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

Supporting information

High Performance Flexible Memristor Based on Lead Free $AgBiI_4$ Perovskite with Ultralow Operating Voltage

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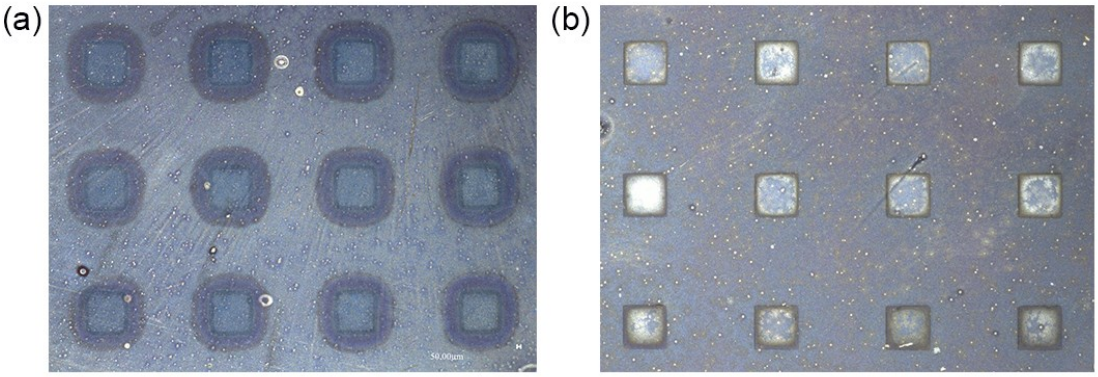

Fig. S1 (a) The photograph of device without PMMA layer. (b) The photograph of device with PMMA layer.

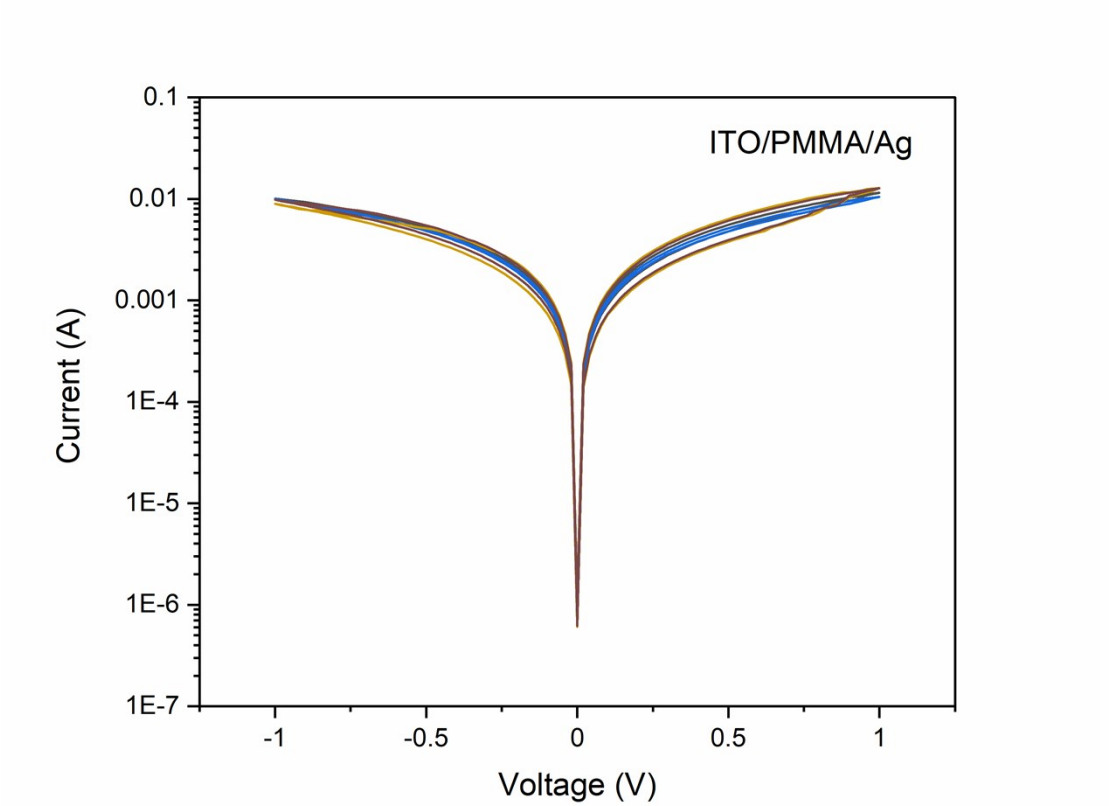

Fig. S2 The current-voltage (*I-V*) characteristics of the PMMA with a structure of ITO/PMMA/Ag.

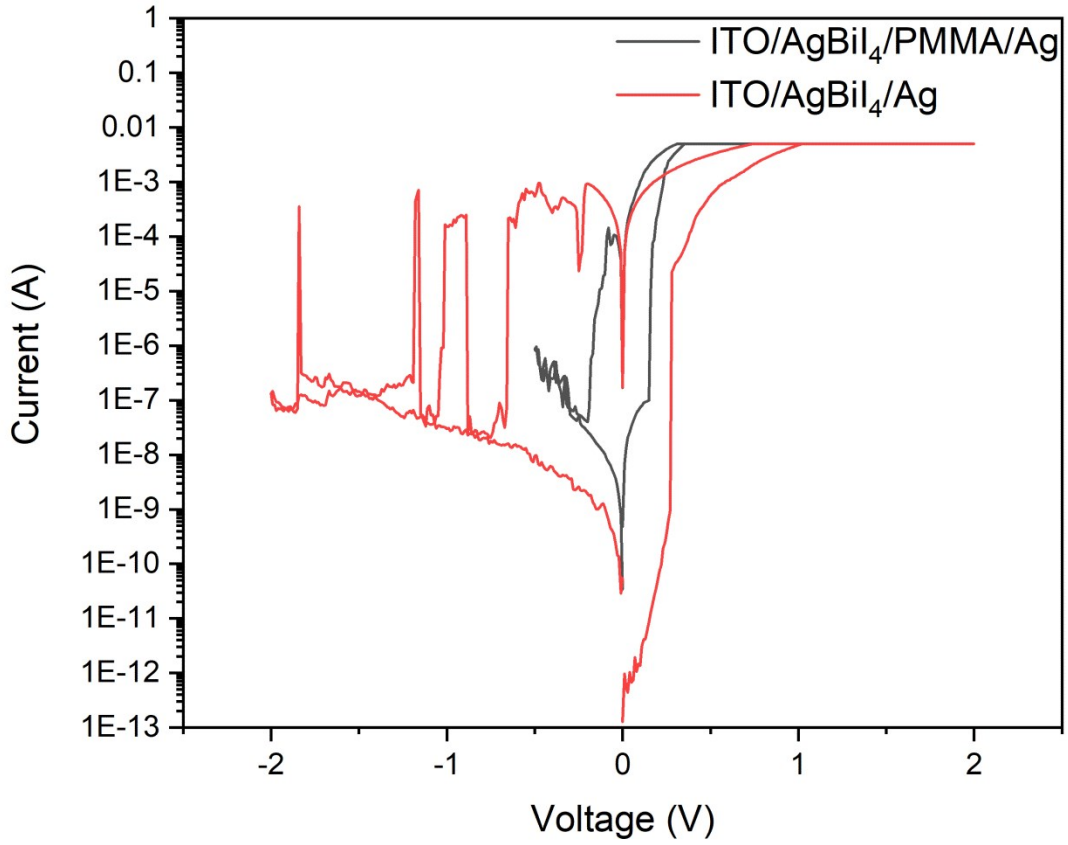

Fig. S3 The current-voltage (*I-V*) characteristics of the $AgBiI_4$ based memory devices with or without PMMA insulating layer.

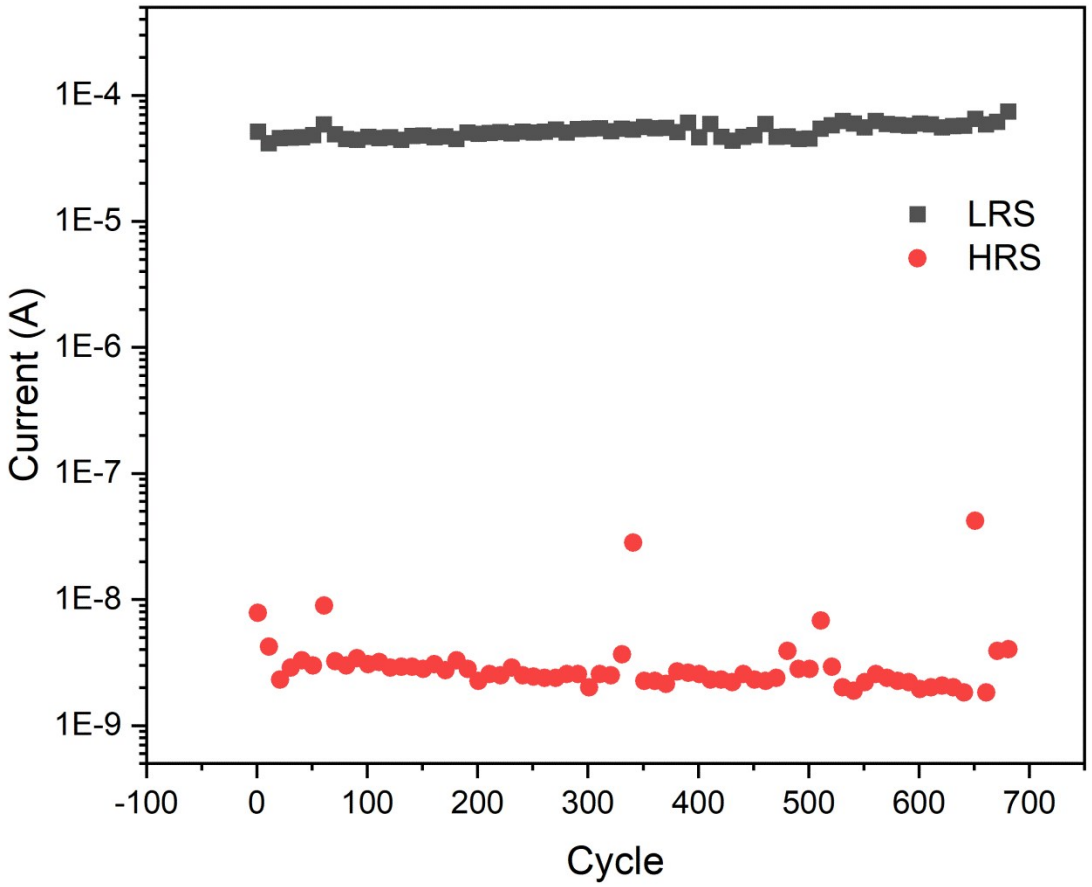

Fig. S4 The switching endurance property of the memory device.

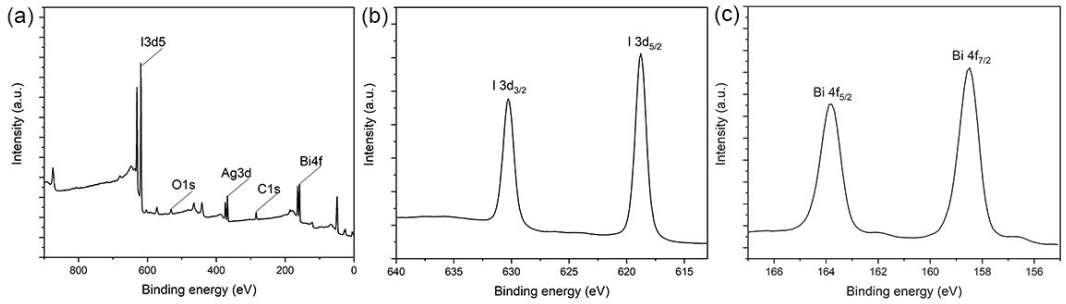

Fig. S5 The XPS survey of the $AgBiI_4$ film.

Table. S1 Comparison of various perovskite-based RRAM devices.

Structure	SET Voltage [V]	RESET Voltage [V]	Retention Time [s]	Stable Endurance [times]	ON/ OFF ratio	Ref.
Au/$CH_3NH_3PbI_3$/ITO/PET	0.7	-0.5	10^4	400	10	[16]
Au/$Cs_3Bi_3I_9$/ITO/PET	0.3	-0.5	10^4	-	10^3	[17]
Au/$CH_3NH_3PbI_3$/Pt/Ti/SiO_2/Si	1	-1	10^5	500	10^3	[50]
Au/$CH_3NH_3PbClxI_{3-x}$/TiO_2/Ti	1	-1.58	10^4	-	20	[51]
Ag/$CH_3NH_3PbBr_{2.54}Cl_{0.46}$/FTO/glass	0.7	-1.3	10^3	250	10^3	[52]
Ag/$CH_3NH_3PbBr_3$/FTO/glass	3	-4	10^3	250	10^3	[52]
Ag/$CH_3NH_3PbI_{3-x}Cl_x$/FTO/glass	1.5	-1.5	4×10^4	10^3	10^2	[53]
Au/(NH_2-dendrimer/oleic acid-stabilized $BaTiO_3)_n$/Pt/Ti/SiO_2/Si	1.5	-1.8	10^5	200	10^4	[54]
Ag/$BiMnO_3$/Ti	3.9	-3.75	-	100	10	[55]
Au/$CH_3NH_3PbI_{3-x}$ Cl_x/FTO/glass	0.8	-0.6	10^4	100	2	[56]
Au/Ti/ZnO/Nb-doped $SrTiO_3$/Al/Au	-2	3	10^4	30	10^2	[57]
Al/$CsPbBr_3$/PEDOT:PSS/ITO/PET	-0.6	1.7	-	50	10^2	[58]
Cu/$CH_3NH_3PbI_3$/poly(3,4-ethyl enedioxy-thiophene)-poly(styrenesulfonate) (PEDOT:PSS)/ITO/glass	-1	1.8	10^4	3000	10^4	[59]
Au/$BaTi_{0.95}Co_{0.05}O_3$/$SrRuO_3$/mica	12	-6	8.6×10^4	3.6×10^5	50	[60]
Ag/PMMA/$AgBiI_4$/ITO	0.16	-0.16	10^4	700	10^4	[This work]

Table. S2 Element ratios of $AgBiI_4$ layer from XPS survey.

Element	Atomic (%)
Ag	8.54
Bi	7.87
I	31.38