# Synthesis and Characterization of a Novel Kind of Near-Infrared Electrochromic Polymers Containing Anthraquinone Imide Group and Ionic Moieties

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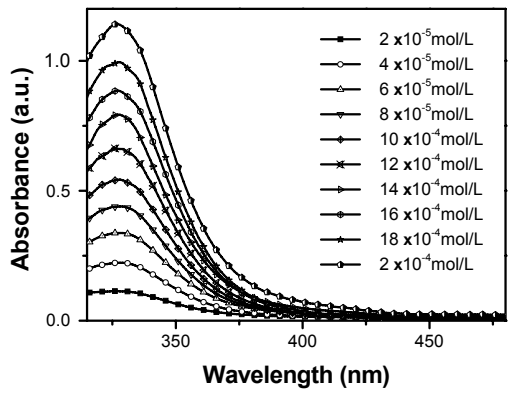
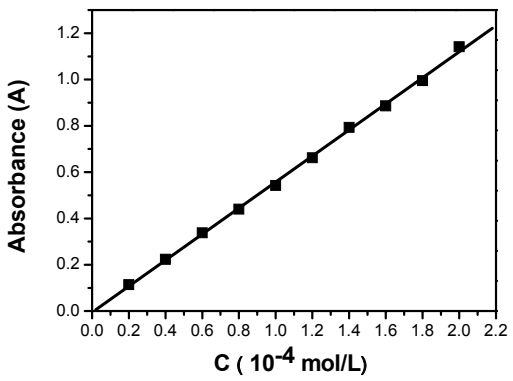
Table S1: Solubility of the polymers

| polymers | solvents [a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | DMF | DMSO | NMP | DMAc | $CH_3OH$ | $H_2O$ | $MeEtIm^+Br^-$ |
| 1a | ++ | ++ | ++ | ++ | - | - | ± |
| 1b | ++ | ++ | ++ | ++ | + | + | + |
| 1c | ++ | ++ | ++ | ++ | ++ | ++ | ++ |

*a* The qualitative solubility was tested with 1 mg of a sample in 1 mL of stirred solvent. + +, soluble at room temperature; +, soluble on heating; ±, partially soluble; -, insoluble even on heating.

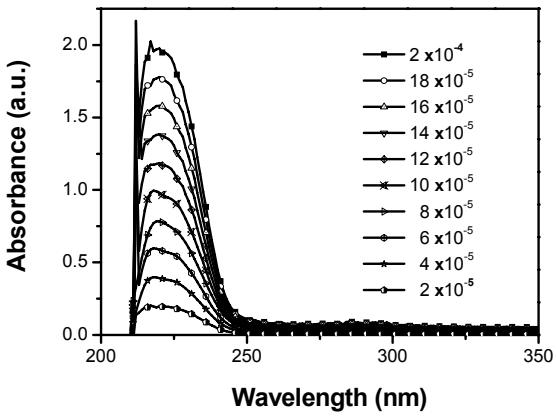


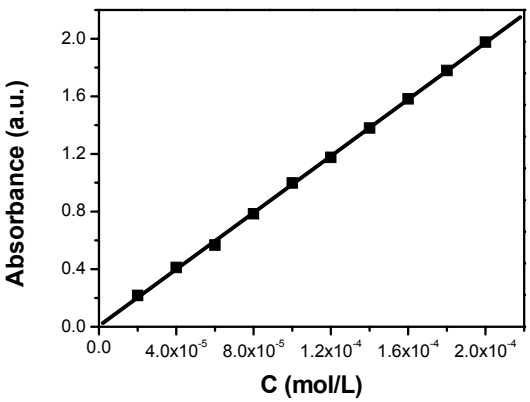

.a. UV-vis spectra of **3** in DMSO with varying concentration

b. Calibration curve of the plots at 326 nm.

Figure S1: UV-vis calibration curves for determining the AQI content in copolymers




a. UV-vis spectra of poly($ViEtIm^+Br^-$) in DMSO with varying concentration




b. Calibration curve of the plots at 220 nm.

Figure S2: UV-vis calibration curves for determining the poly(ionic liquid) content in copolymers

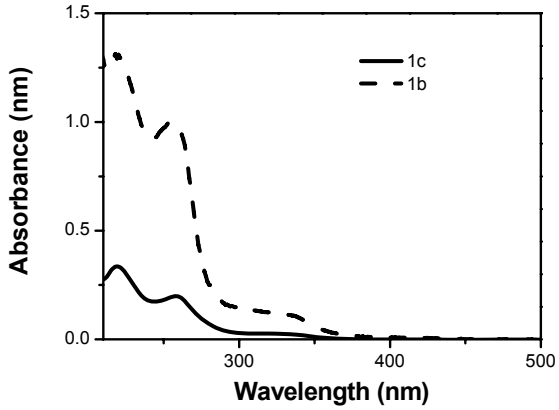



Figure S3: UV-vis curve of the copolymers

0.09 mg/mL in DMSO for **1c**

0.12 mg/mL in DMSO for **1b**

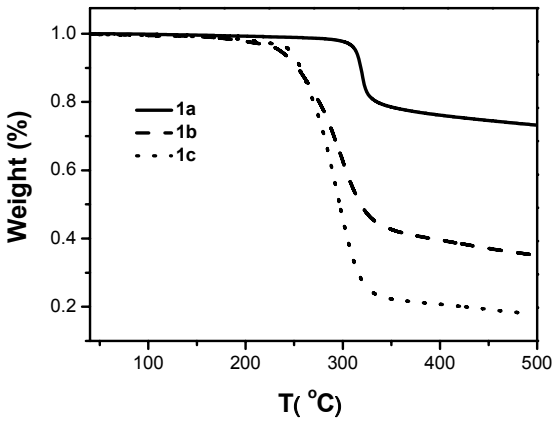



Figure S5: TGA traces of the polymers

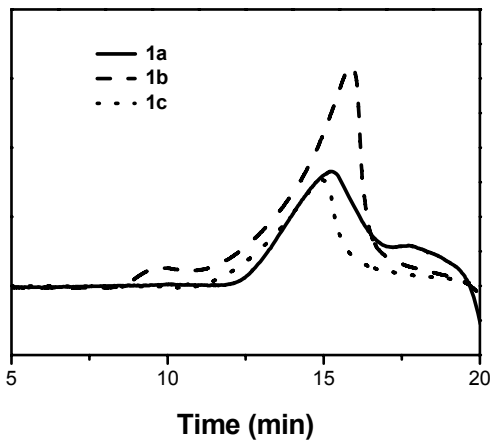



Figure S4: GPC traces of the polymers (*c*= 10 mg/mL in DMF)

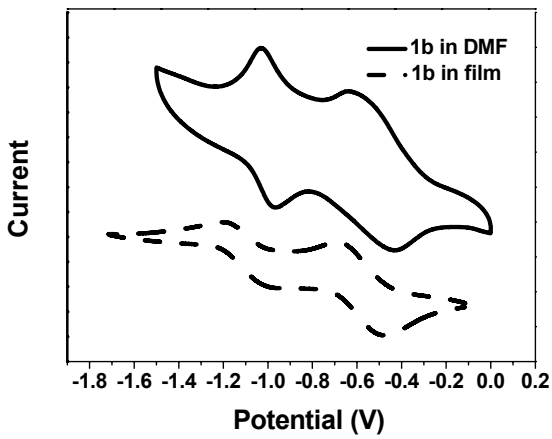



Figure S6: Cyclic voltammograms of polymer **1b** in DMF and in film, potentials vs Ag/AgCl.

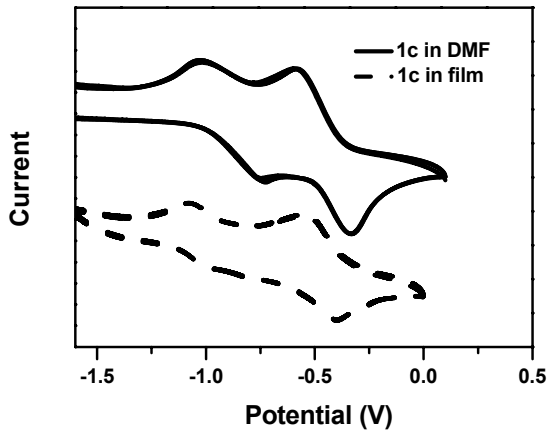



Figure S7: Cyclic voltammograms of polymer **1c** in DMF and in film, potentials vs Ag/AgCl.

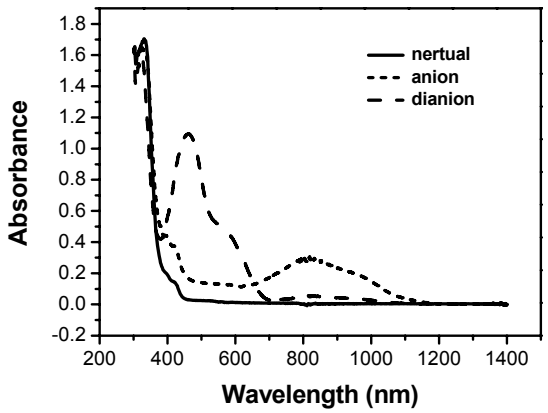



Figure S8: UV-vis-NIR spectra of polymer **1b** in DMF ($5\times10^{-3}$ M) containing TBAP in its neutral, anionic, and dianionic states.

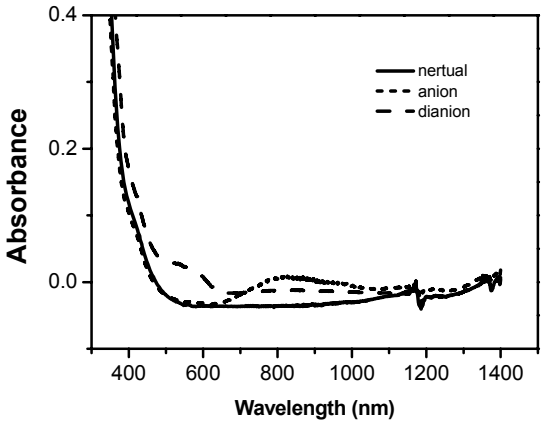



Figure S9: UV-vis-NIR spectra of polymer **1b** in film. （THF containing 0.1 M TBAP）

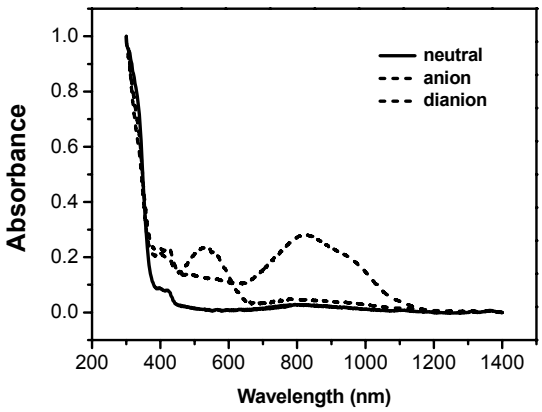



Figure S10: UV-vis-NIR spectra of polymer **1c** in DMF ($5\times10^{-3}$ M) containing TBAP in its neutral, anionic, and dianionic states.

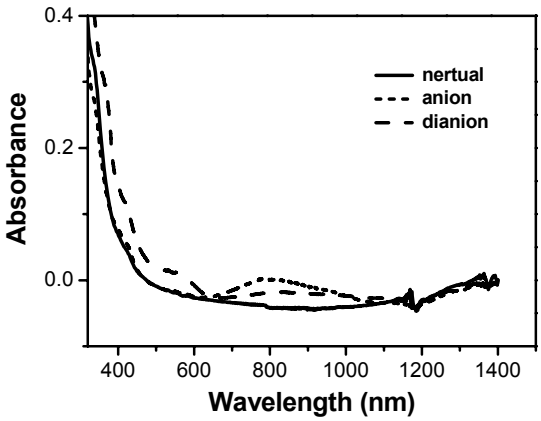



Figure S11: UV-vis-NIR spectra of polymer **1c** in film. （THF containing 0.1 M TBAP）

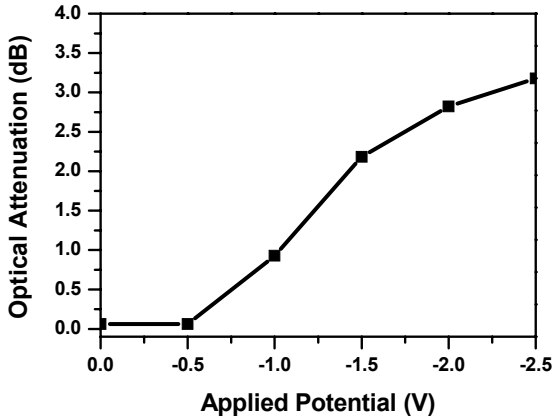



Figure S12: Optical attenuation of film of polymer **1a** at540 nm on ITO glass as a function of applied potential with a switching time of 20 seconds and a stepping potential (0.4 V vs silver electrode).