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


# Supplementary Information

# Ion-gating synaptic transistors with long-term synaptic weight modulation

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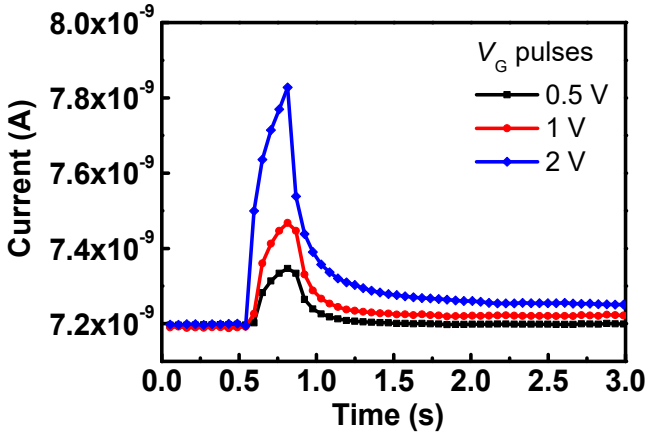


**Figure S1.** Changes in $I_D$ by applying $V_G$ pulses with different amplitudes (0.5 V, 1 V, 2 V) at the fixed pulse width (250 ms).

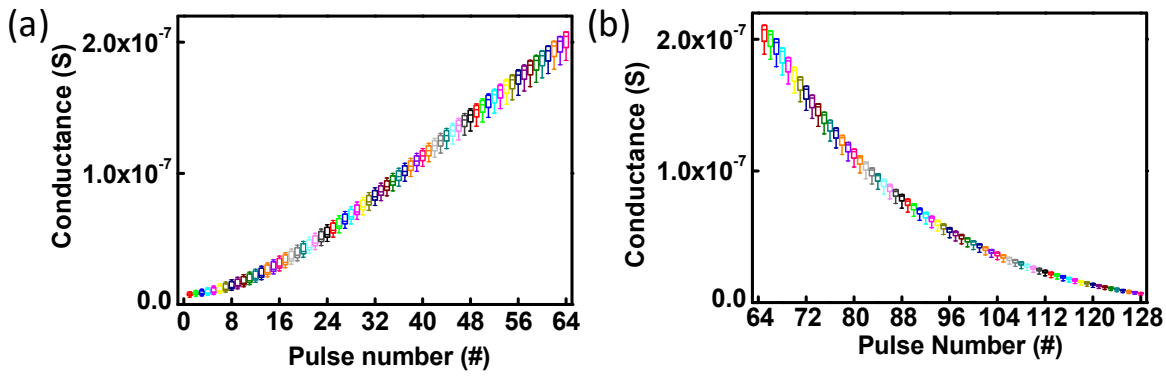


**Figure S2**. Cycle-to-cycle variation of (a) potentiation and (b) depression characteristics. 25 cycles of potentiation and depression are plotted.

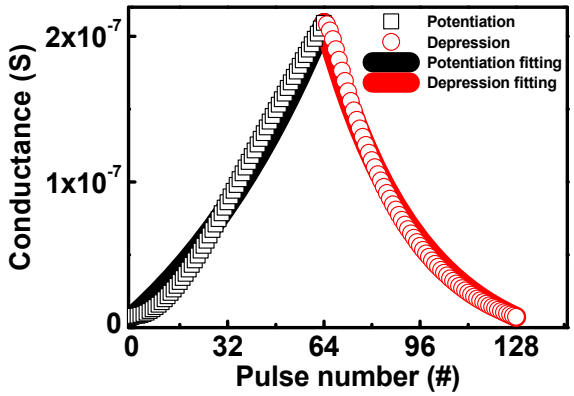


**Figure S3**. Fitted curves for potentiation and depression of a synaptic transistor.

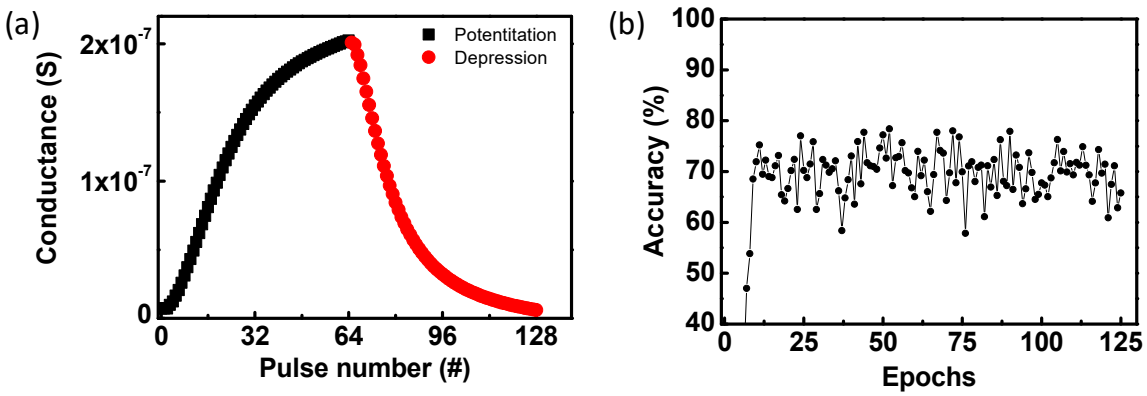


**Figure S4.** (a) Potentiation and depression characteristics during application of 64 consecutive identical positive $V_G$ pulses (9 V), then 64 consecutive negative $V_G$ pulses (-8 V). (b) Simulation of recognition accuracy for ANN that uses potentiation and depression obtained by pulses with identical amplitude.

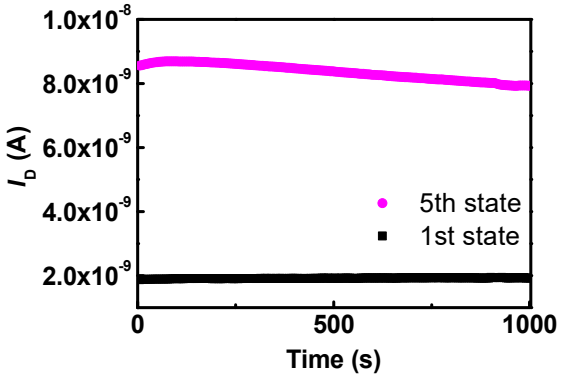


**Figure S5.** Data retention properties of synaptic transistors with the threshold switch at 1st and 5th synaptic states after positive $V_G$ sweeps from 0 V to 2 V.