Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Out of Sight but Not Out of Mind: the Role of Counter Electrodes in Polymer-Based Solid-State Electrochromic Devices

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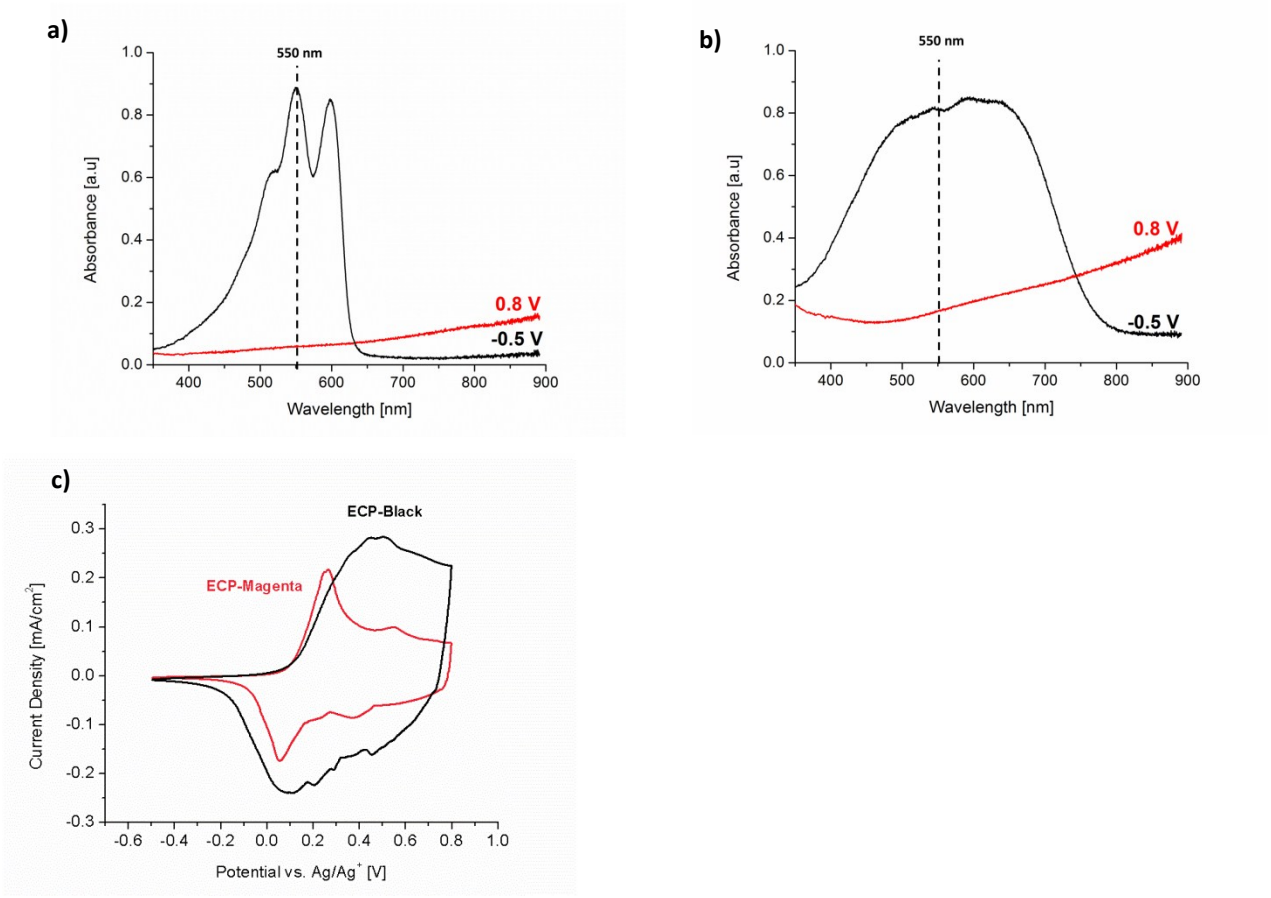


Figure S1. Absorbance spectra on a) ECP-Magenta and b) ECP-Black films in their fully colored (black curves) and fully bleached (red curves) states in 0.5 M LiOTf-PC. c) Cyclic voltammograms of ECP-Magenta (red curve) and ECP-Black (black curve) films blade coated to an optical density of 0.8 a.u (scan rate 50 mV/s in 0.5 M LiOTf-PC).

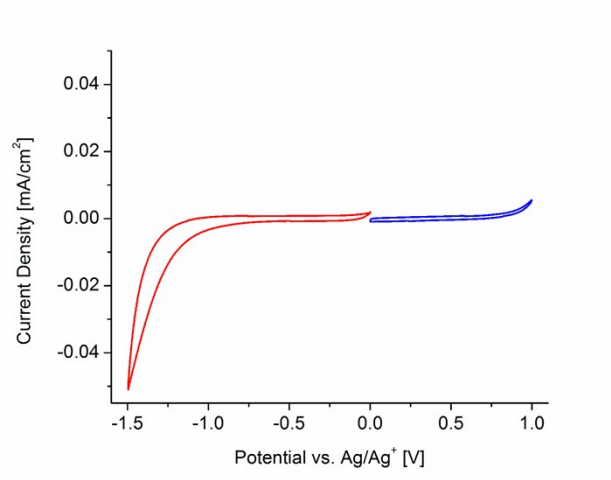


Figure S2. Cyclic voltammogram of ITO electrode in 0.5 M LiOTf-PC at 50 mV/s between -1.5 V and 1.0 V.

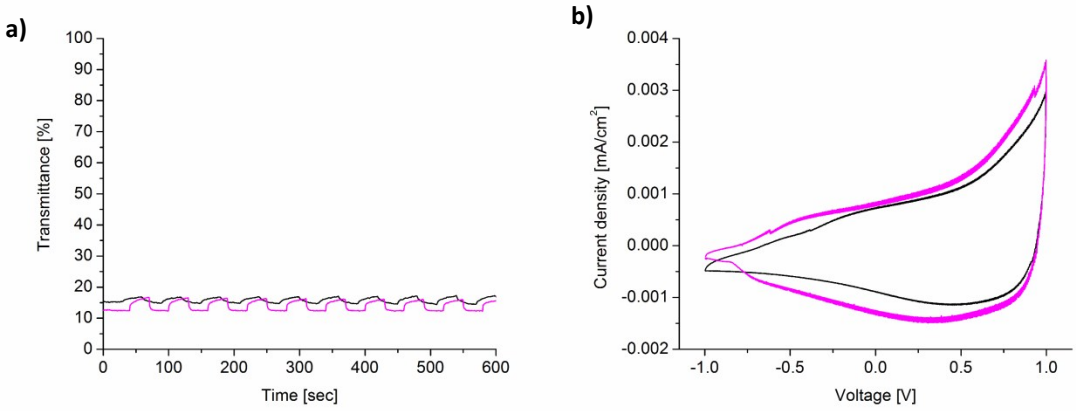


Figure S3. a) Switching performance of a Magenta/ITO ECD (magenta curve) and a Black/ITO ECD (black curve) in a +/- 1 V window in 30 sec intervals. b) Cyclic voltammograms of the same ECDs cycled between -1.0 V and 1.0 V at 50 mV/s.

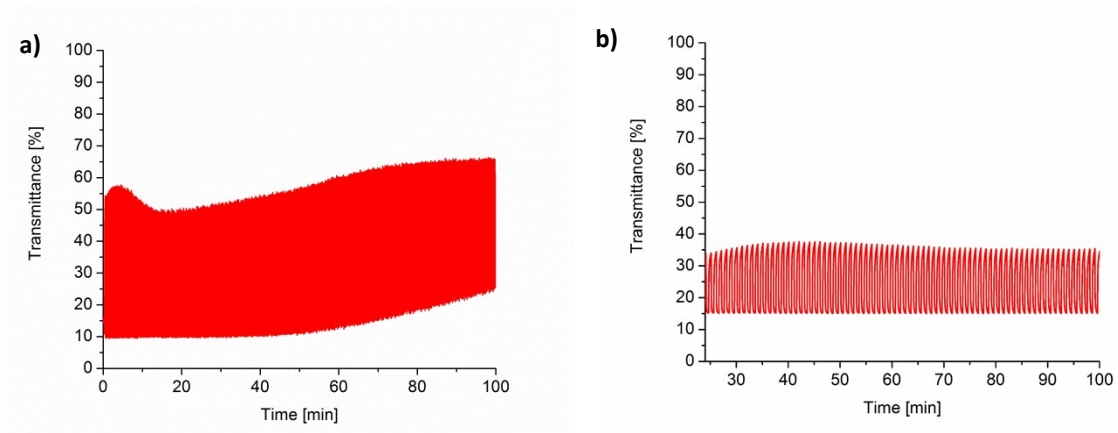
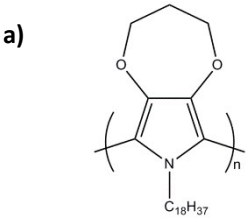
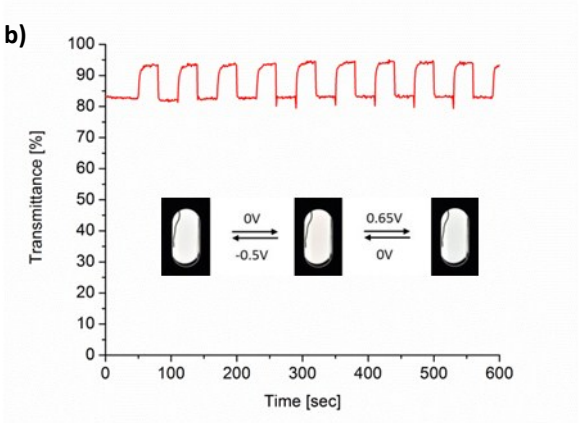


Figure S4. Stability of a) Magenta/ITO ECD and b) Black/ITO ECD over the course of 50 switches.





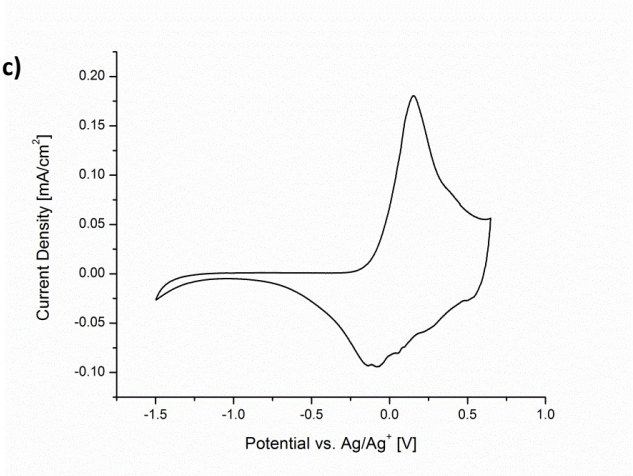


Figure S5. a) Repeat unit structure of MCCP. b) Transmittance values for MCCP film switched between -0.5 V and 0.65 V in 30 sec intervals as well as photographs of a MCCP film in its fully reduced (left photograph), half-oxidized (middle photograph), and fully oxidized (right photograph) states in 0.5 M LiOTf-PC. c) Cyclic voltammogram of MCCP film blade coated to an optical density of 0.25 a.u in 0.5 M LiOTf-PC (scan rate 50 mV/s).

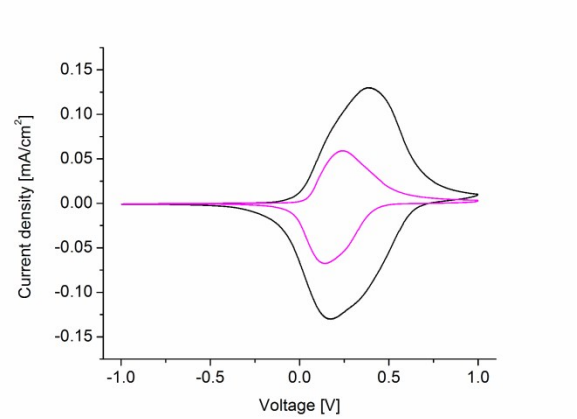


Figure S6. Cyclic voltammogram of Magenta/MCCP (magenta curve) and Black/MCCP (black curve) ECDs from – 1.0 V to 1.0 V at 50 mV/s.

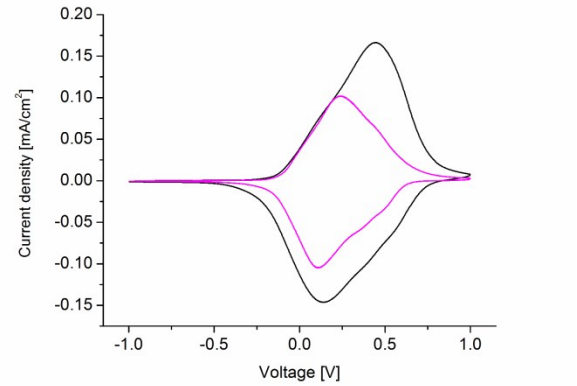


Figure S7. Cyclic voltammogram of Magenta/ox-MCCP (magenta curve) and Black/ox-MCCP (black curve) ECDs from – 1.0 V to 1.0 V at 50 mV/s.

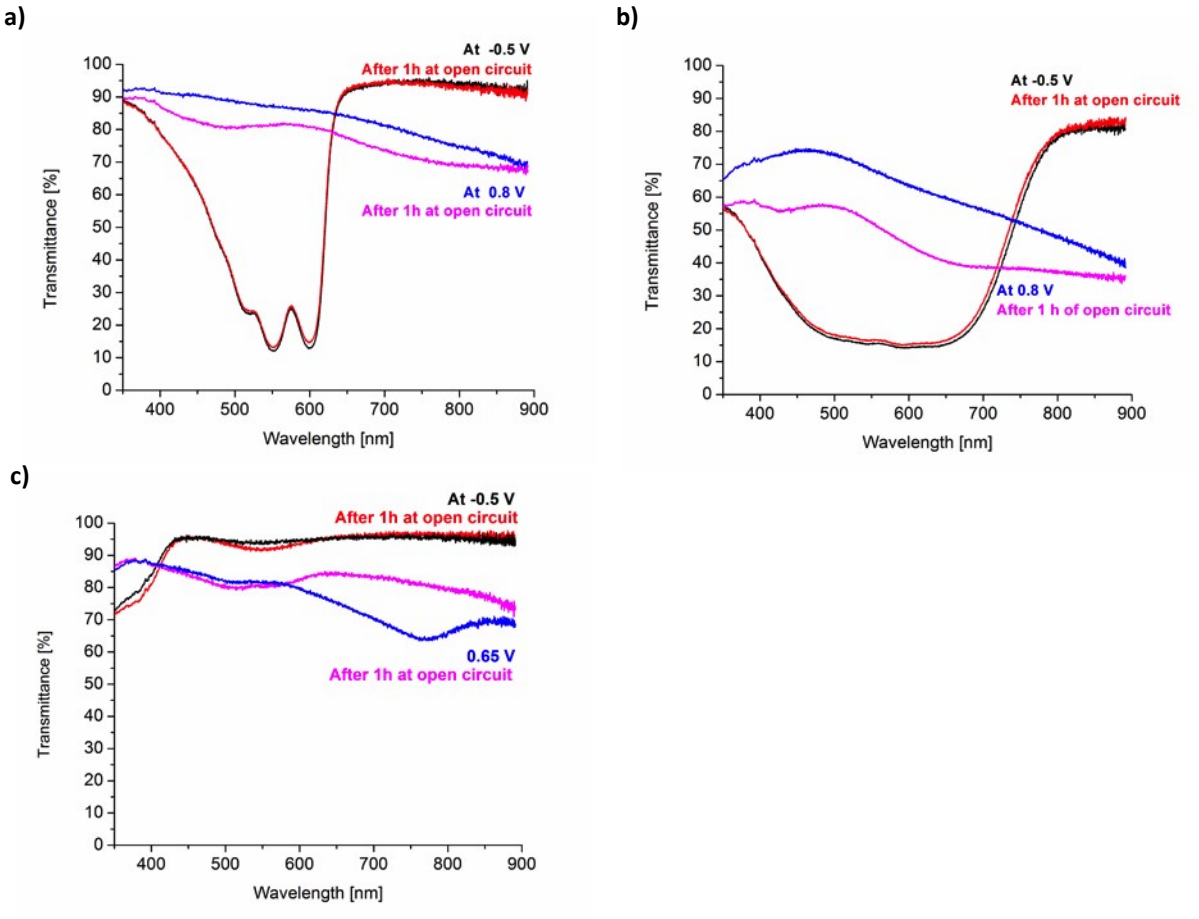


Figure S8. Spectra of a) ECP-Magenta in the fully reduced state (-0.5 V, black curve) and in the fully oxidized state (0.8 V, blue curve). The red curve represents the same ECP-Magenta film held at open circuit for 60 min after having been switched to its colored state. The magenta curve represents the same ECP-Magenta film held at open circuit for 60 min after having been switched to its bleached state. b) ECP-Black in the fully reduced state (-0.5 V, black curve) and in the fully oxidized state (0.8 V, blue curve). The red curve represents the same ECP-Black film held at open circuit for 60 min after having been switched to its colored state. The magenta curve represents the same ECP-Black film held at open circuit for 60 min after having been switched to its bleached state. c) MCCP in the fully reduced state (-0.5 V, black curve) and in the fully oxidized state (0.65 V, blue curve). The red curve represents the same MCCP film held at open circuit for 60 min after having been switched to its reduced state state. The magenta curve represents the same MCCP film held at open circuit for 60 min after having been switched to its fully oxidized state.

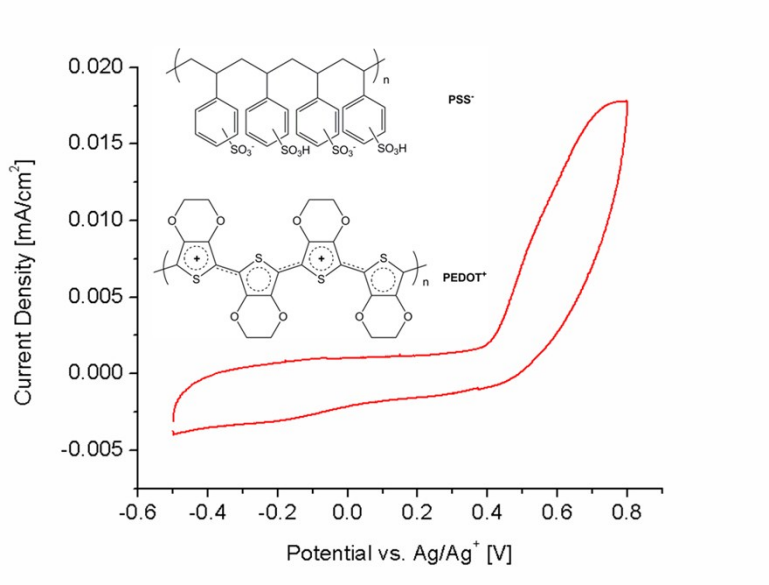


Figure S9. Cyclic voltammogram and structure of PEDOT:PSS film blade coated to an optical density of 0.05 a.u in 0.5 M LiOTf-PC (scan rate 50 mV/s).

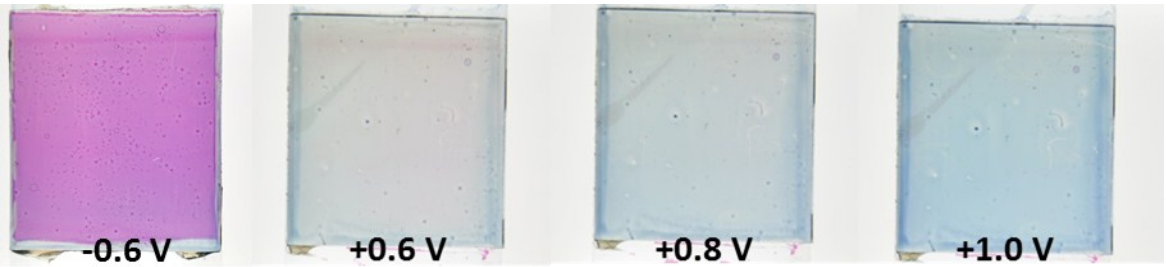


Figure S10. Photographs of a Magenta/PEDOT:PSS ECD at various potentials.

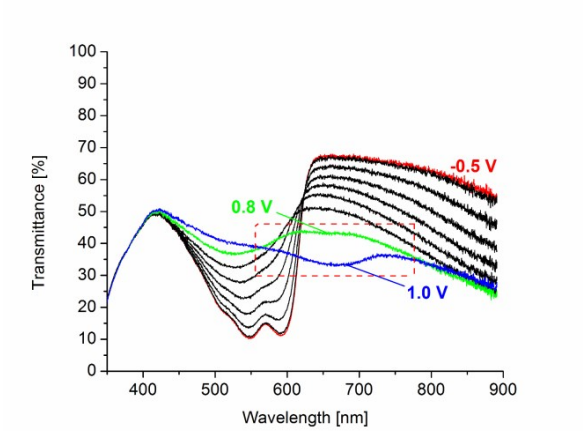


Figure S11. Spectroelectrochemistry of a Magenta/PEDOT:PSS ECD shown in 0.2 V intervals. The box marks the wavelength range where the residual absorbance that gives the ECD its blue hue when it is switched to it bleached state.

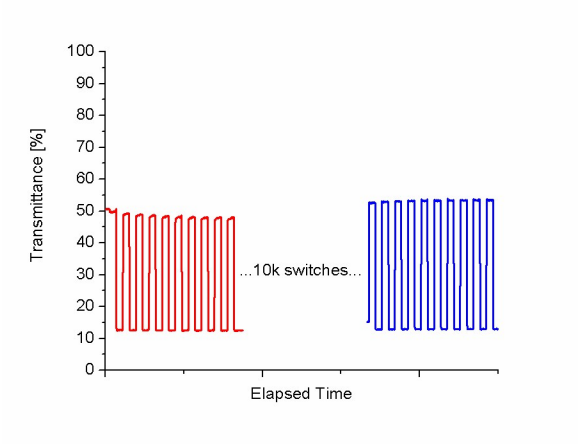


Figure S12. Switching stability of a Magenta/PEDOT:PSS device between -0.6 V and 0.8 V. The ECD was held at each voltage for 10 seconds.