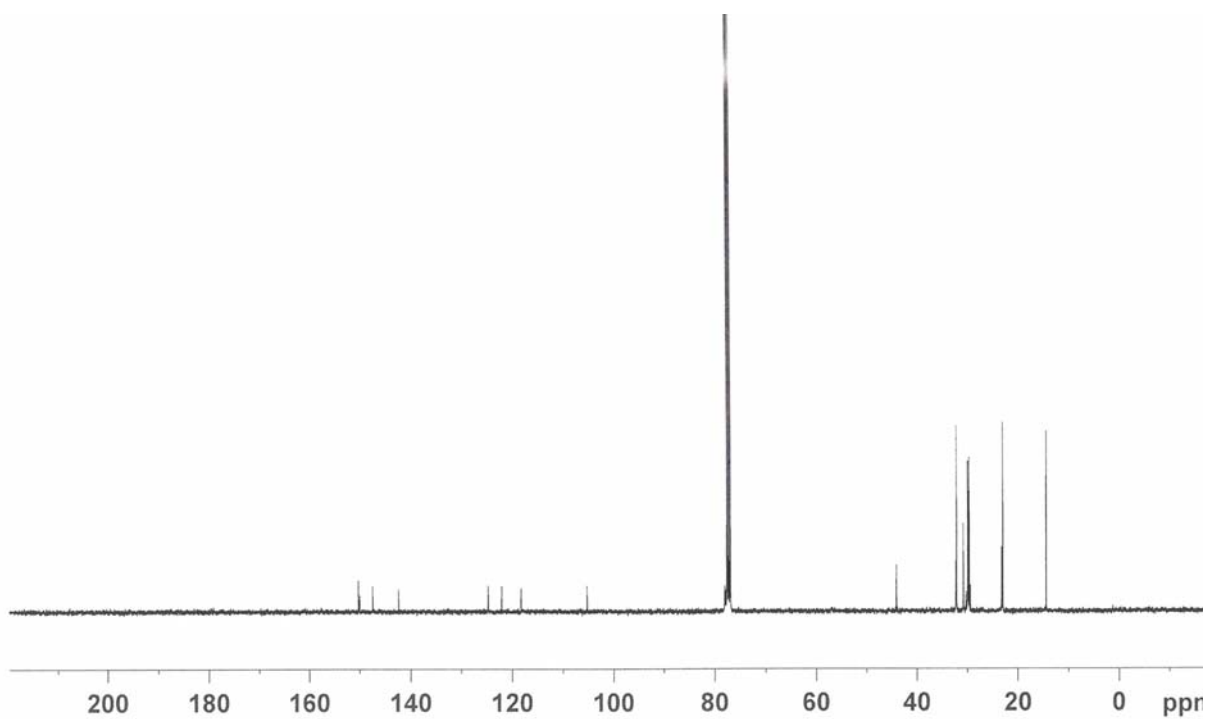


Figure S8. ^{13}C NMR Spectrum of **5** in CDCl_3 .

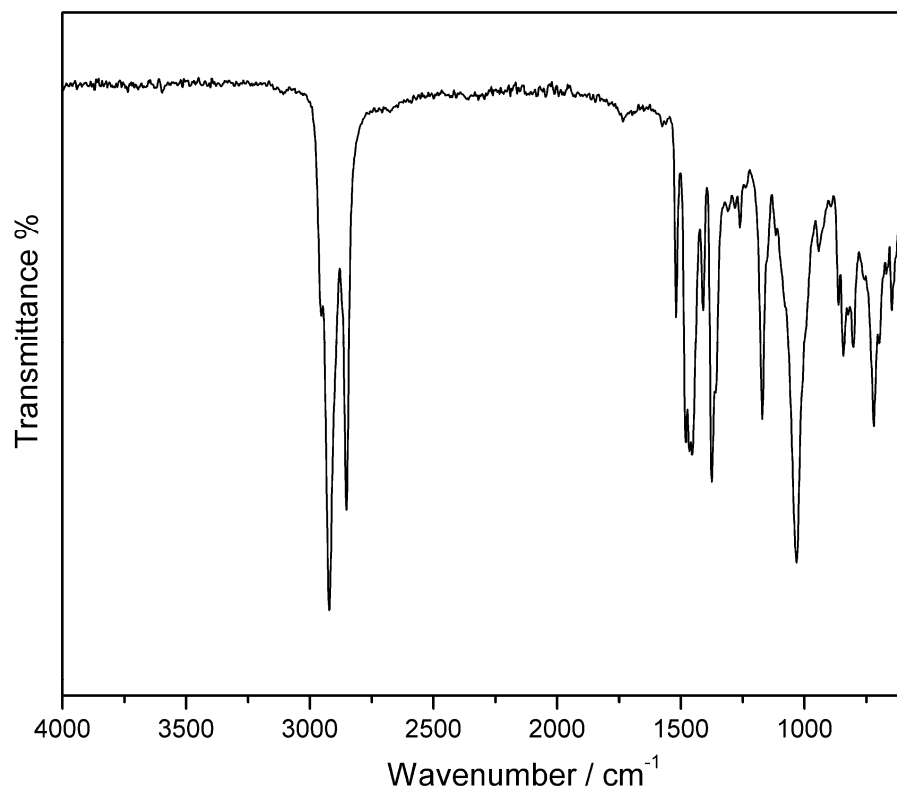


Figure S9. FTIR Spectrum of **5**.

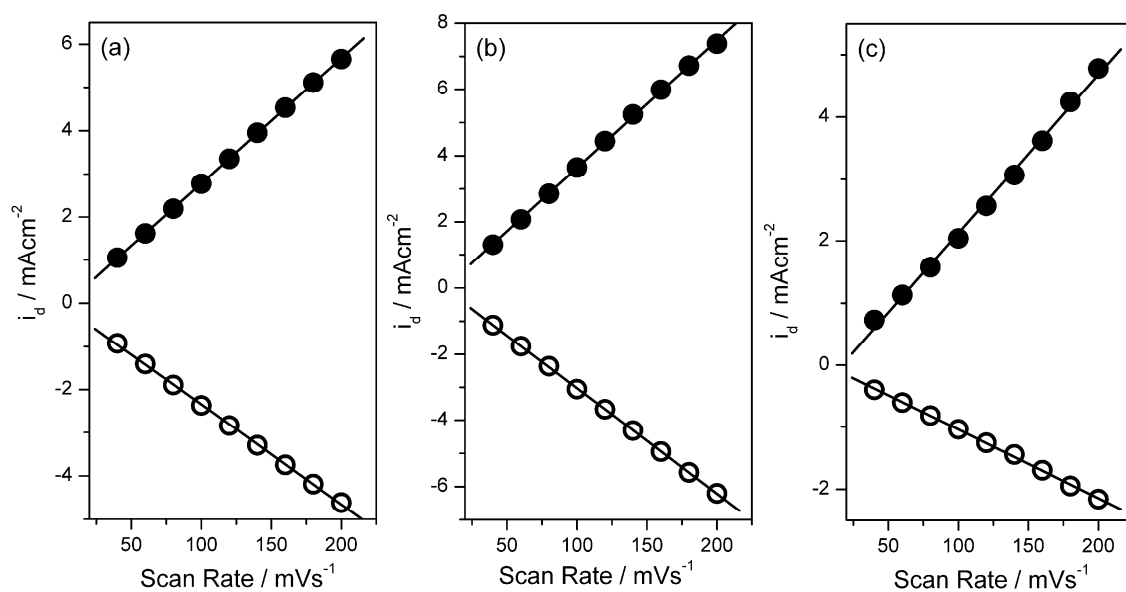


Figure S10. Relationship of anodic and cathodic peaks current as a function of scan rate for neutral and oxidized (a) **P3**, (b) **P4**, and (c) **P5** in 0.1 M TBAH/ACN.

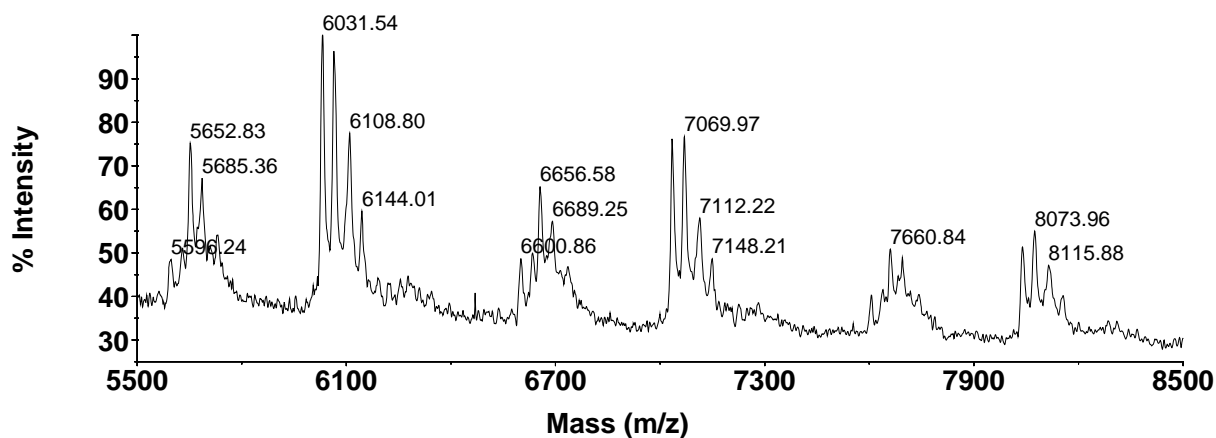


Figure S11. Mass spectrum of chemically polymerized **P4** (experimental notes: $M_n = 7652.24$, $M_w = 8991.42$, $M_z = 10221.84$, $PDI = 1.18$).

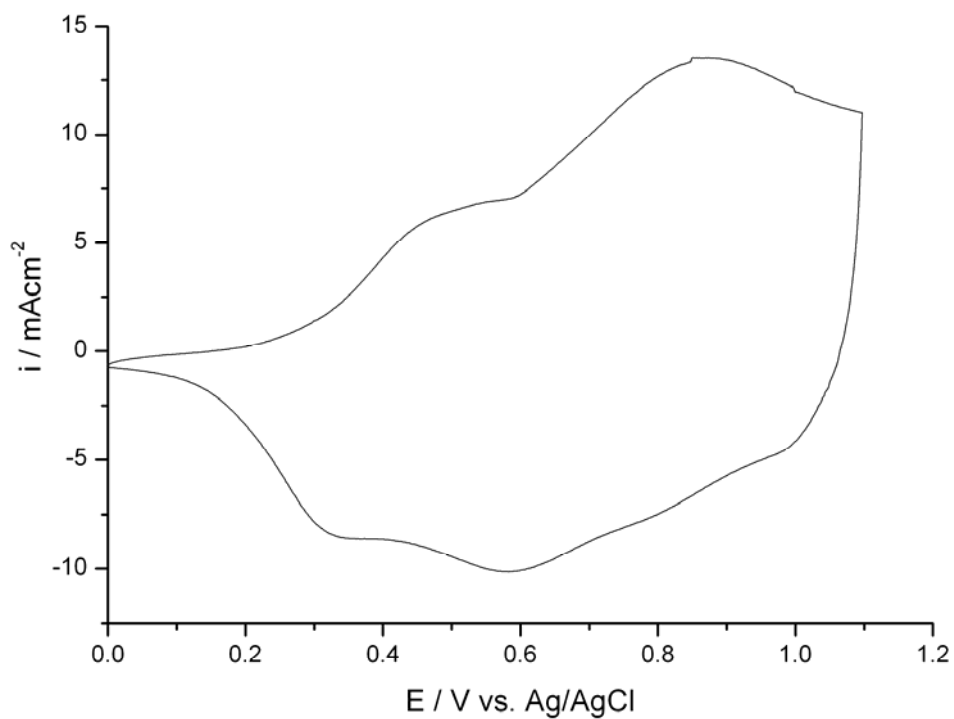
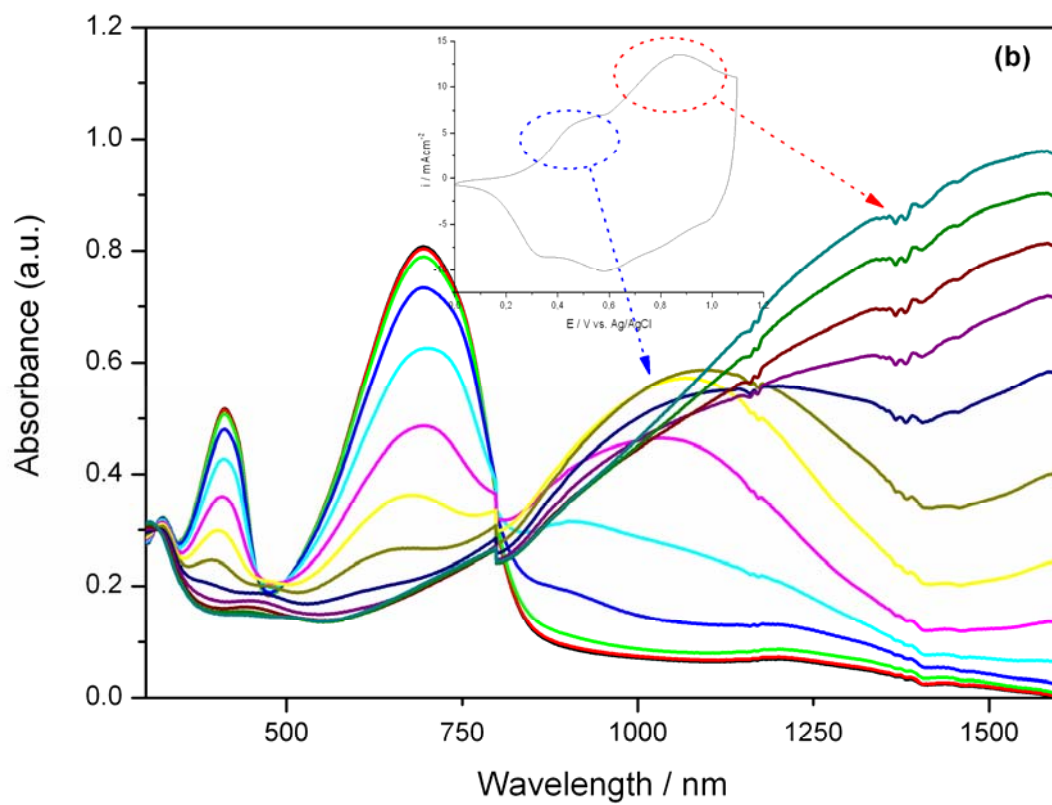
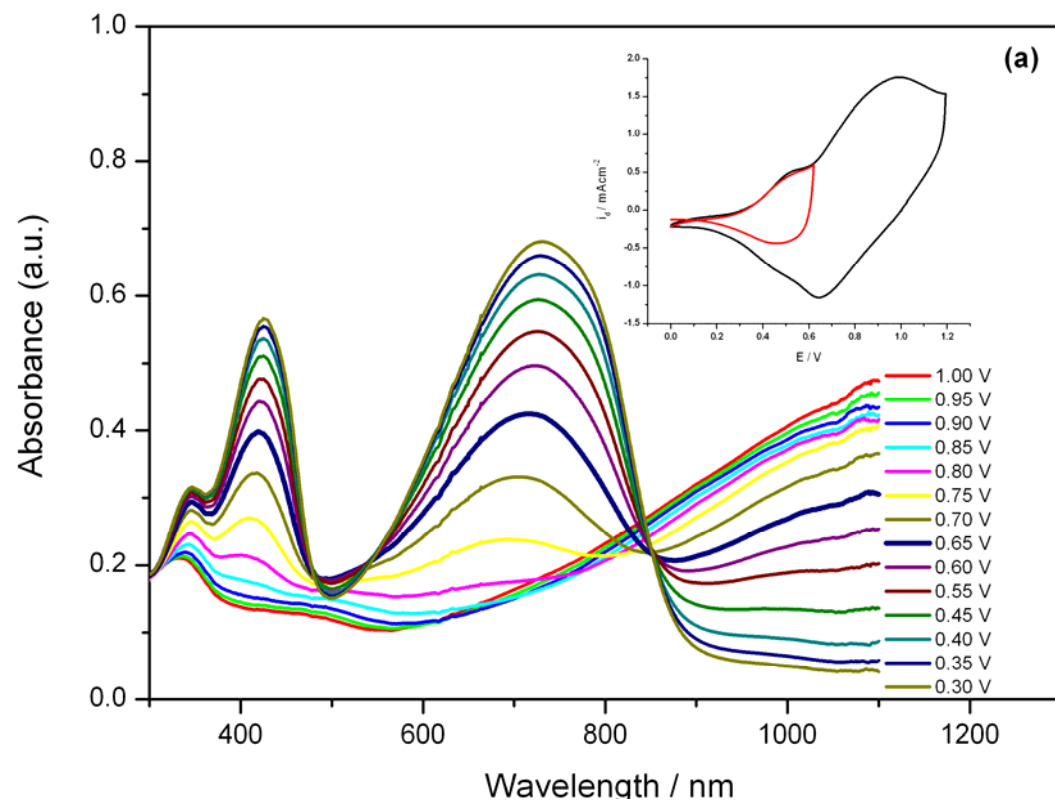


Figure S12. Cyclic voltammograms of chemically polymerized **P4** coated on ITO in 0.1 TBAH/ACN at a scan rate of 100 mV/s.



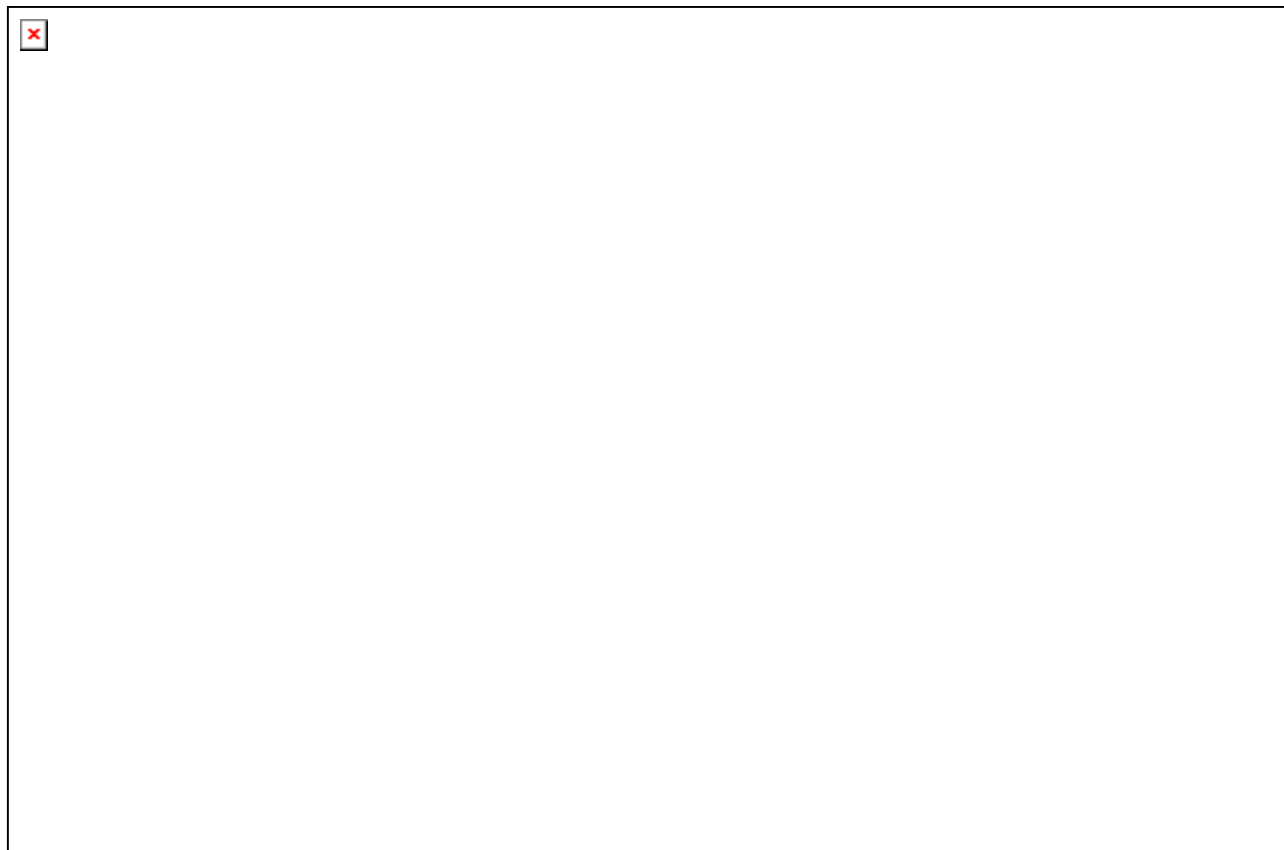
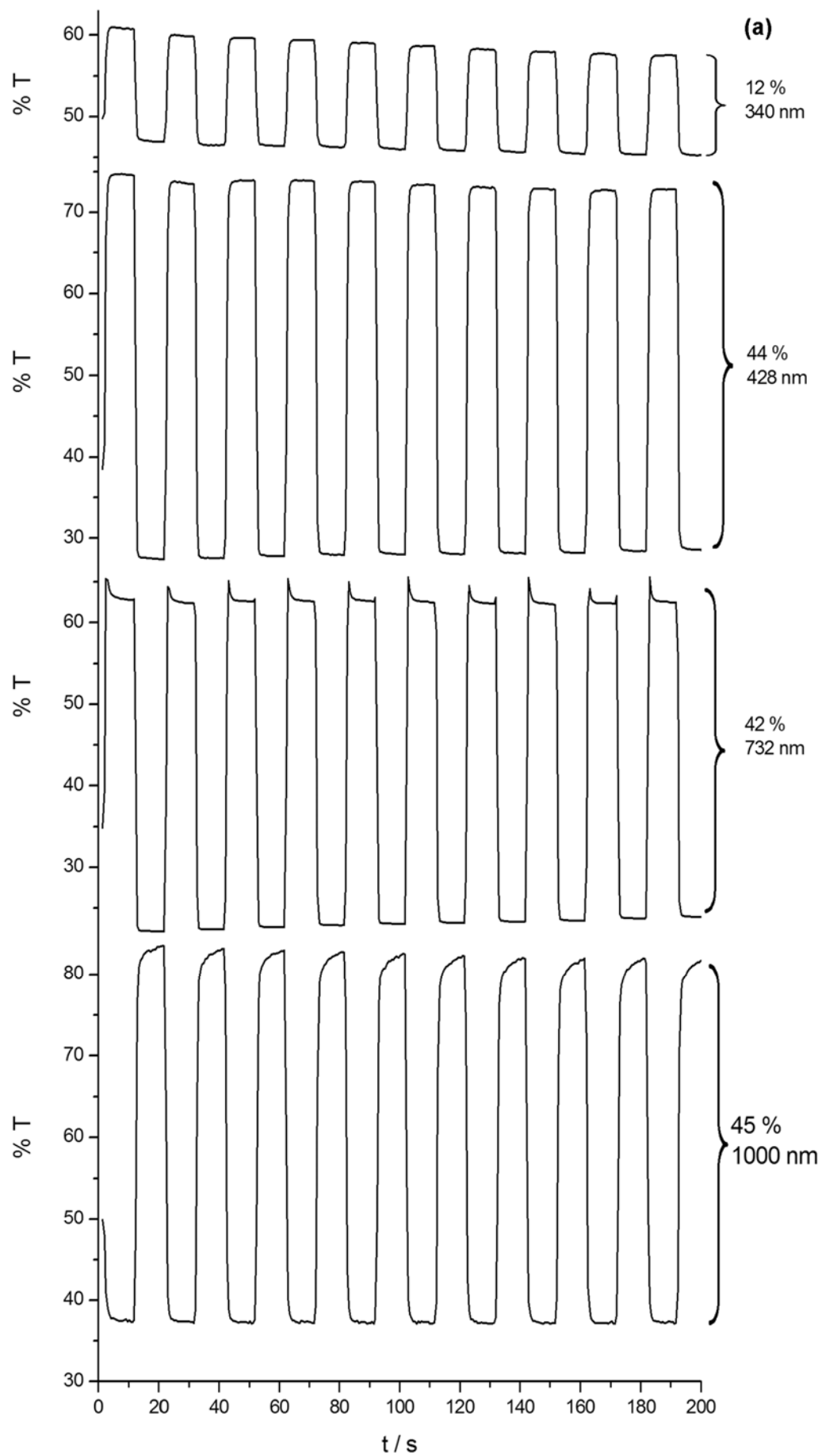
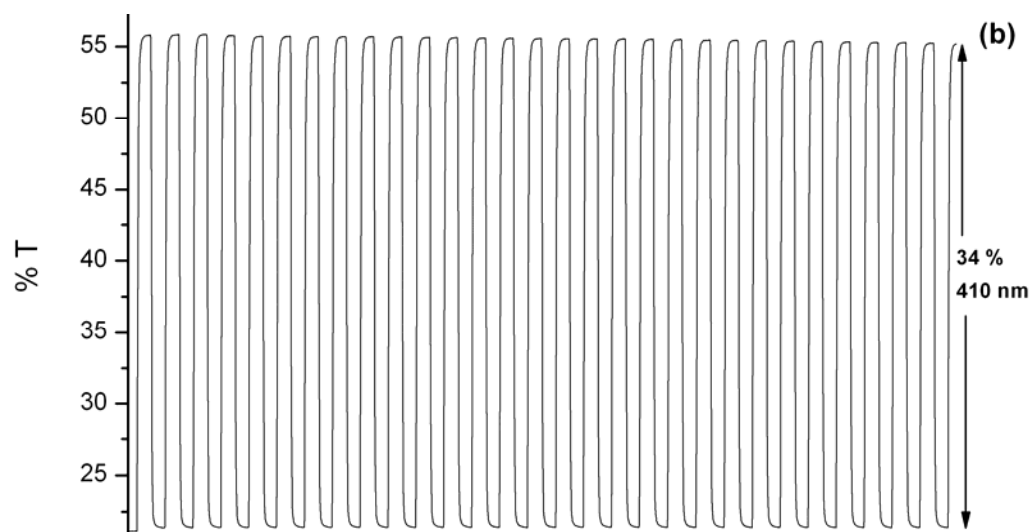


Figure S13. Optical spectra of chemically synthesized (a) **P3**, (b) **P4** and (c) **P5** (from 0.3 V to 1.0 V, 0.0 V to 1.2 and 0.0 V to 1.2 V, respectively) which were dip coated on ITO in 0.1 M TBAH/ACN. Inset: Cyclic voltammograms of chemically synthesized **P3-P5** coated on ITO in 0.1 TBAH/ACN at a scan rate of 100 mV/s.





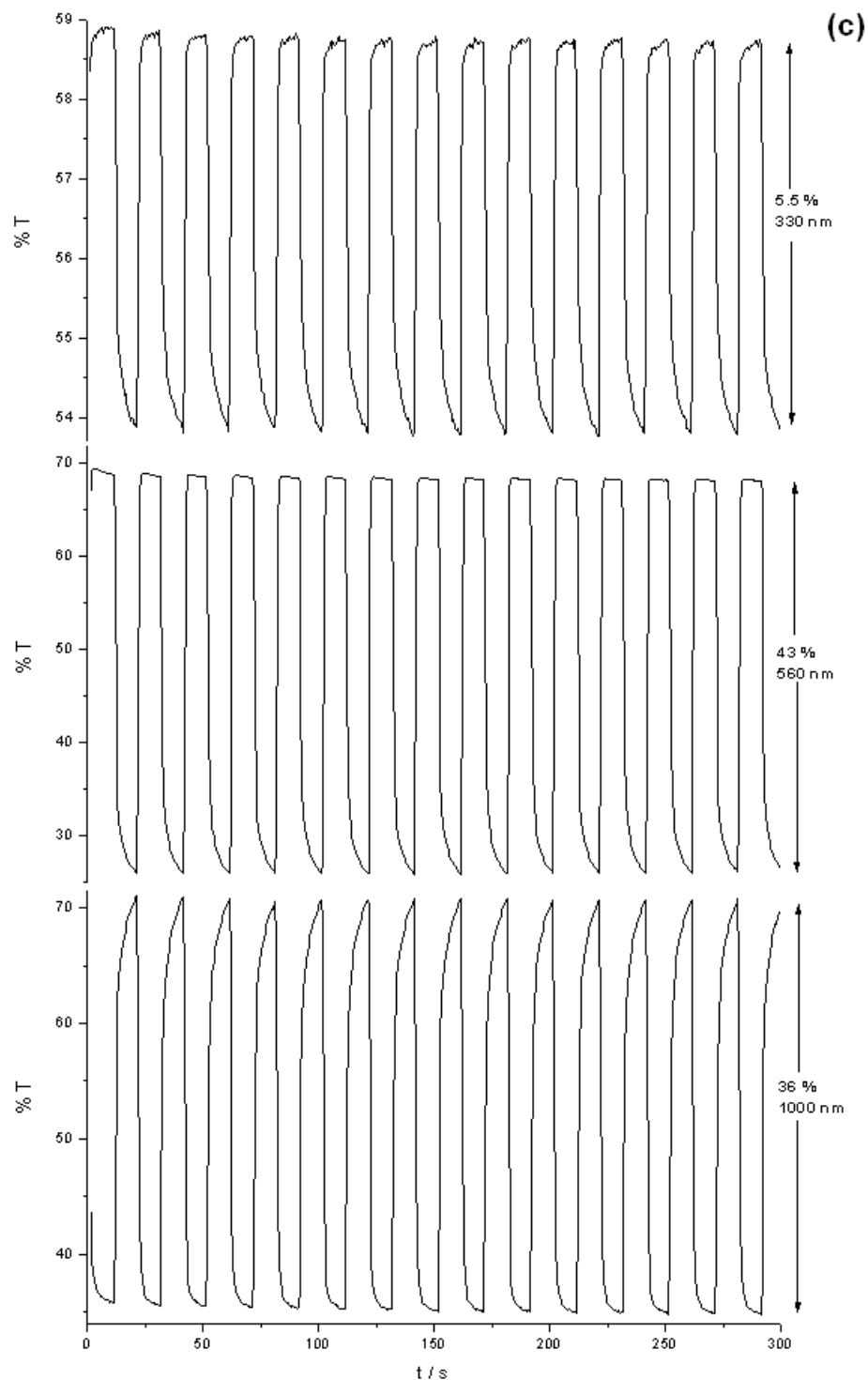


Figure S14. Chronoabsorptometry experiments for chemically polymerized **P3-P5** (a, b and c, respectively) coated on ITO in 0.1 M TBAH/ ACN while the polymers were switched between 0.0-1.2 V, and 0.0-1.0 and 0.0-1.2 V, respectively.

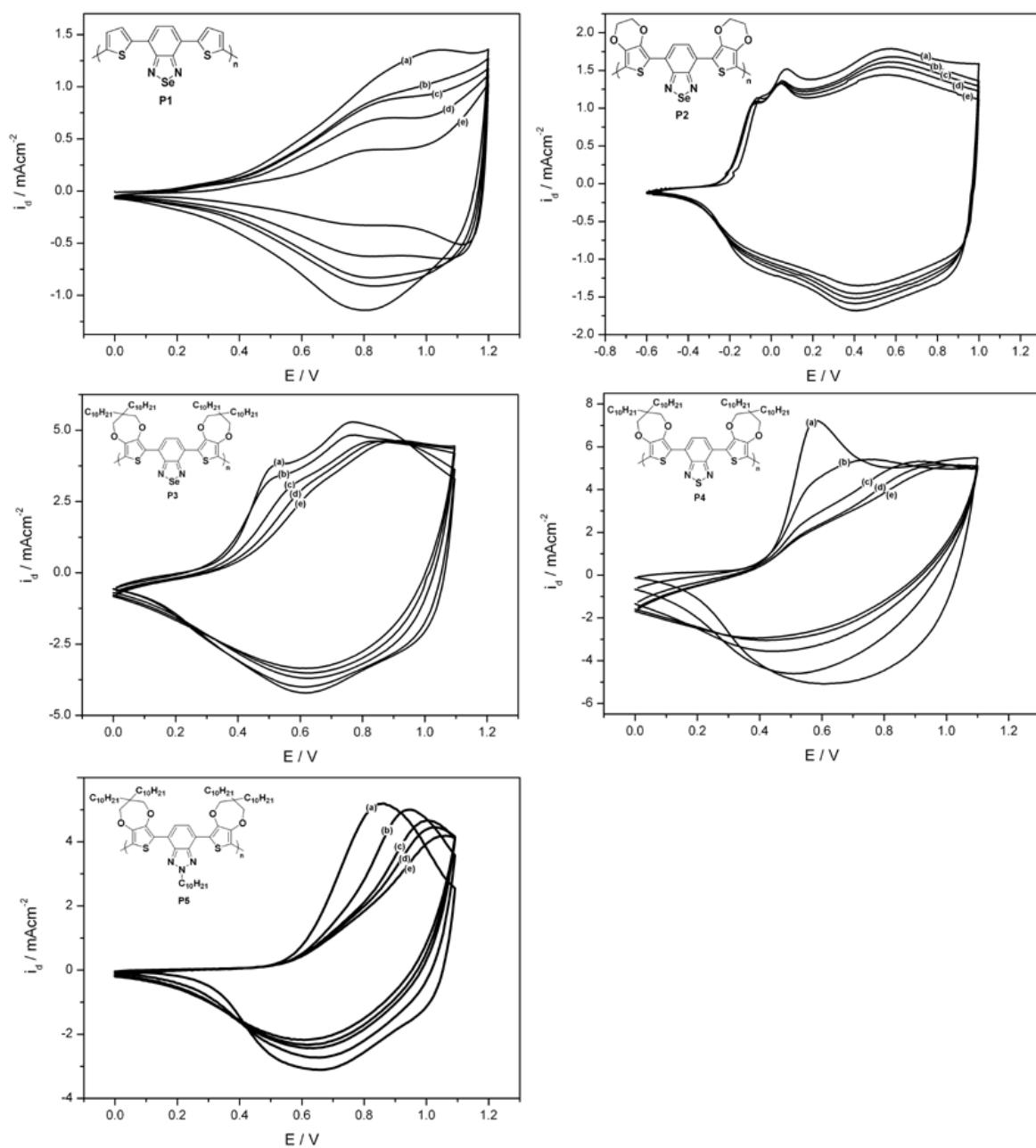


Figure S15. Stability test for the **P1-P5** film by cyclic voltammetry after (a) 1st cycle, (b) 500th cycle, (c) 1000th cycle, (d) 1500th cycle and (e) 2000th cycle in 0.1 M TBAH/ACN at a scan rate of 200 mV/s under ambient conditions.

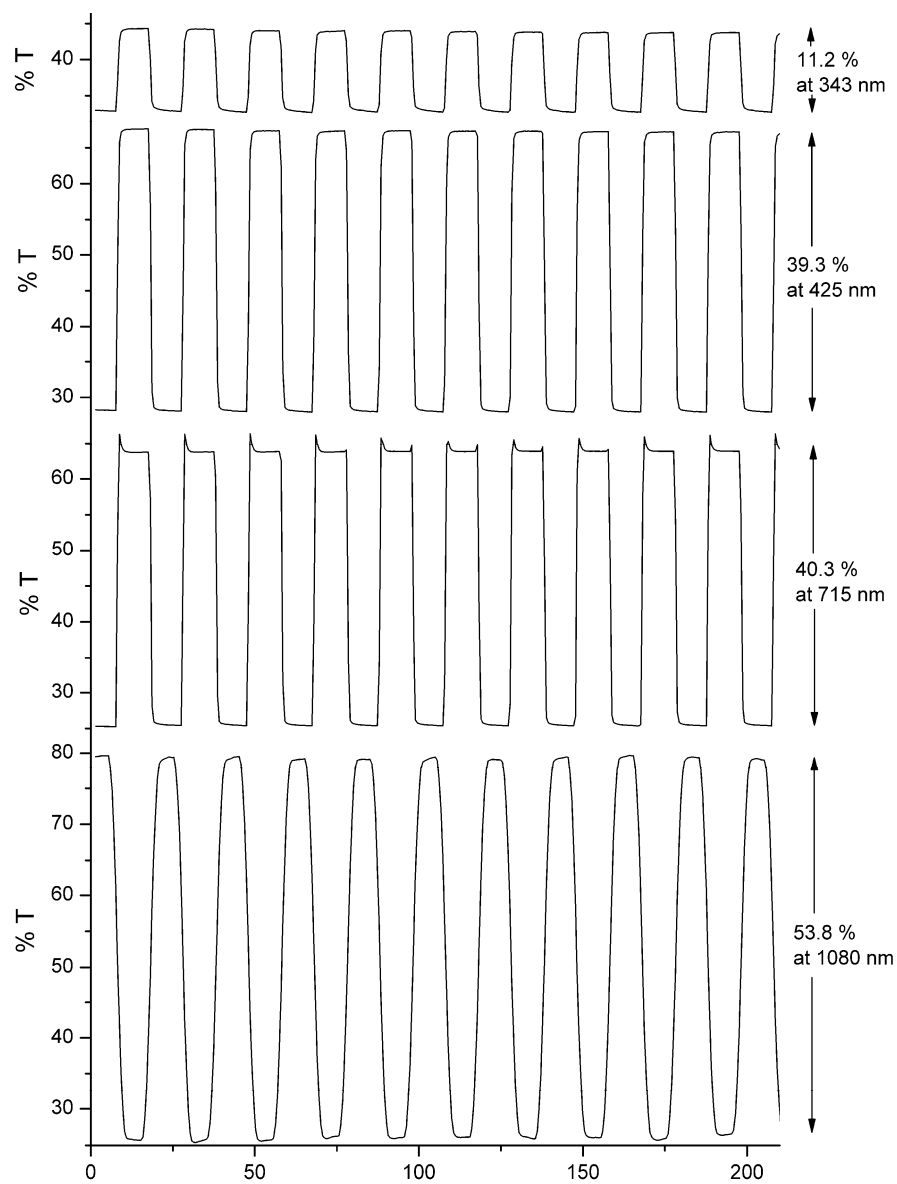


Figure S16. Chronoabsorptometry experiments for **P3** on ITO in 0.1 M TBAH/ ACN while the polymer was switched between -0.1 V and 1.1 V.

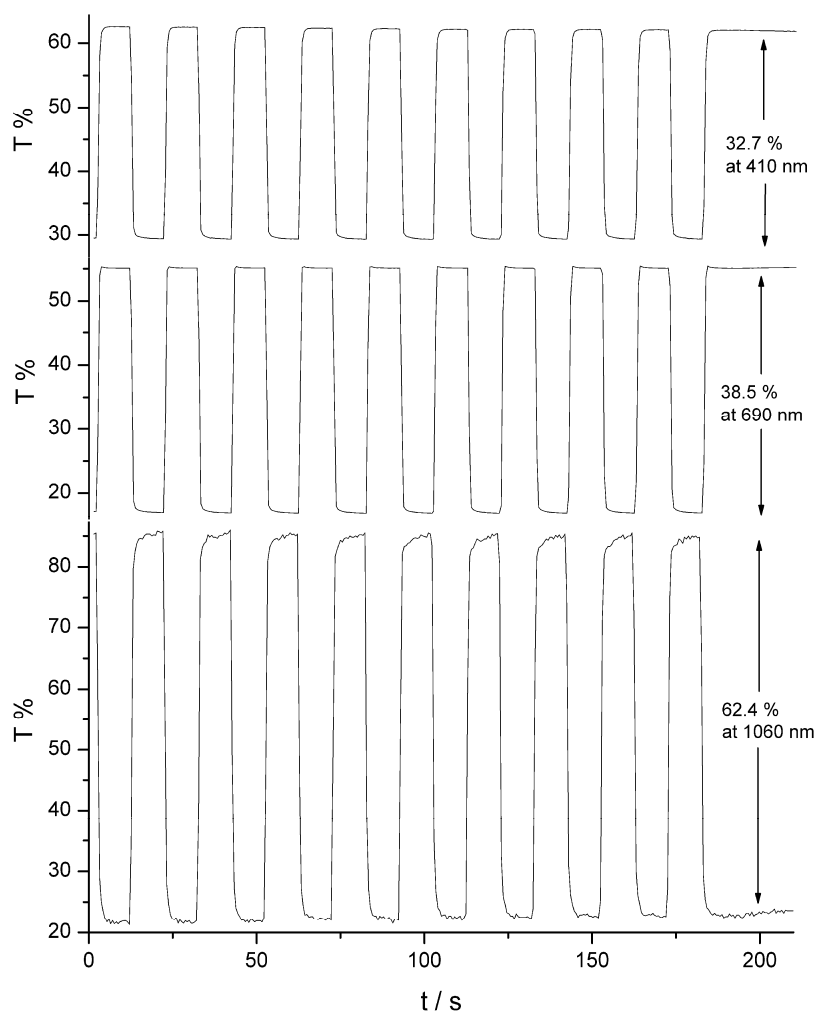


Figure S17. Chronoabsorptometry experiments for **P4** on ITO in 0.1 M TBAH/ ACN while the polymer was switched between -0.5 V and 1.2 V.

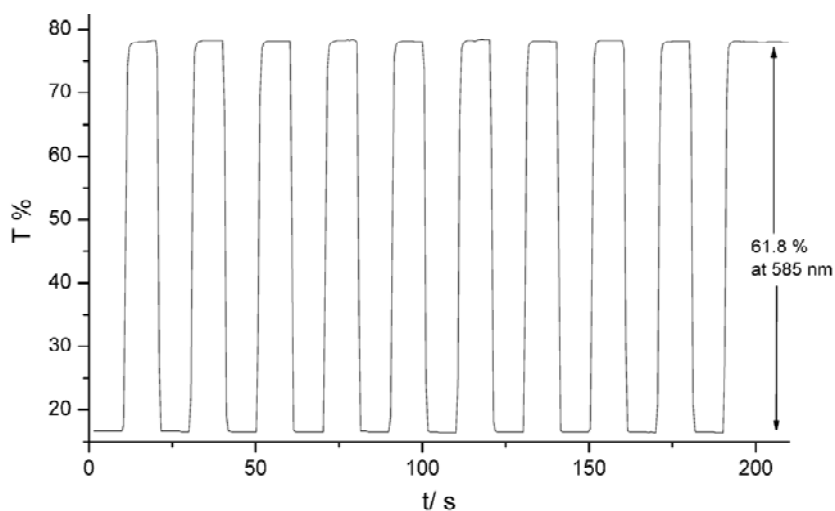


Figure S18. Chronoabsorptometry experiments for **P5** on ITO in 0.1 M TBAH/ACN while the polymer was switched between 0.0 V and 1.0 V.

References for supporting information

- (1) Cihaner, A.; Algı, F. *Adv. Funct. Mater.* 2008, 18, 3583
- (2) Yang, R.; Tian, R.; Yan, J.; Zhang, Y.; Yang, J.; Hou, Q.; Yang, W.; Zhang, C.; Cao Y. *Macromolecules* 2005, 38, 244.
- (3) Shin, W. S.; Kim, M.; Jin, S.; Shim, Y.; Lee, J.; Lee, J. W.; Gal, Y. *Mol. Cryst. Liq. Cryst.* 2006, 444, 129.