## An all-in-one memory cell based on a homopolymer with pyrene side chain and its volatile and nonvolatile resistive switch behaviors

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Figure S2. <sup>13</sup>C NMR spectr of MNPE in DMSO-*d*<sub>6</sub>.







Figure S4. <sup>13</sup>C NMR spectrum of MPPE in CDCl<sub>3</sub>.





**Figure S6.** The thermal stabilities and the glass transition temperature of (a) PMNPE and (b) PMPPE.



Figure S7. The thermal stabilities of MNPE and MPPE.



Figure S8. CV cures of PMNPE and PMPPE.



Figure S9. Current–voltage (I-V) characteristic of ITO/PMNPE/LiF/Al device.



Figure S10. Absorption spectrum of PMPPE-2 films in the ON or OFF states.



**Figure S11.** Current–voltage (I–V) characteristics: (a) ITO/PMPPE-1/Al device, (b) ITO/PMPPE-2/Al device.

Table S1 Thermal, optical, and electro-chemical properties of PMNPE and (b) PMPPE.

compound	Td(℃)	Tg(℃)	λmax(nm)	Eg <sup>a</sup> (eV)	Eox(eV)	HOMO <sup>C</sup> (eV)	LUMO <sup>d</sup> (eV)
PMNPE	239	148	347	3.03	1.63	-5.96	-2.93
PMPPE	332	149	306/395	2.59	1.32	-5.64	-3.05

<sup>a</sup>The data were calculated using the following equation:  $E_g = 1240/\lambda$  at the onset of the film absorption spectra.

<sup>b</sup>The data were calculated from cyclic voltammetry results.

<sup>c</sup>The HOMO energy levels were calculated from cyclic voltammetry results with reference to ferrene.

<sup>d</sup>  $E_{\text{LUMO}} = E_{\text{HOMO}} + E_{\text{g}} (\text{eV}).$