Electronic Supplementary Material (ESI) for RSC Advances
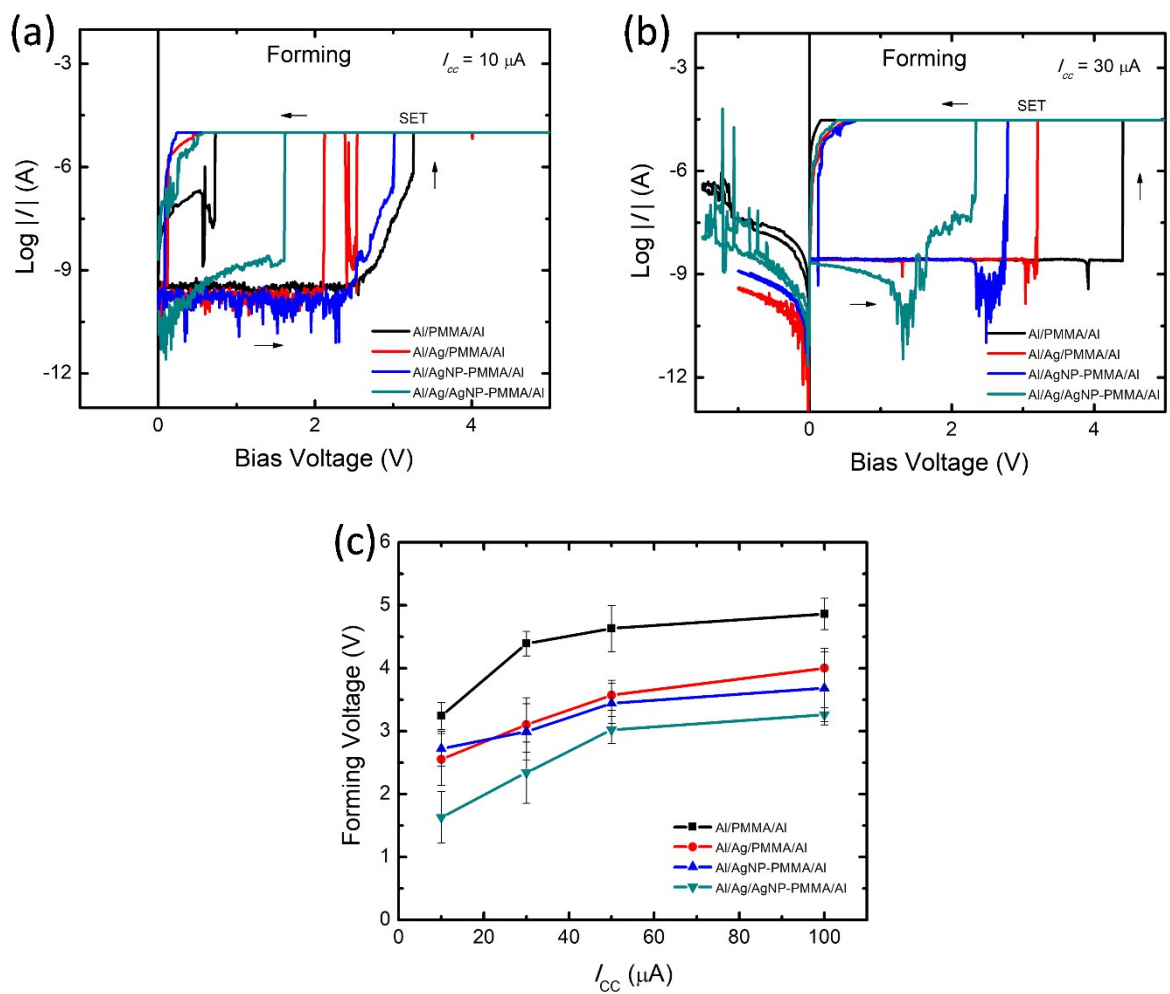
Configurable Switching Behavior in the Polymer-based Resistive Memories by Adopting Unique Electrode/Electrolyte Arrangement

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Fig. S1 The *I–V* plots of the forming process of the devices measured under (a) I_{CC} = 10 μA, (b) I_{CC} = 30 μA and (c) the plot between I_{CC} and forming voltage (evaluated from the *I–V* data of 5 devices at each I_{CC}).
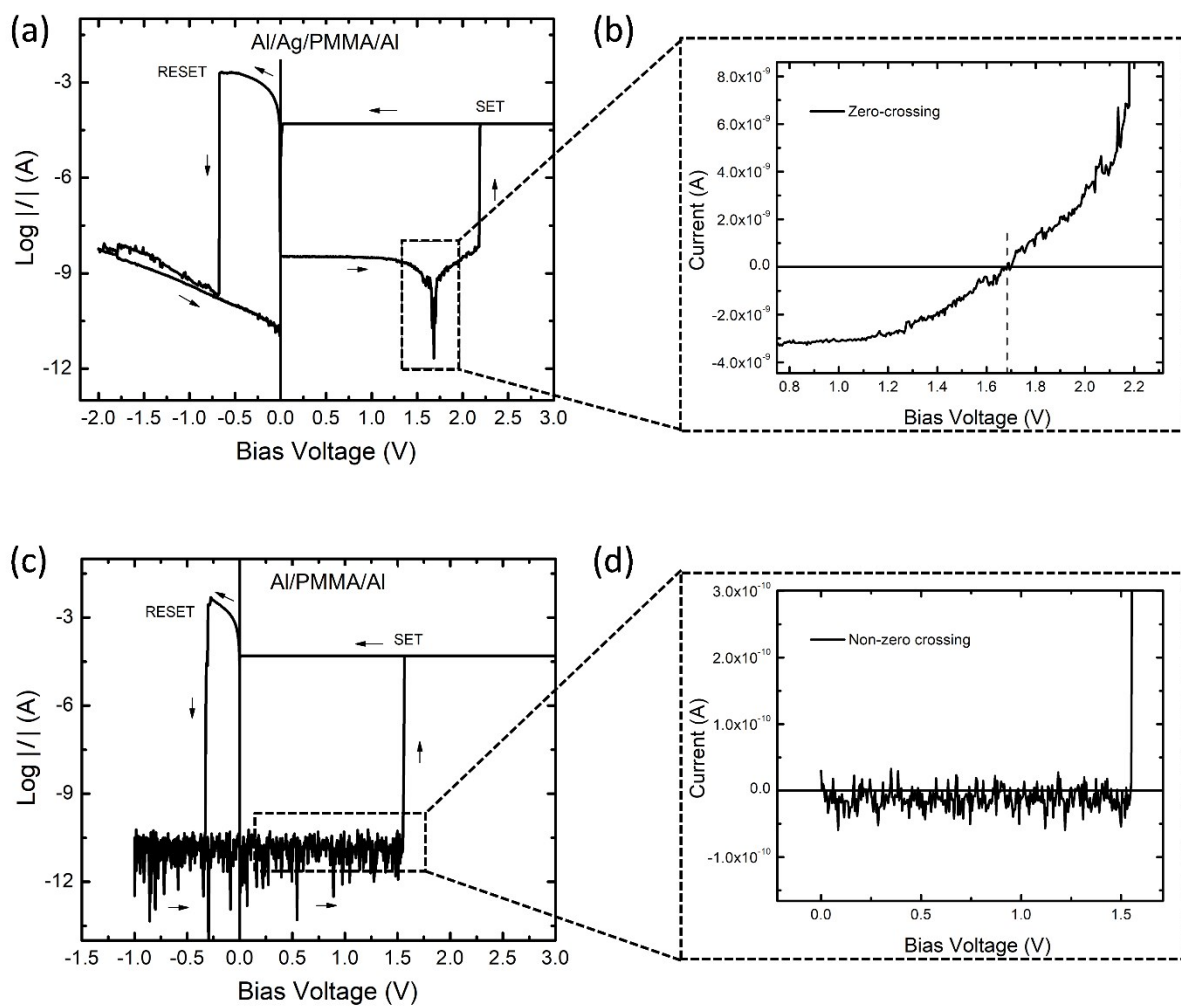
Fig. S2 (a and c) The current minimum in a logarithmic scale of the *I–V* behaviour, corresponding to a (b) zero-current crossing point and (d) non-zero current crossing in a linear scale of the Al/Ag/PMMA/Al and Al/PMMA/Al devices, respectively.
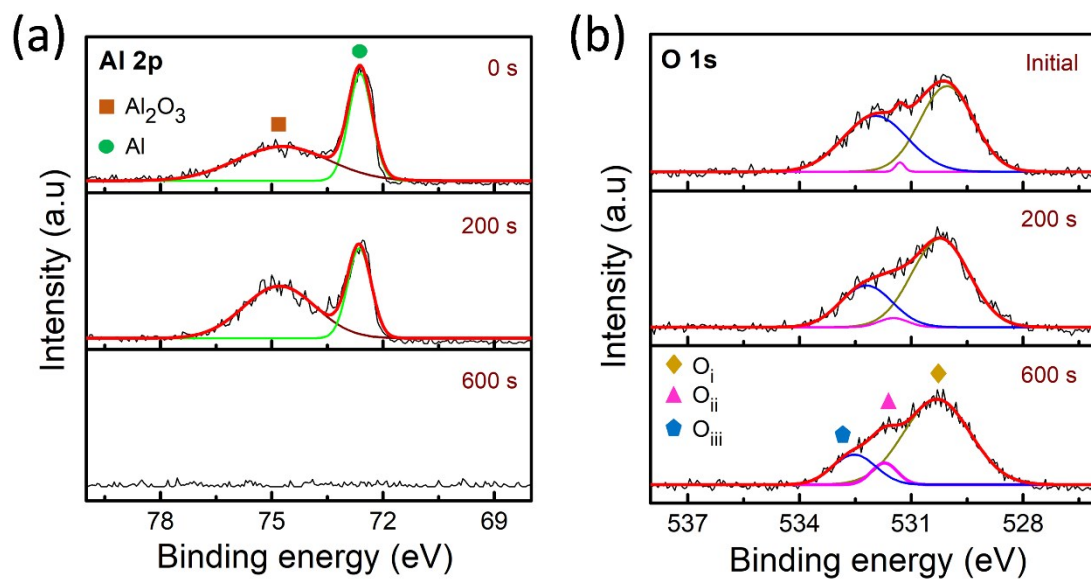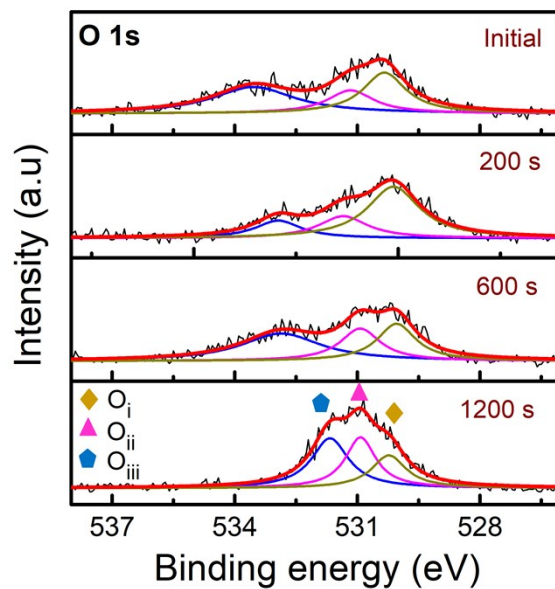
Fig. S3 Depth-profiling XPS scans of (a) Al 2p and (b) O 1s signals of the pristine Al/PMMA/Al device (HRS).
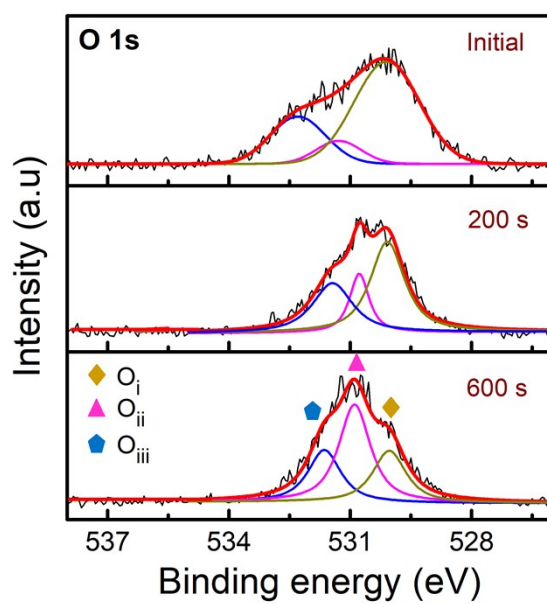
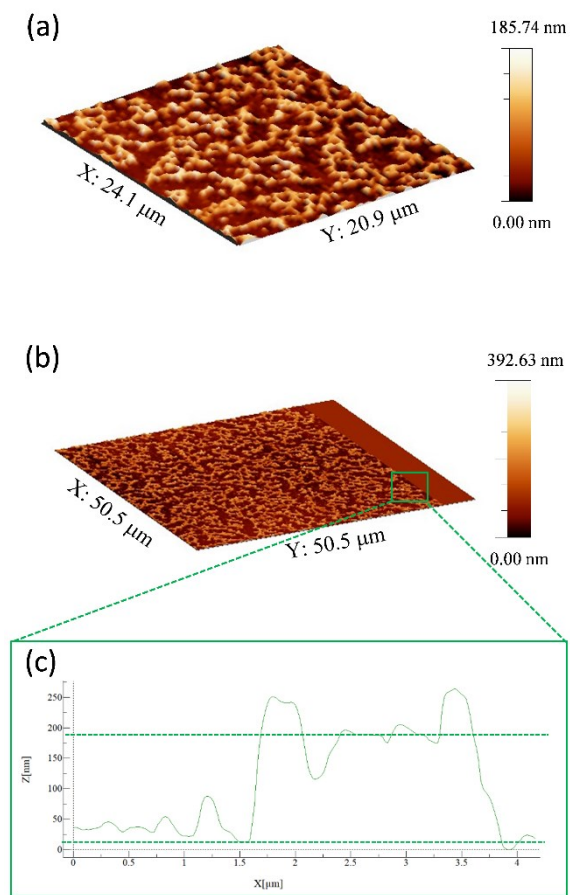**Fig. S4** O 1s signals of the depth-profiling XPS spectra of Al/AgNP-PMMA/Al device.
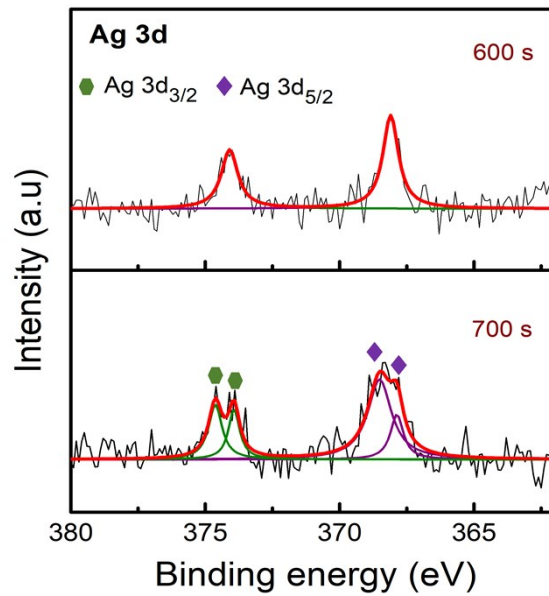
Fig. S5 Ag 3d signals of the depth-profiling XPS spectra of Al/AgNP-PMMA/Al device.

Fig. S6 O 1s signals of the depth-profiling XPS spectra of Al/Ag/PMMA/Al device.

Fig. S7 (a) AFM image of the pure PMMA film and (b) AFM image of the etched film and (c) the corresponding thickness variation profile. The thickness of film is ~200 nm.

Table S1. The mean value (μ) and standard deviation (σ) of the V_{SET}/ V_{RESET} and $R_{\text{LRS}}/R_{\text{HRS}}$ data of all the devices

Device	Mean value (μ) / Standard deviation (σ)		Mean value (μ) / Standard deviation (σ)	
	V_{SET} (V)	V_{RESET} (V)	R_{LRS} (Ω)	R_{HRS} (Ω)
Al/PMMA/Al	2.28/ 0.70	-0.48/ 0.29	165.7/ 211.6	2.59×10^9/ 2.64×10^9
Al/Ag/PMMA/Al	2.30/ 0.74	-0.88/ 0.38	218.5/ 210.2	4.58×10^7/ 4.94×10^7
Al/AgNP-PMMA/Al	2.37/ 0.63	-0.44/ 0.17	67.9/ 117.7	6.50×10^9/ 1.16×10^{10}
Al/Ag/AgNP-PMMA/Al	1.73/ 0.61	-0.36/ 0.17	419.8/ 312.1	4.65×10^7/ 4.23×10^7