Electronic Supplementary Material (ESI) for Nanoscale.
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# Supplementary Material

## Liquid-based memory and artificial synapse

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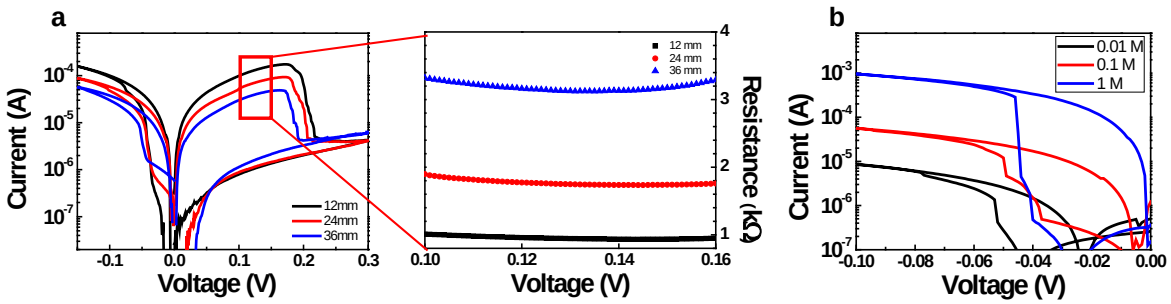


**Figure S1** (a) I-V curves of the LRSM with the distance from the top probe tip to bottom electrode. Resistance increased and "on" current decreased as the distance between top probe to bottom electrode increased. b) "On" current decreased as the concentration of $AgNO_3$ solution decreased.

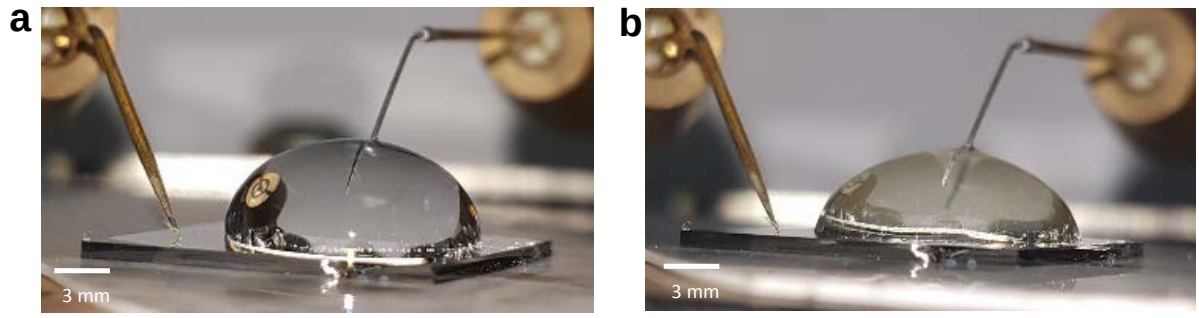


**Figure S2** Photos of the LRSM device before and after endurance test. $AgNO_3$ solution became cloudy after the endurance test. a) Before and b) after the endurance test.

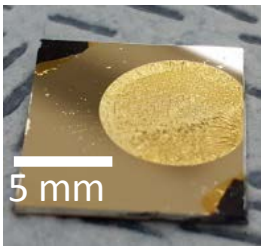


**Figure S3** Photo of the oxidized Ag electrode on the Au/$SiO_2$/Si substrate. Au was exposed on the surface after the operation.

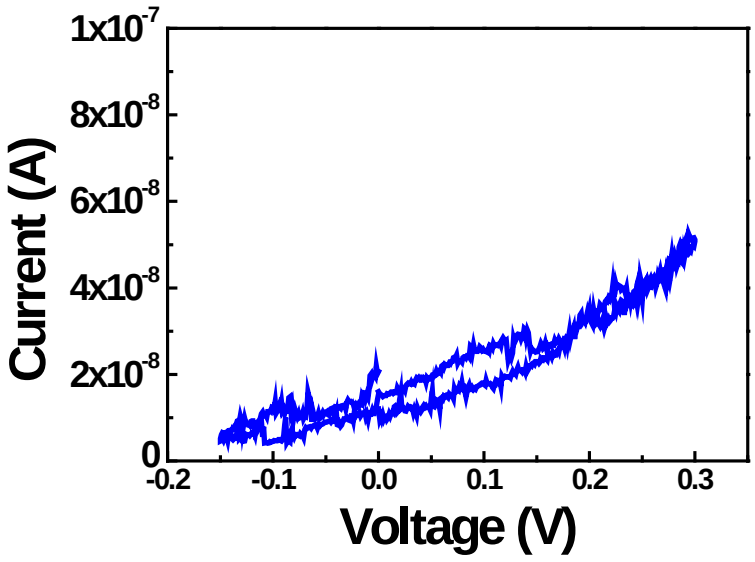


**Figure S4** I-V curve of the $AgNO_3$ on the Au bottom electrode without Ag.

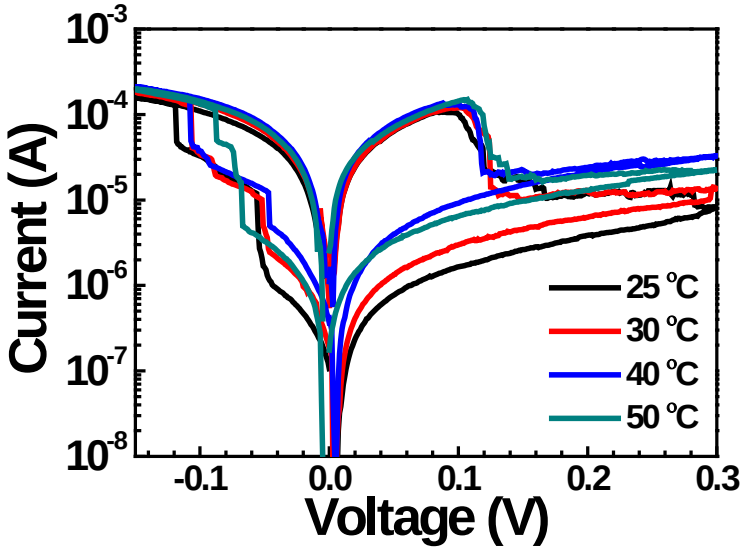


**Figure S5** I-V curves of the LRSM device with different operation temperatures.