Electronic Supplementary Information for:

Electropolymerized Films as a Robust Molecular Platform for Volatile Memory Devices with Two Near-Infrared Outputs and Long Retention Time

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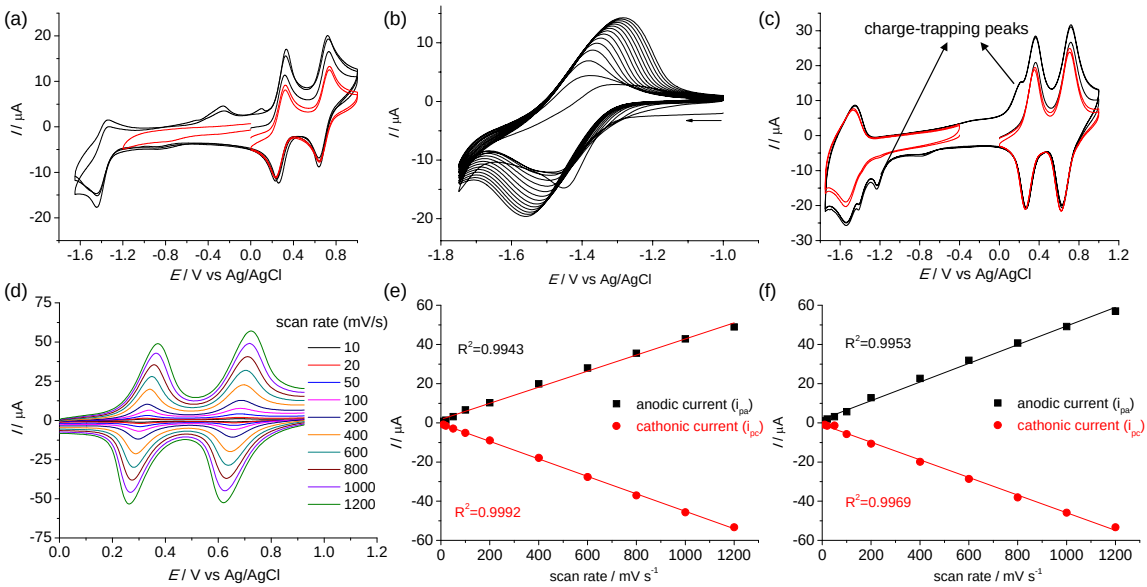


Figure S1. (a) CV of **4**(PF_6) in CH_3CN at a glassy carbon electrode (d = 3 mm). (b) Reductive electropolymerization of **4**(PF_6) (0.2 mM in CH_3CN) on the glassy carbon electrode by 15 repeated cyclic potential scans at 100 mV/s between −1.00 and −1.75 V vs Ag/AgCl in 0.1 M Bu_4NClO_4/CH_3CN. (c) CV of the polymeric film obtained in (b) at a scan rate of 100 mV/s in a clean supporting electrolyte solution. The pre-wave peaks just before the main oxidation and reduction peaks are charge-trapping peaks.[1] (d) Anodic CVs of the polymeric films obtained in (b) at different scan rates from 10 to 1200 mV/s. (e,f) Linear dependence of the peak currents of the redox waves at +0.31 and +0.66 V, respectively, in (d) as a function of the scan rate. This is characteristic electrochemical behavior of redox species confined on electrode surfaces.

[1] (a) Denisevich, P.; Willman, K. W.; Murray, R. W. *J. Am. Chem. Soc.* **1981**, *103*, 4727. (b) Takada, K.; Storrier, G. D.; Pariente, F.; Abruña, H. D. *J. Phys. Chem. B* **1998**, *102*, 1387.

X-ray photoelectron spectroscopy data were obtained with an ESCALab220i-XL electron spectrometer from VG Scientific using 300W AlKα radiation. The base pressure was about 3×10^{-9} mbar. The binding energies were referenced to the C1s line at 284.8 eV from adventitious carbon.

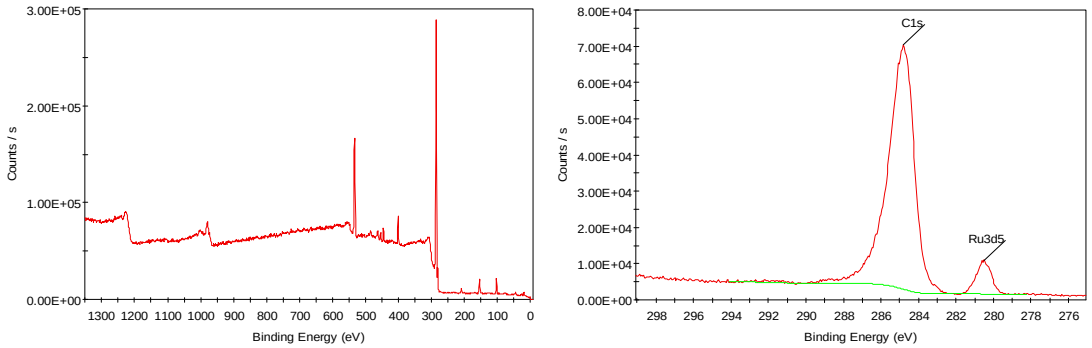


Figure S2. XPS spectra of poly-**4**$^{+}$/ITO film. Left plot: survey scan. Right plot: C1s and Ru3d5 peaks.

Table S1. XPS data of poly-**4**$^{+}$/ITO film and **4**(PF_6) monomer as a powder.

	Binding energy (eV)	Atomic%	
		Poly-**4**$^{+}$/ITO film	**4**(PF_6) monomer as a powder
Ru3d5	280.51	0.66	0.24
N1s	399.81	5.54	2.00
O1s	532.38	12.63	14.5
F1s	685.93	--	2.01
Cl2p	207.54	0.92	--
Si2p	102.46	4.2	--
In3d5	444.96	0.22	--
C1s	284.82	75.82	80.96

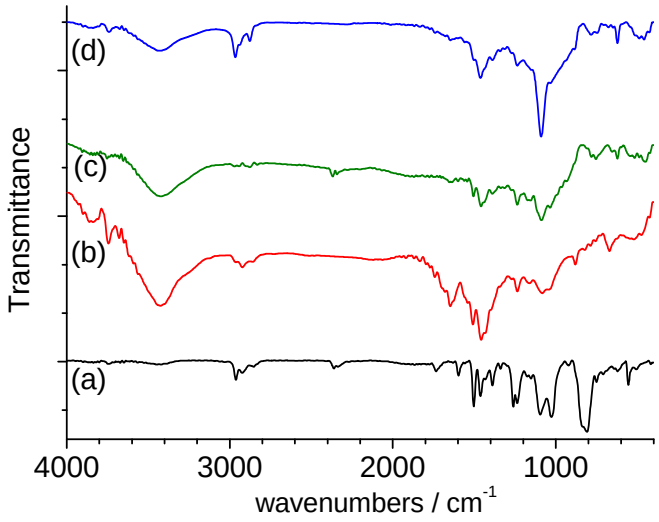


Figure S3. FTIR spectra of (a) the monomer $\mathbf{4}^{+}$ and (b-d) the polymeric materials after holding the potential for 1 min at –0.2 V, +0.55 V and +1.05 V vs Ag/AgCl, respectively.

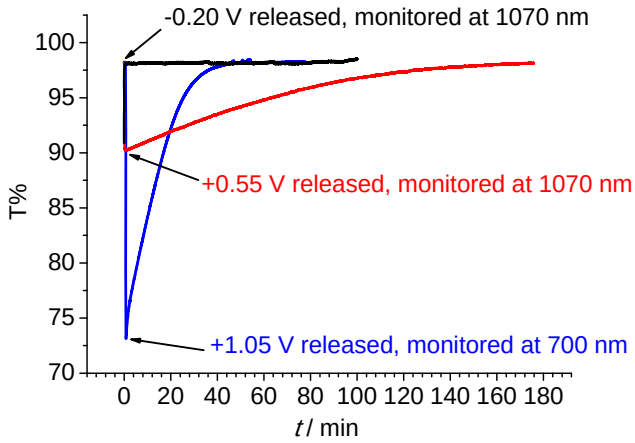
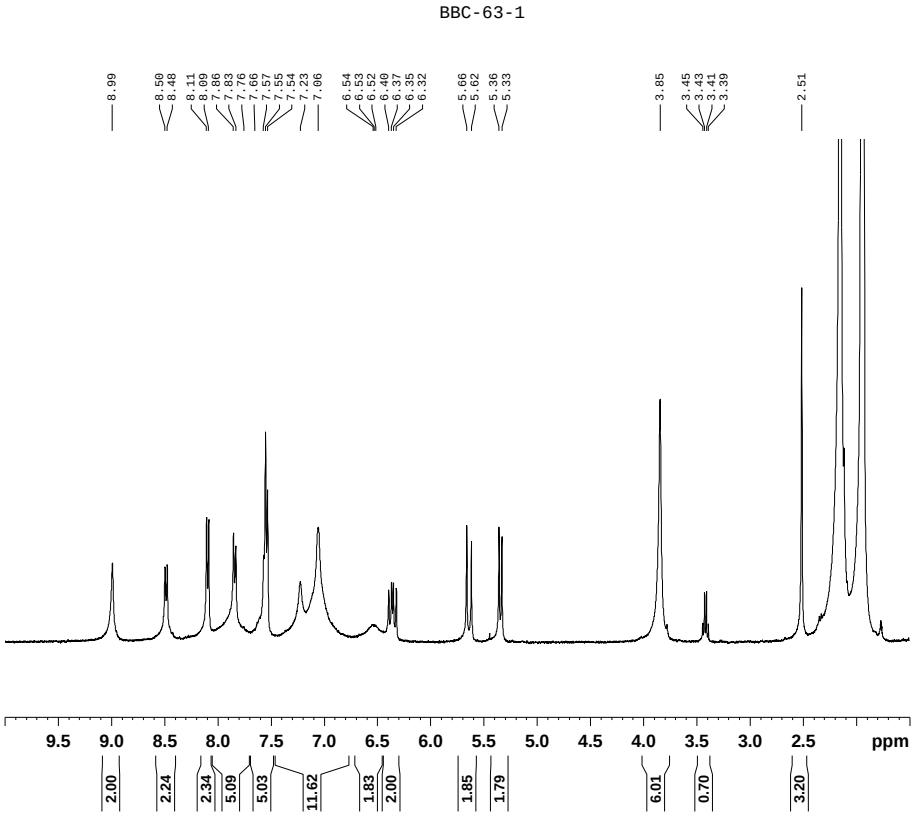


Figure S4. Retention time measurement of poly-**4**$^{+}$/ITO film (Γ = 1.7 × 10^{-9} mol/cm^{2}, ca. 10 nm thick) at different potential stages.

^{1}H NMR of **4**(PF_6) in CD_3CN:



MALDI-MS of **4**(PF_6):