

Supplementary information

Controllable Digital Resistive Switching for Artificial Synapses and Pavlovian Learning Algorithm

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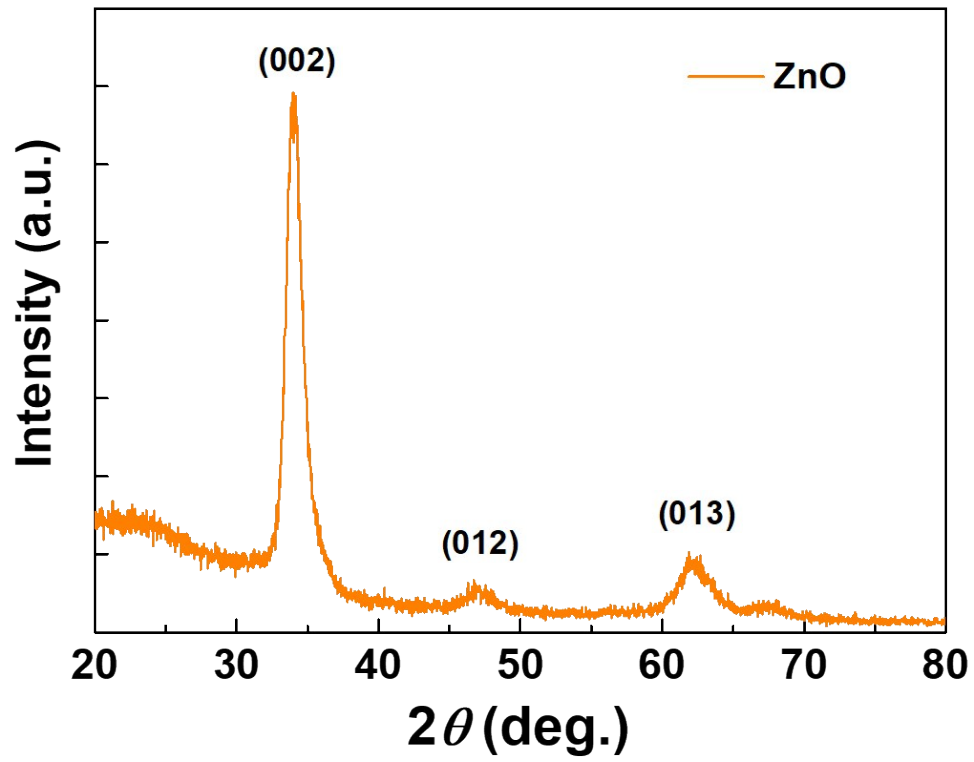


Fig S1. XRD spectra of the ZnO thin film; the presence of the intense peak close to 34 degrees corresponds to the (002) plane of the ZnO crystal.

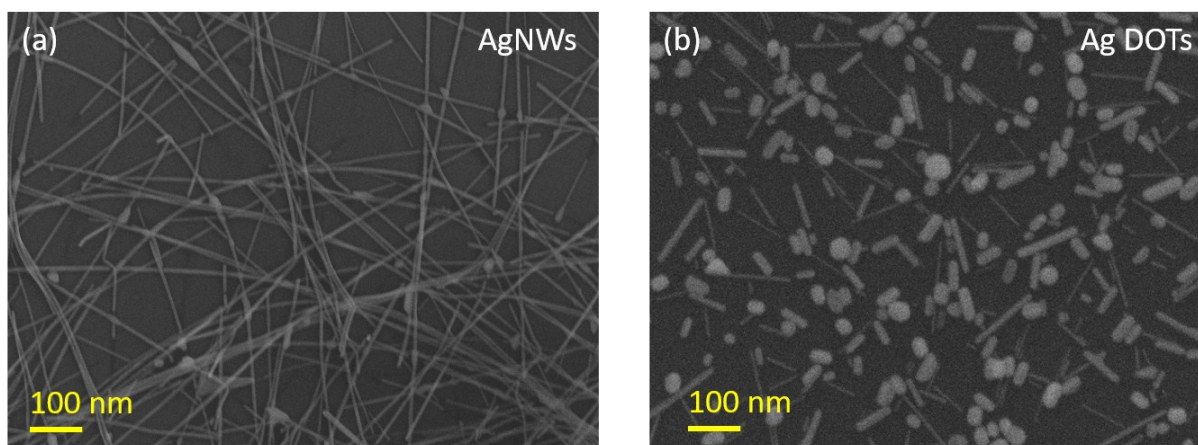


Fig. S2: The SEM image of (a) AgNWs and (b) Ag dots coated Si substrates. These two substrates were used to grow the ZnO and ITO films sequentially.

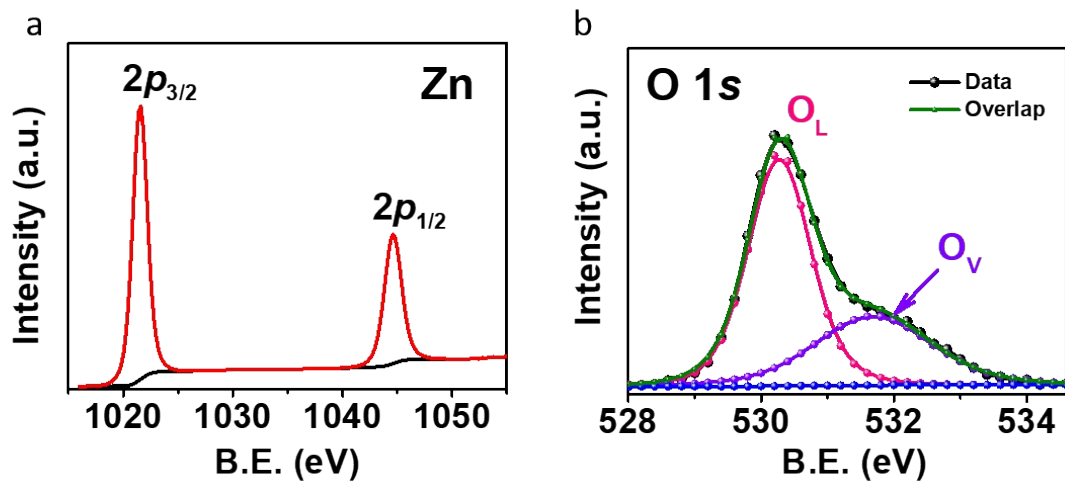


Fig S3. a) and b) depict the Zn 2p and O 1s XPS spectra, respectively, obtained from the ZnO thin film.

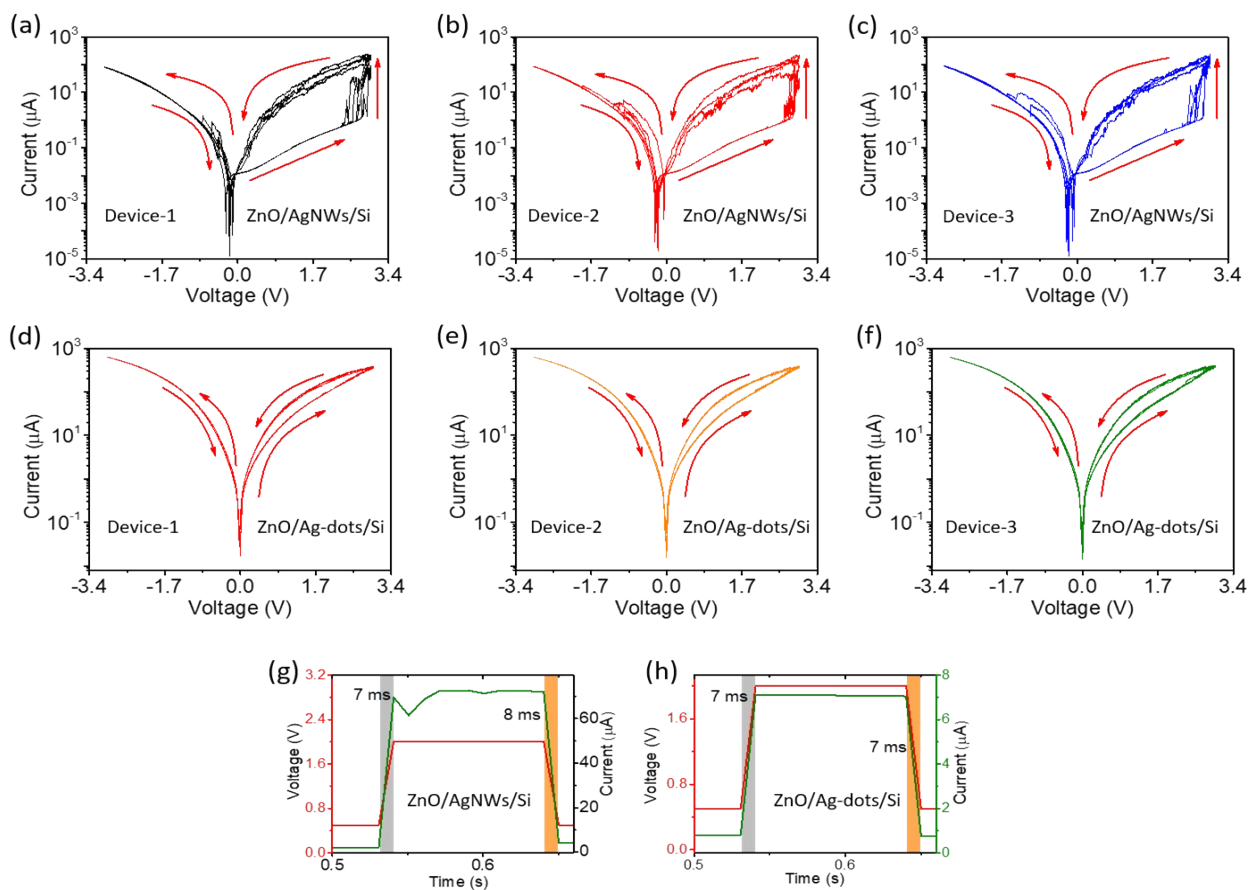


Fig. S4: Typical $I-V$ curves for (a-c) ITO/ZnO/AgNWs/Si and (d-f) ITO/ZnO/Ag-dots/Si devices in semilogarithmic scale. (g) ITO/ZnO/AgNWs/Si device response with applied pulse. (h) ITO/ZnO/Ag-dots/Si devices response with applied pulse.

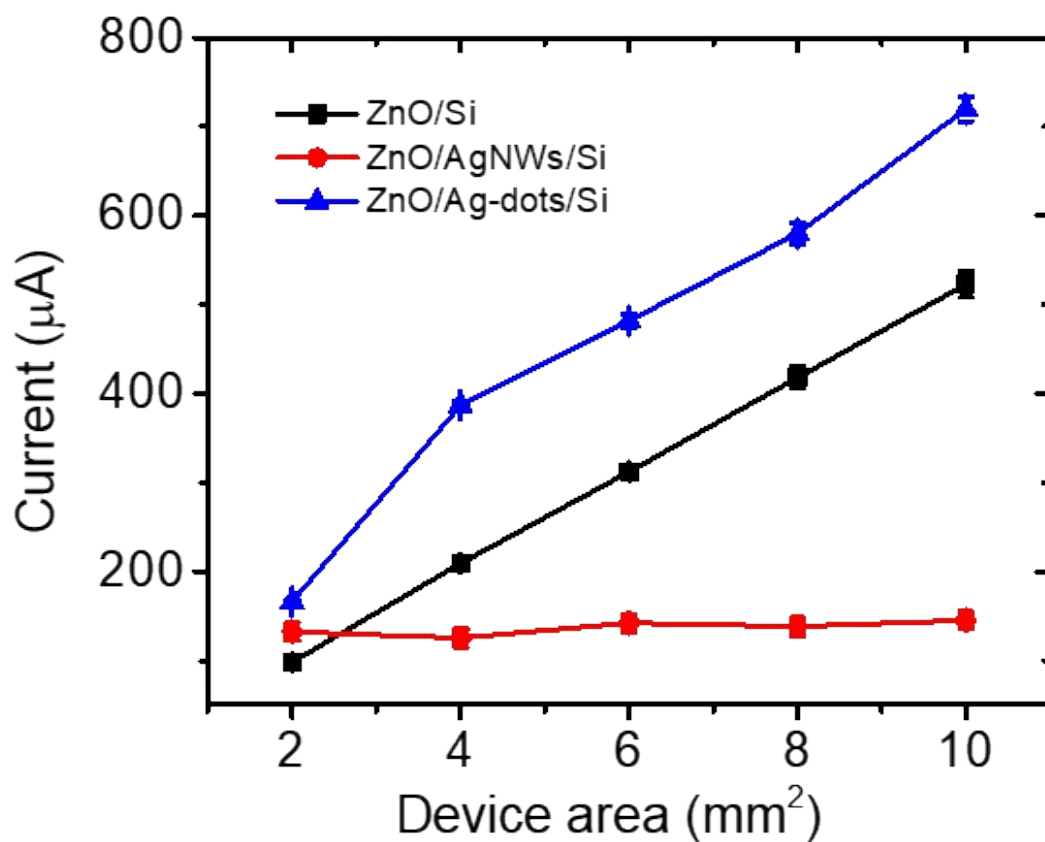


Fig S5. Current profile versus area of the devices. Note that the current increases with increasing device area for the ZnO/Si and ZnO/Ag-dots/Si devices. However, the current remains the same for the ZnO/AgNWs/Si devices.

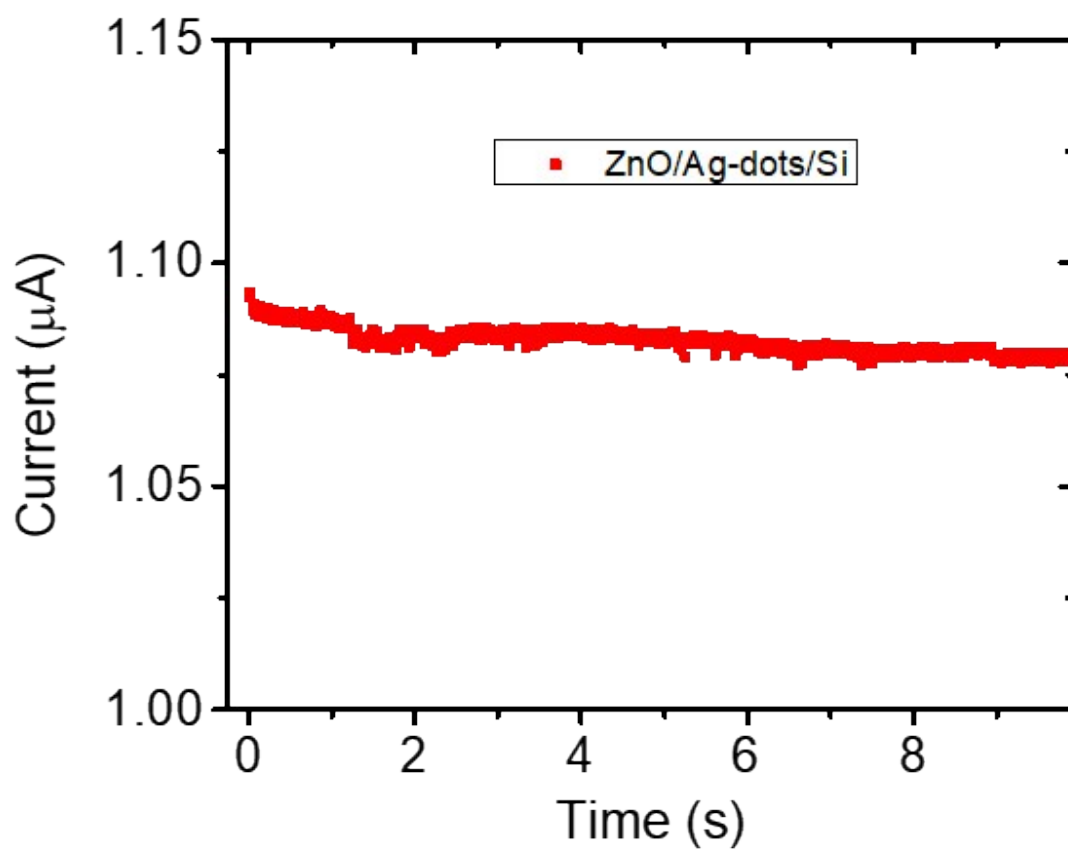


Fig S6. The change decay with time measured at +0.5V; this decaying behavior corresponds to the STM behavior of the device.

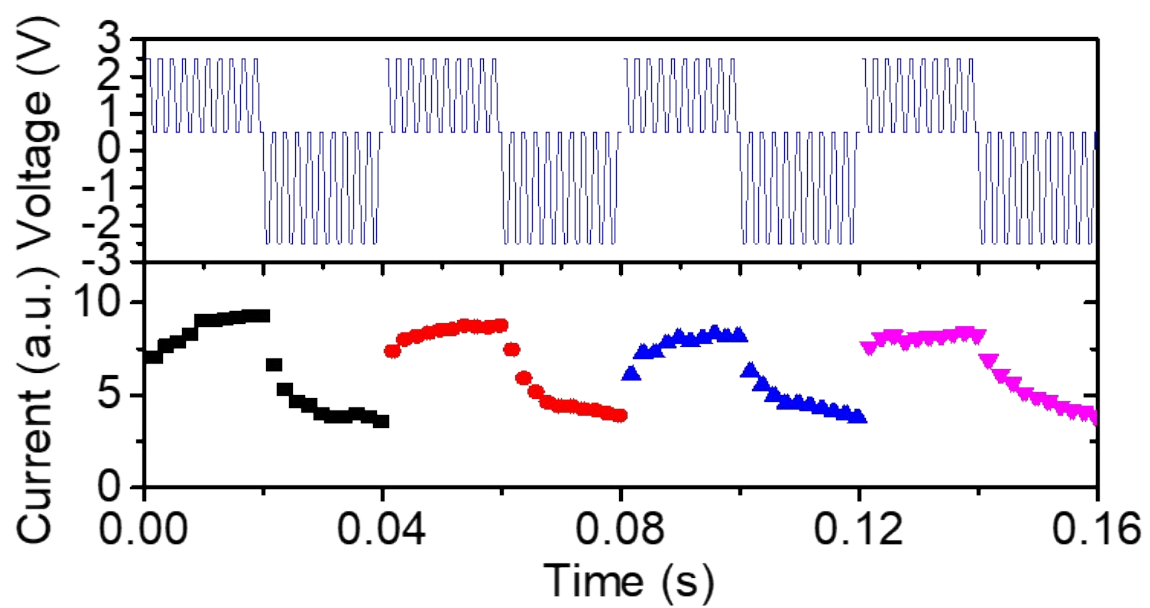


Fig S7. Reproducibility of the device for demonstration of potentiation.