SUPPORTING INFORMATION

Solution-Processed Inorganic δ-phase $CsPbI_3$ Electronic Synapses with Short- and Long-Term Plasticity in a Crossbar Array Structure

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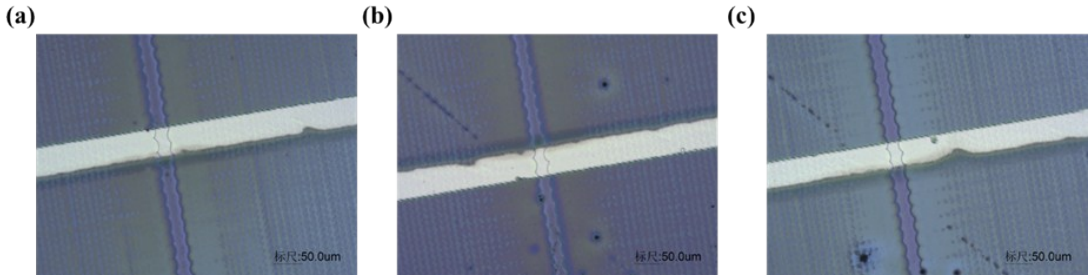

Figure S1. Optical micrographs of crossbar-array Ag/PMMA/$CsPbI_3$/ITO devices at different regions after three-months exposure in the air: (a) on the left side, (b) in the middle, and (c) on the right side. The corresponding scale bars are shown at the bottom right corner of the images.

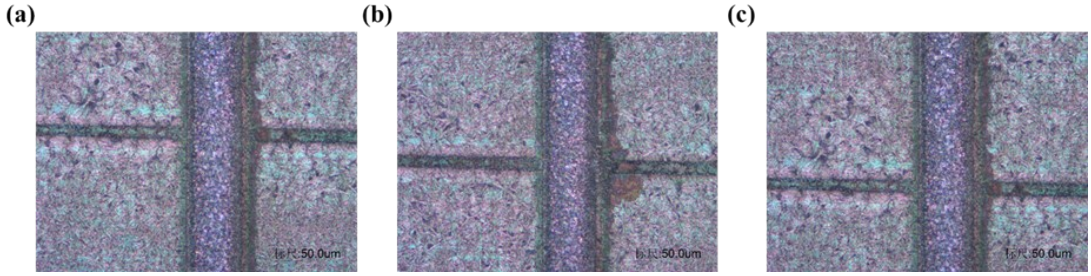

Figure S2. Optical micrographs of crossbar-array Ag/$CsPbI_3$/ITO devices at different regions after three-months exposure in the air: (a) on the left side, (b) in the middle, and (c) on the right side. The corresponding scale bars are shown at the bottom right corner of the images.

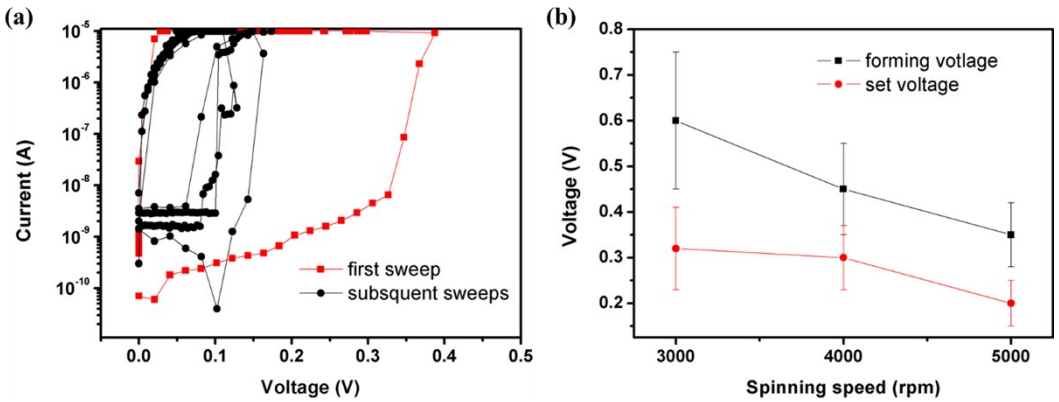

Figure S3. (a) Typical I-V characteristics of $CsPbI_3$ memristive devices using spin coating speed at 5000 rpm. (b) The relations of forming voltage and set voltage with spinning speed.

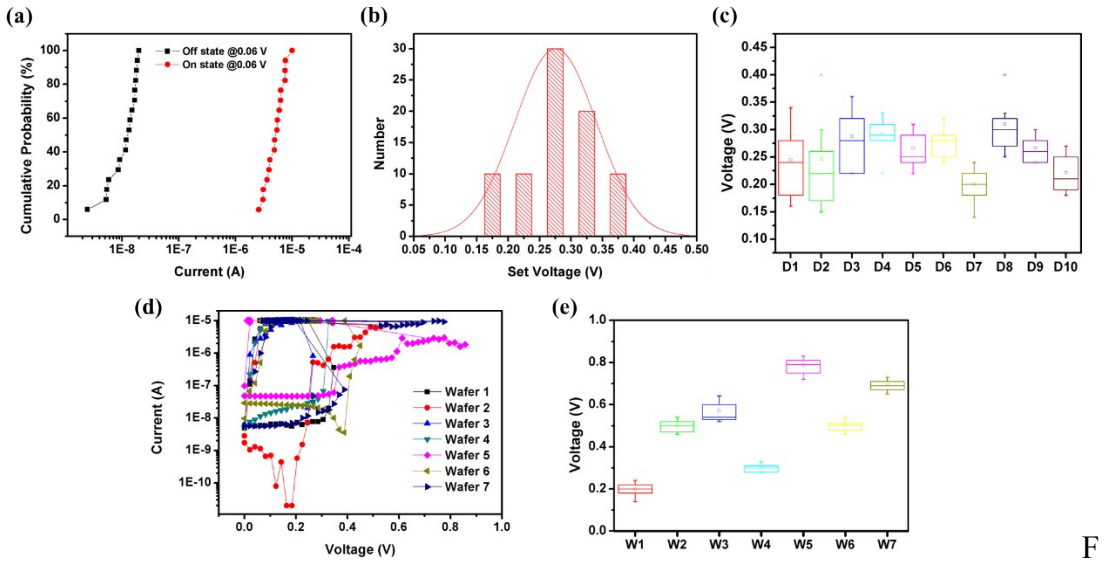

Figure S4. (a) Cumulative probability of current levels of on and off states at 0.06 V. (b) A histogram plot for set voltages. (c) Device to device uniformity of set voltages (error bar: max and min data, box: standard error). (d) I-V threshold switching characteristics of each device from 7 different wafers. (e) Wafer to wafer uniformity of set voltages (error bar: max and min data, box: standard error).

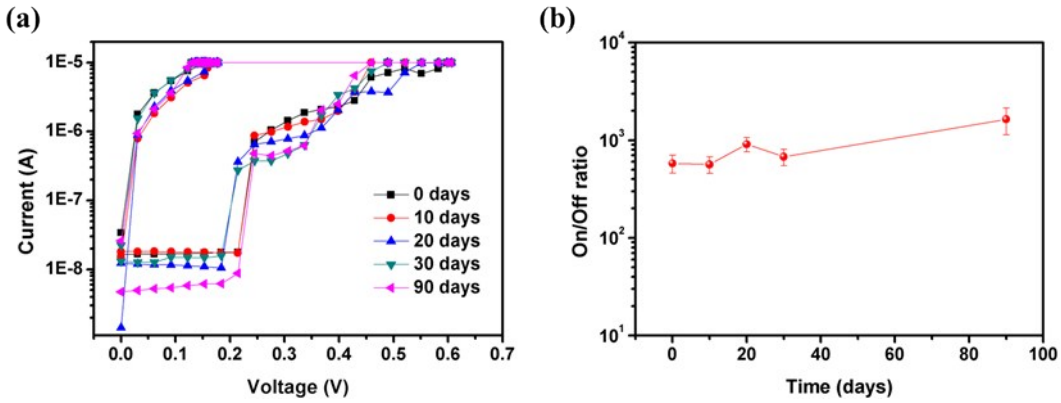

Figure S5. (a) The I-V curves of the same device at different air exposure times and (b) the variation of the On/Off ratio of the threshold switching device vs. air exposure time.

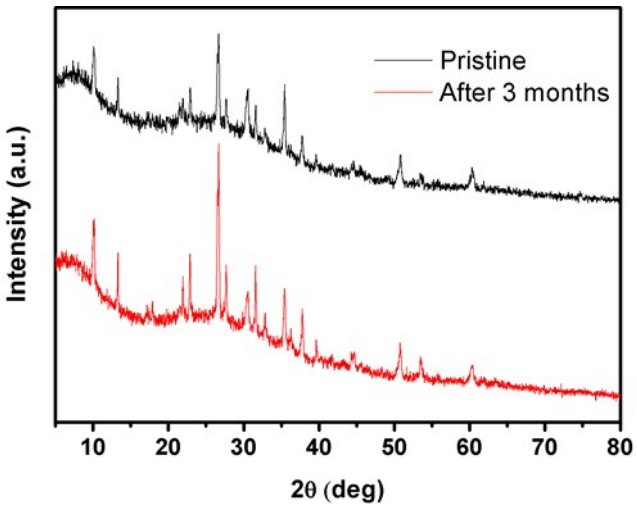

Figure S6. X-ray diffraction pattern of PMMA/CsPbI3/ITO thin films on a glass substrate.

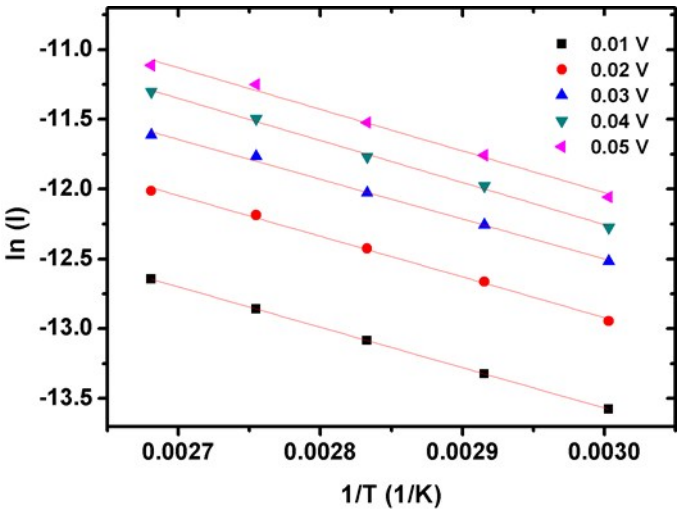

Figure S7. Arrhenius (ln I vs. 1/T) plot for electron transport of the memristive device.

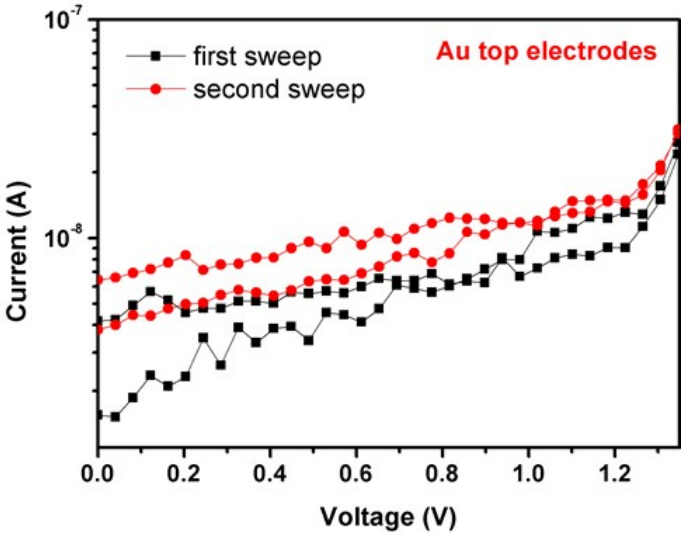

Figure S8. I-V characteristics of $CsPbI_3$ memristive devices using Au top electrodes.

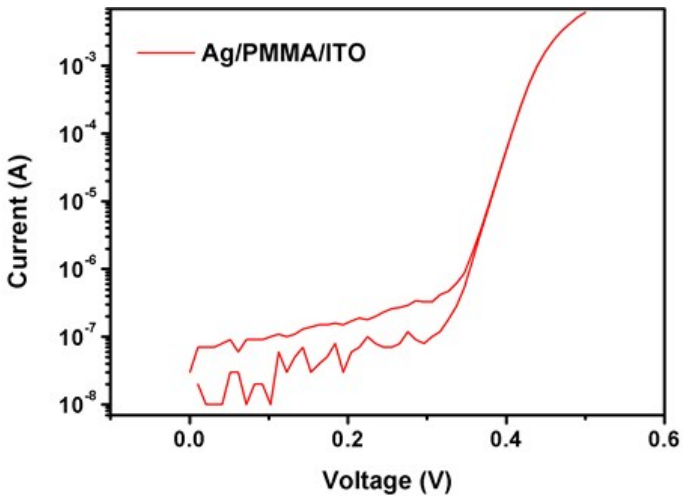

Figure S9. I-V characteristics of the Ag/PMMA/ITO structure.