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

Supporting Information for:

A Dual-Wavelength Electrochromic Film Based on Pt(II) Complex for Optical Modulation at Telecommunication Wavelength and Dark Solid-State Display Device

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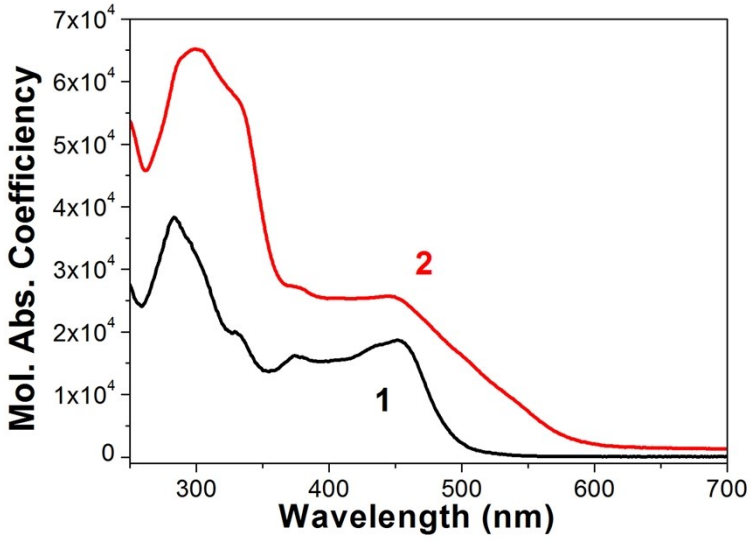
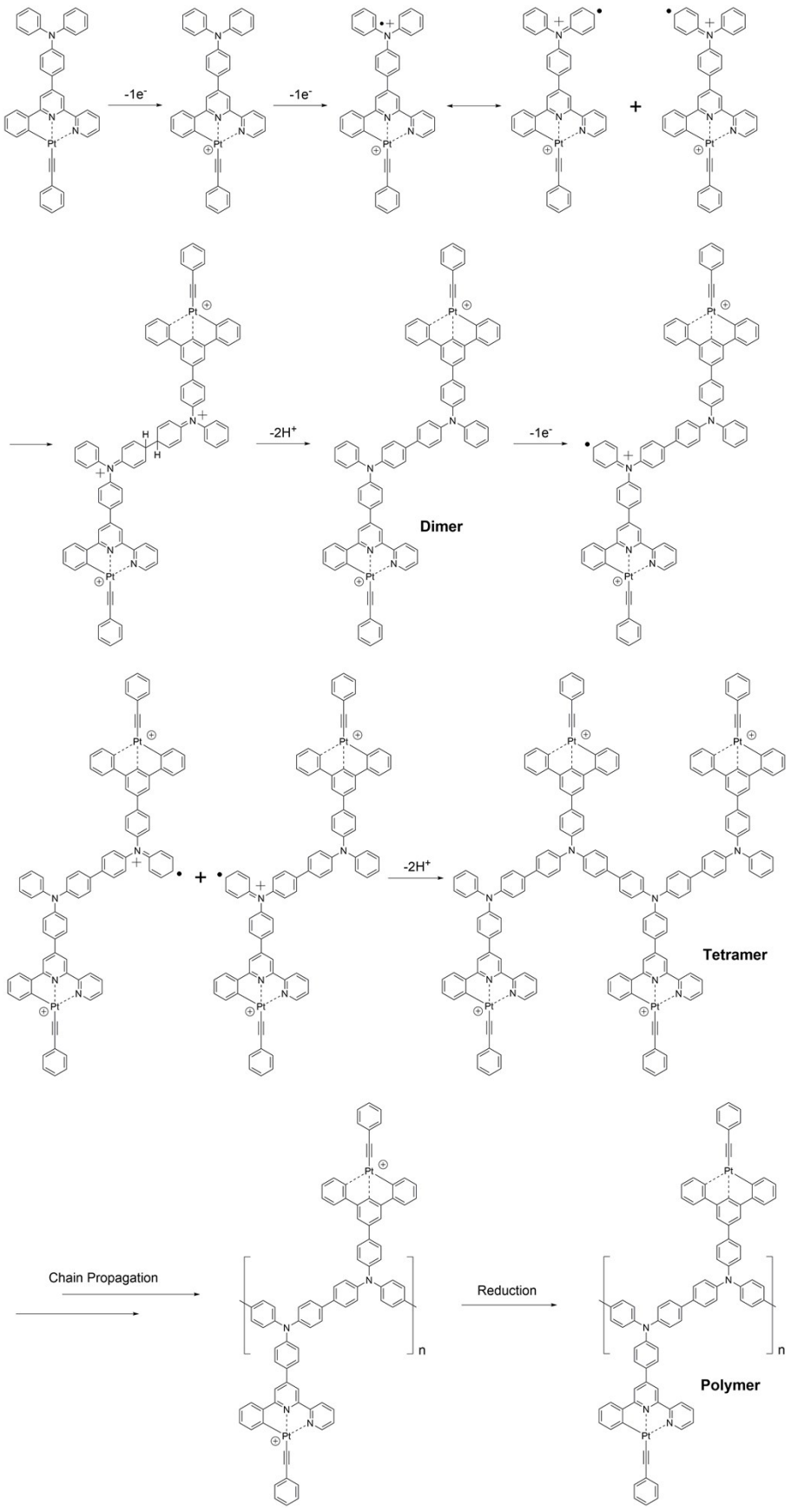


Figure S1. UV-vis absorption spectra of the parent complex [(**L**)PtCl] (**1**) and the target complex [(**L**)Pt(C≡C-ph)] (**2**) in CH_2Cl_2 solution.

Table S1. Photophysical properties of the parent and target complexes.[a]

Complex	$\lambda_{max,\ abs}$ **(nm)** ($\varepsilon \times 10^4$ **dm^3·mol^{-1}·cm^{-1})**	$\lambda_{max,\ em}$[b] **(nm)**	Φ_{em}[c]	τ_{em}[c] **(μs)**
[(**L**)PtCl]	452(1.87), 435(1.78), 374(1.62), 326(2.01), 283(3.83)	590	0.009	10.6
[(**L**)Pt(C≡C-ph)]	445(broad, 2.75), 377(2.83), 335(sh, 5.85), 286 (6.54)	607	0.021	11.1

[a] Measured in an air-saturated CH_2Cl_2 solution at room temperature. [b] Excited wavelength is 450 nm. [c] PL quantum yields and lifetime.



Scheme S1. Proposed EP mechanism of the target complex.

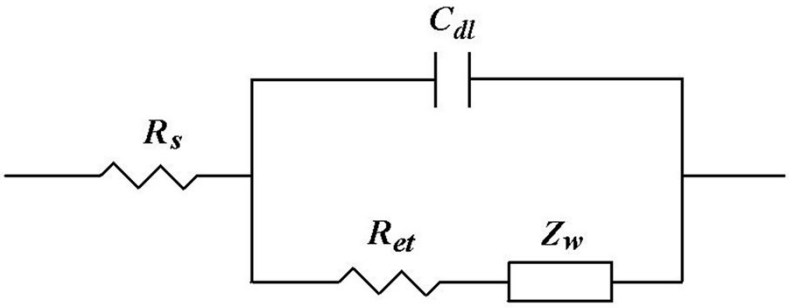


Figure S2. The equivalent circuit proposed for the EP film coated ITO electrode.

Table S2. Solution resistance (R_s), electron transfer resistance (R_{et}) and capacity (C_{dl}) of the EP film coated ITO electrodes prepared by various EP cycles.

Electrode name	R_s (Ω)	R_{et} (Ω)	C_{dl} (F/cm^2)
EP-5	40.6	385.9	1.6×10^{-9}
EP-10	40.7	397.5	1.5×10^{-9}
EP-15	41.0	503.4	1.0×10^{-9}
EP-20	35.4	451.3	1.2×10^{-9}
EP-25	32.2	384.9	1.4×10^{-9}

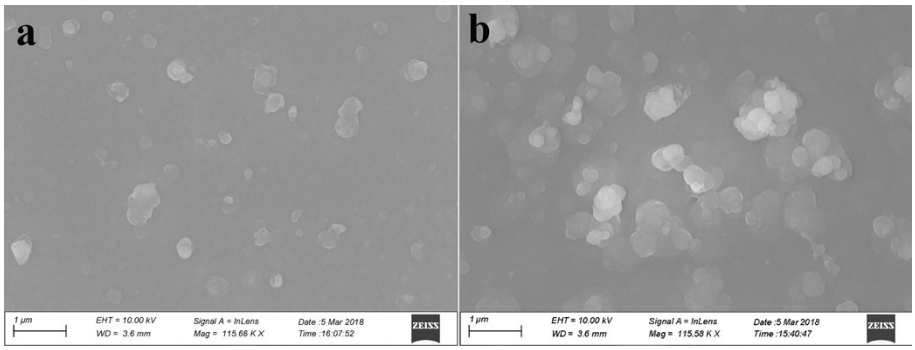


Figure S3. FESEM images of the EP film coated ITO electrodes obtained after 5 (a) and 25 (b) EP cycles, respectively.

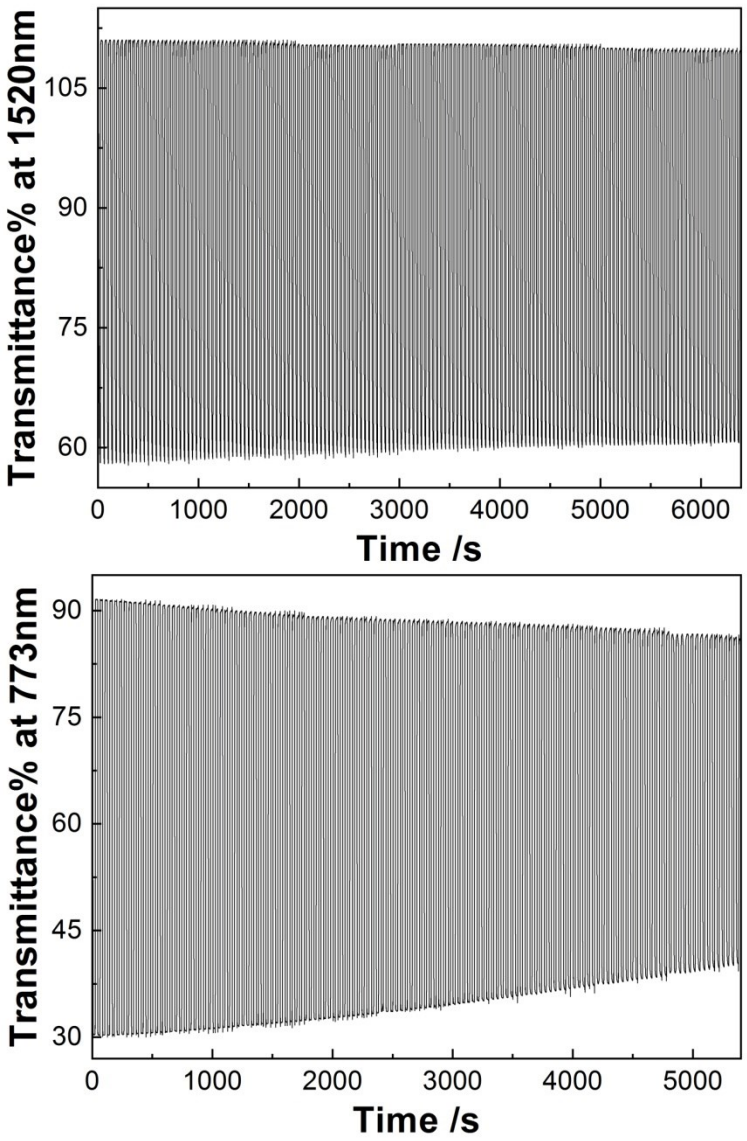


Figure S4. Dynamic changes of the transmittance of the EP film coated ITO electrode at 1520 nm upon switching the potential between -0.5 and +1.0 V (top) and at 773 nm (bottom) upon switching the potential between -0.5 and +1.4 V with a pulse width of 20 s.

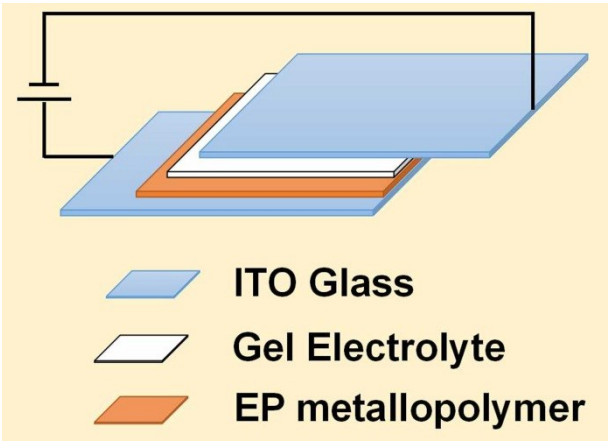


Figure S5. Schematic graph of the solid-state EC device construction.

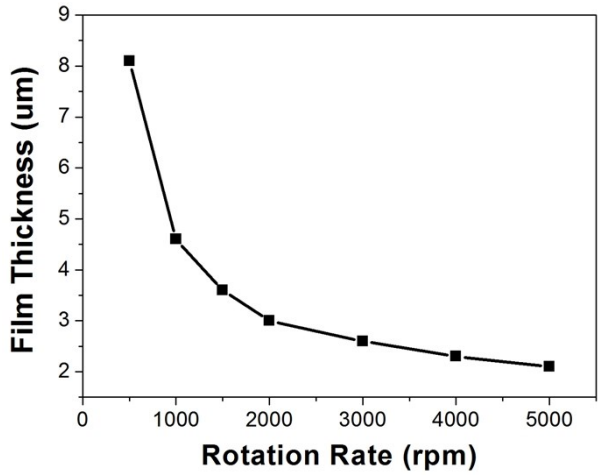
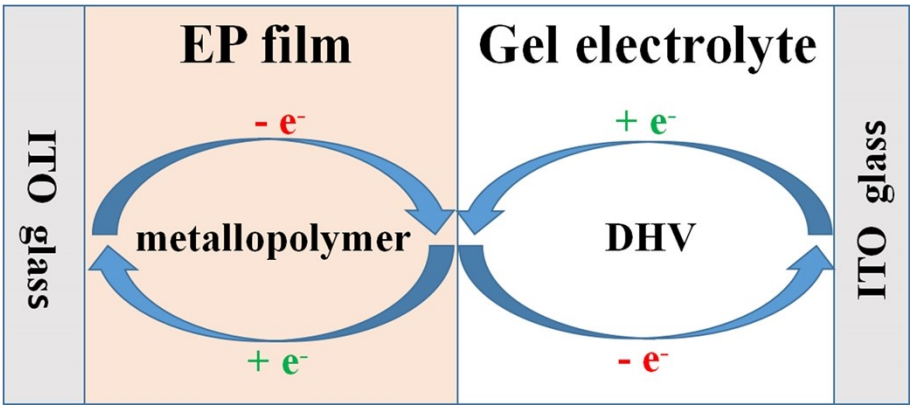


Figure S6. Relationship between the gel electrolyte film thickness and the spin-coating rate.



Scheme S2. Redox reaction cycle between anodic EC metallopolymer and cathodic EC DHV at the interface of the EP polymer and gel electrolyte films.