Supporting Information

Solution-processable star-shaped small molecules for efficient organic RRAM by induced conductive filament mechanism

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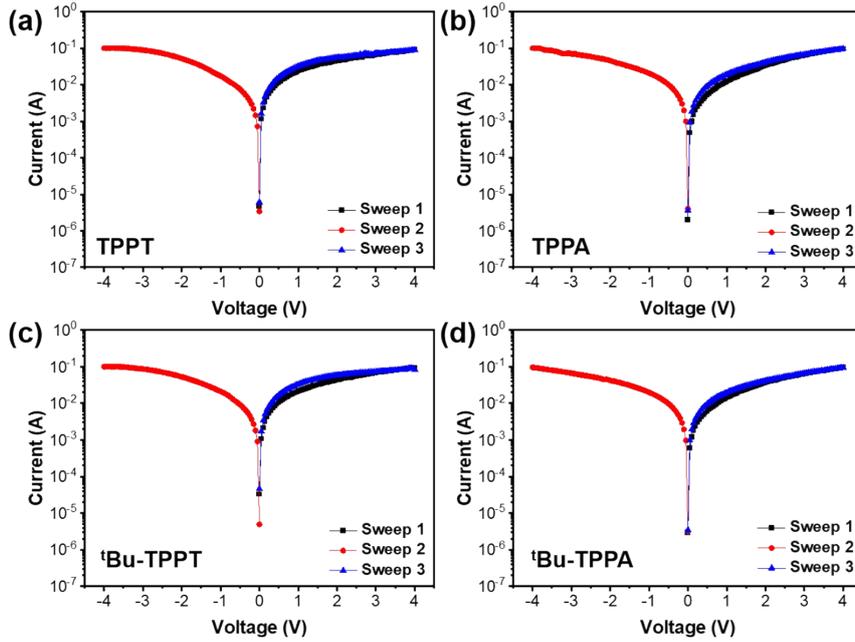
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Fig. S1 Retested I–V curves of all memory devices after a period of one-month for (a) TPPT, (b) TPPA, (c) ᵗBu-TPPT and (d) ᵗBu-TPPA, respectively.
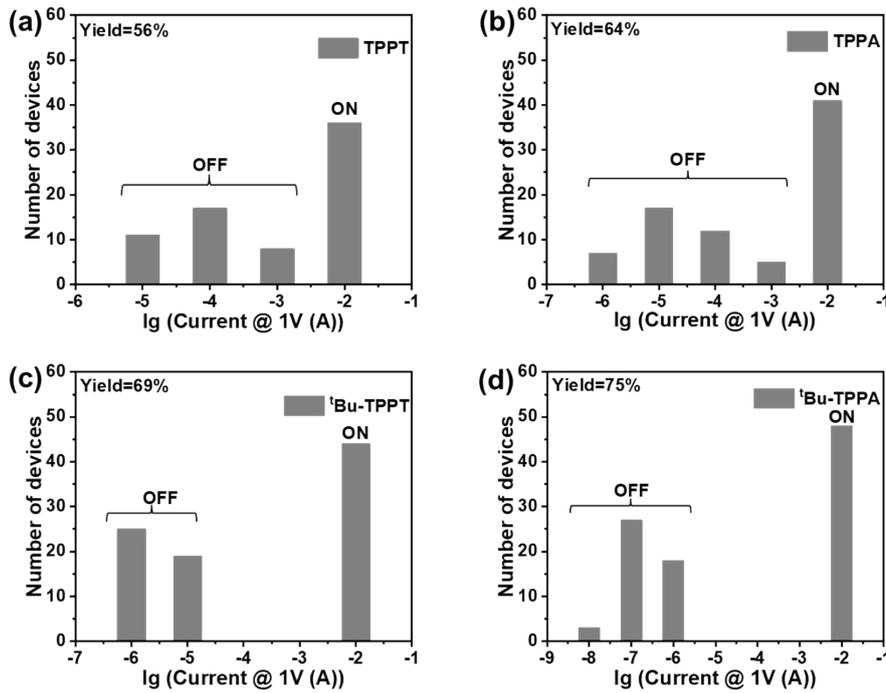

Fig. S2 The statistical analysis of the data of reproducibility and current distribution of devices based on (a)TPPT, (b)TPPA, (c) ᵗBu-TPPT, and (d) ᵗBu-TPPA (64 cells for each device).
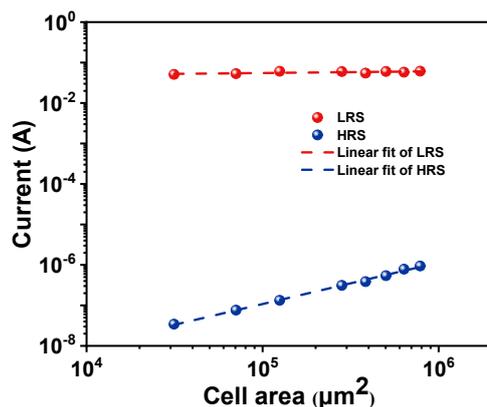
Fig. S3 The relationship of cell area and current in LRS (red) and HRS (blue), respectively (Insert is the photo of as-fabricated mask-type device).

Table S1 The photophysical properties for BPPT, TPPT, TPPA, ^{t}Bu-TPPT and ^{t}Bu-TPPA.

Molecules		BPPT	TPPT	TPPA	^{t}Bu-TPPT	^{t}Bu-TPPA
λ_{abs} (nm)	Solution	310	334	273/367	347	278/368
	Film	310	335	277/371	349	300/389

Table S2 Photophysical and electrochemical properties of BPPT, TPPT, TPPA, ^{t}Bu-TPPT and ^{t}Bu-TPPA.

Molecules	λ_{onset}[a] (nm)	E_{ox}[b] (V)	E_g[c] (eV)	HOMO[d] (eV)	LUMO[d] (eV)
BPPT	344	1.45	3.60	-5.93	-2.33
TPPT	374	1.41	3.32	-5.89	-2.57
^{t}Bu-TPPT	383	1.60	3.24	-6.08	-2.84
TPPA	400	0.86	3.10	-5.34	-2.24
^{t}Bu-TPPA	403	0.91	3.07	-5.39	-2.32

[a] THF measurement.

[b] Calculated using CV.

[c] Calculated from onset of the absorption spectra ($E_g = 1240/\lambda_{onset}$).

[d] The HOMO and LUMO energy levels measured against ferrocene were calculated using the following equations: $E_{HOMO} = [E_{ox} - E_{Fc} + 4.8]$, $E_{LUMO} = [E_{HOMO} - E_g]$.

Table S3 Statistic results of the star-shaped molecules-based memory devices.

Devices	BPPT	TPPT	TPPA	^{t}Bu-TPPT	^{t}Bu-TPPA
$V_{th}(V)$	–	1.60	1.50	1.50	1.45
I_{ON}/I_{OFF}	–	10^2:1	10^3:1	10^4:1	10^5:1