Supporting information

Lead-free $AgBiI_4$ perovskite artificial synapses for tactile sensory neuron system with information preprocessing function

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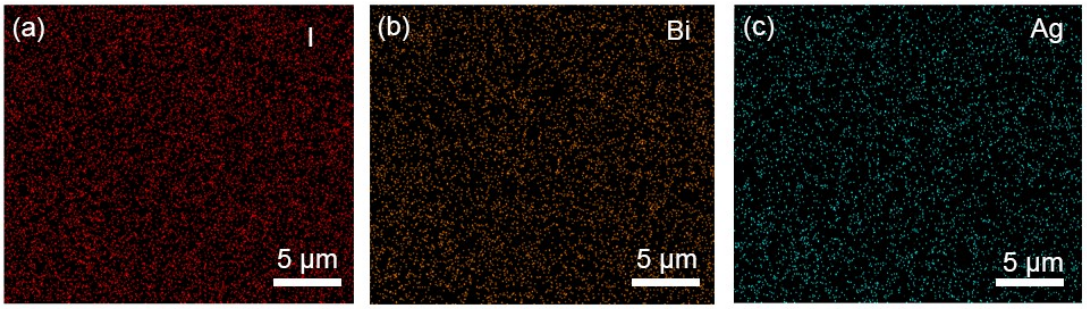

Fig. S1 The energy dispersive spectroscopy (EDS) elemental mapping of the $AgBiI_4$ components (Ag, Bi and I).

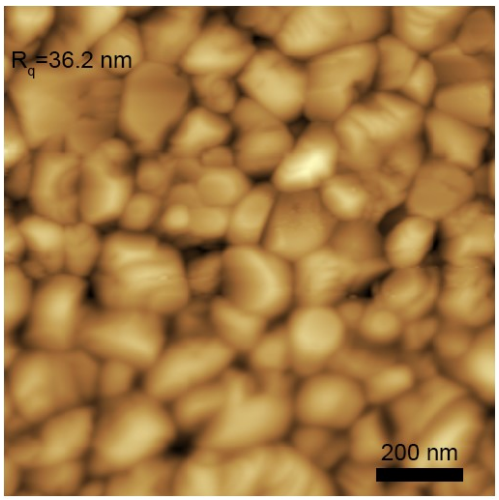

Fig. S2 The AFM measurement of the $AgBiI_4$ film.

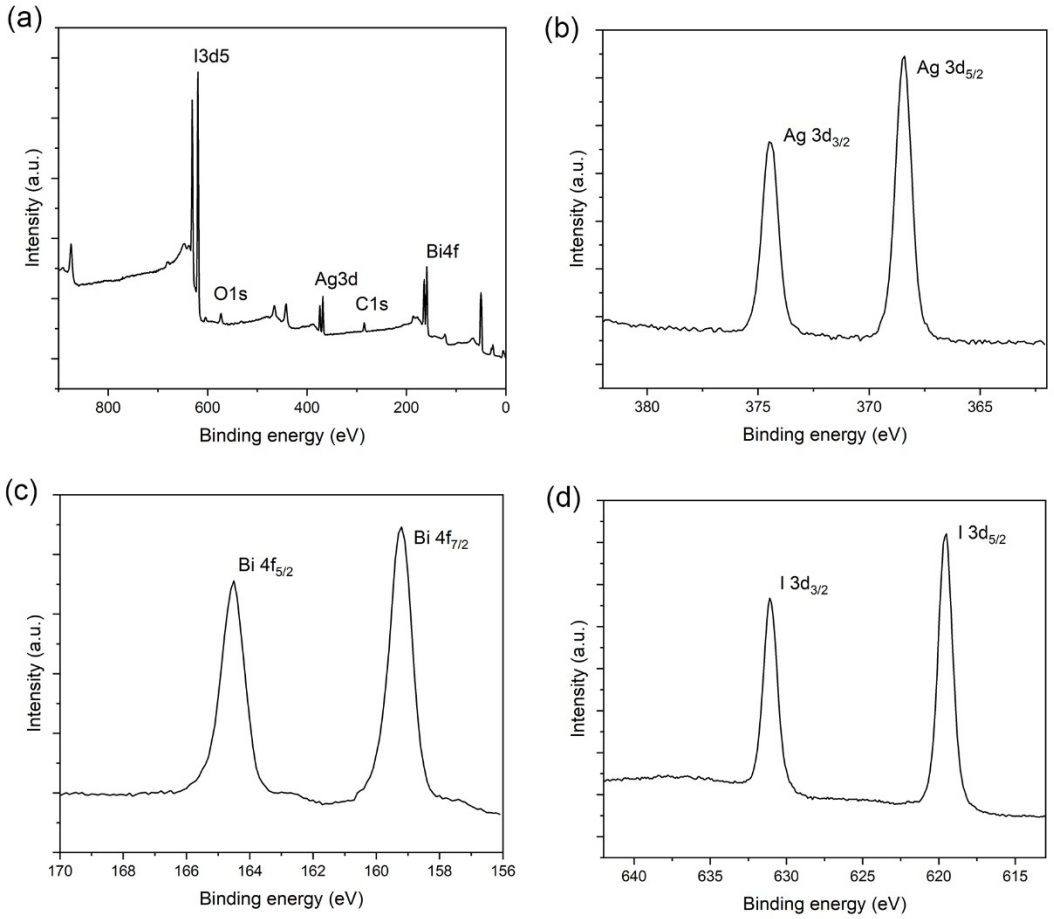

Fig. S3 The X-ray photoelectron spectroscopy (XPS) spectrum of the Ag, Bi and I element in the $AgBiI_4$ film.

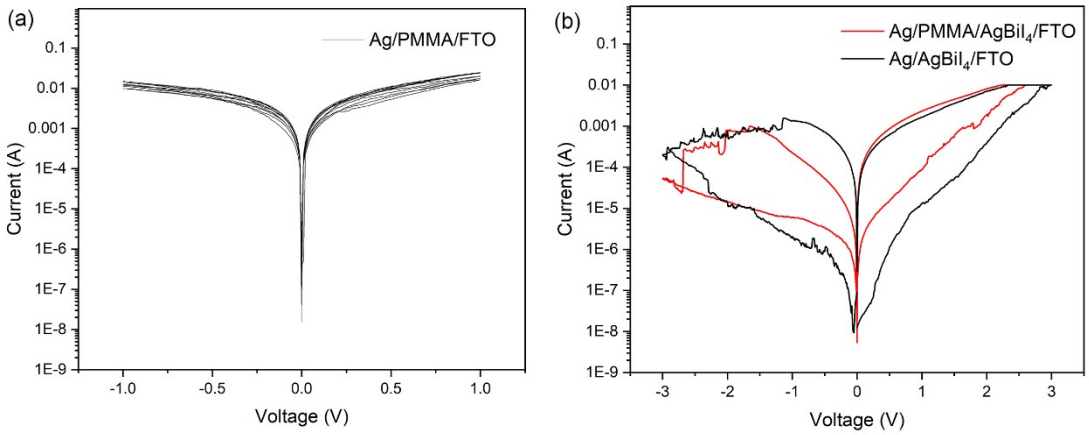

Fig. S4 (a) The I-V characteristics of the PMMA with a structure of ITO/PMMA/Ag. (b) The I-V characteristics of the $AgBiI_4$ devices with or without PMMA insulating layer.

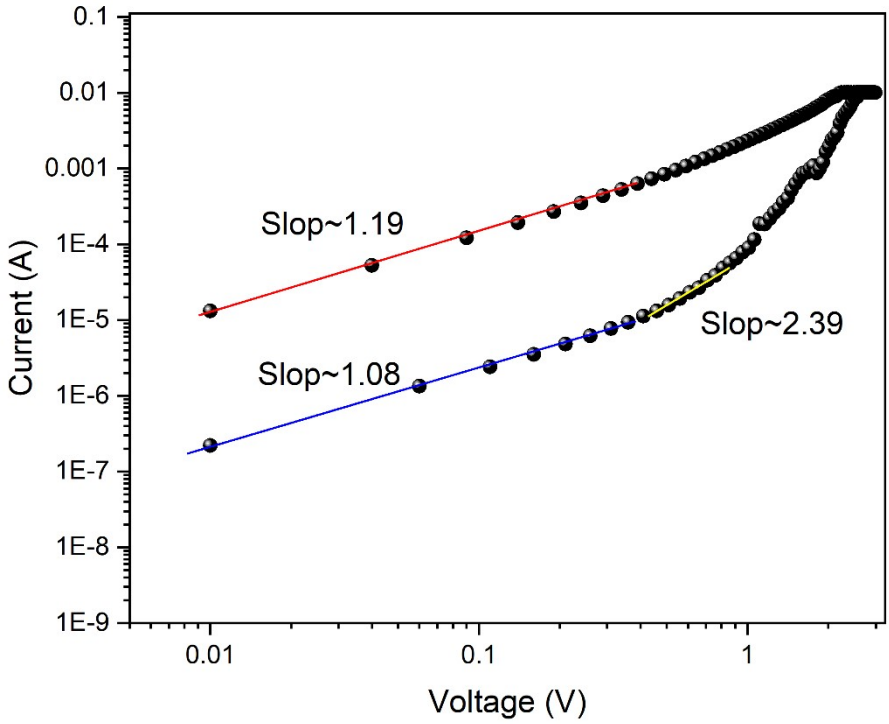

Fig. S5 The logarithmic I–V plots for the positive-voltage region of the $AgBiI_4$ device.

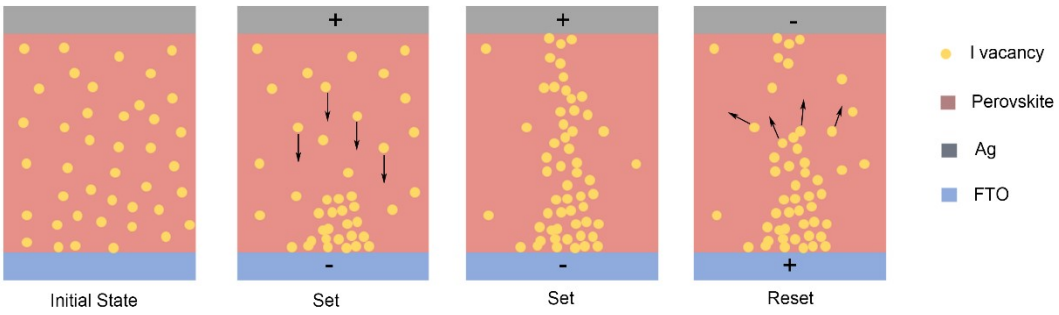

Fig. S6 Schematic illustration of the formation and disruption of the V_I conductive filaments.

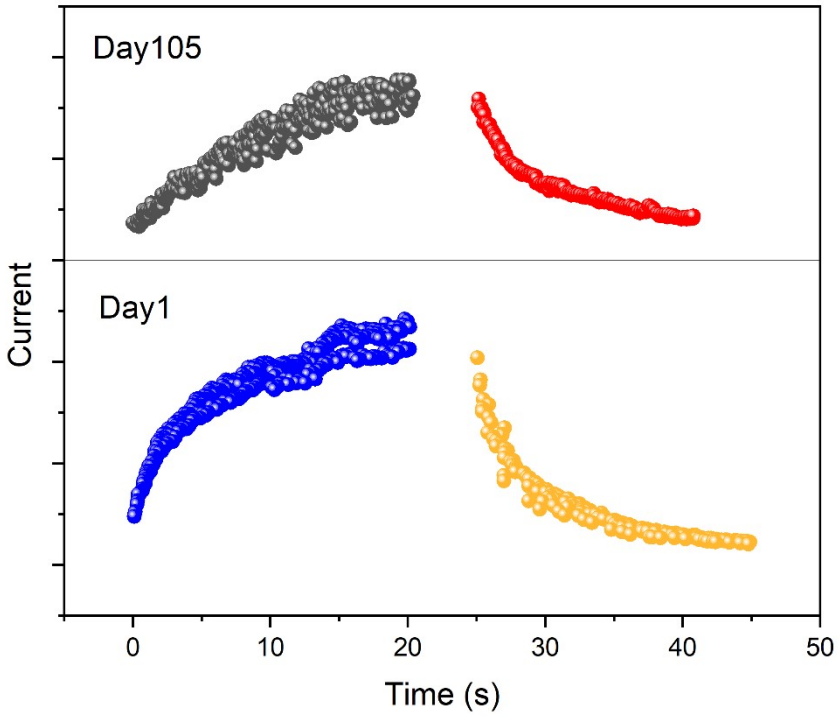

Fig. S7 the LTP and LTD characteristics of the device before and after storage.

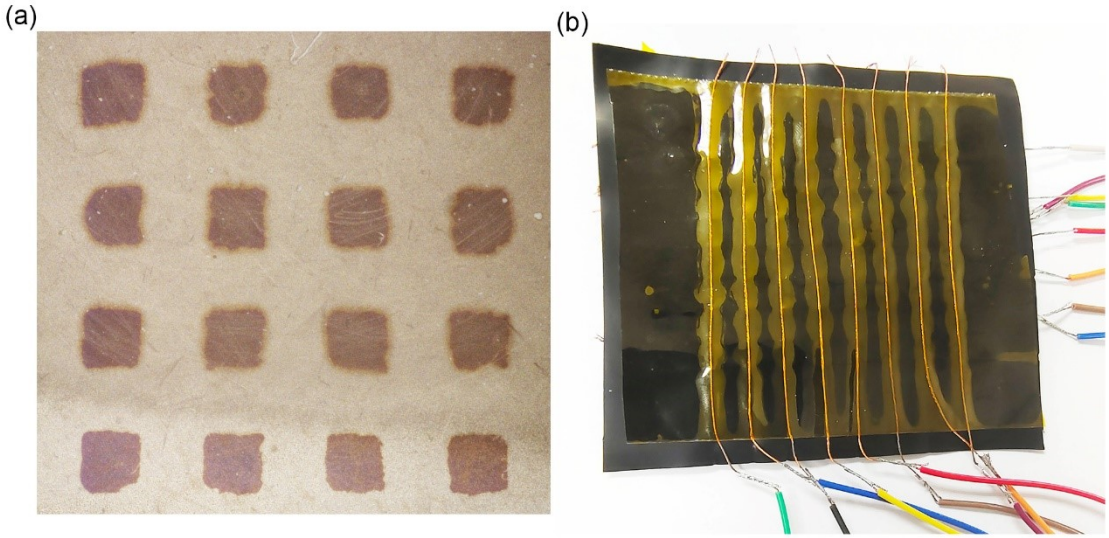

Fig. S8 The photographs of (a) the $AgBiI_4$ artificial synaptic device and (b) the tactile sensor.

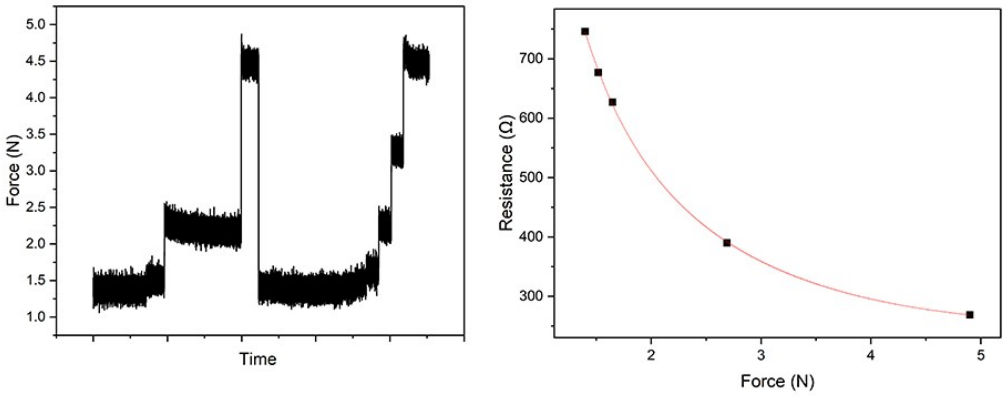

Fig. S9 The pressure response of the tactile sensor.

Table. S1 Element ratios of $AgBiI_4$ layer from XPS survey.

Element	Atomic (%)
Ag	9.18
Bi	9.44
I	42.38