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

Supplementary Information

Artificial Neurosynaptic Device Based on Amorphous Oxides for Artificial Neural Network Constructing

Qiujiang Chen[#], Ruqi Yang[#], Dunan Hu, Zhizhen Ye, Jianguo Lu[*]

State Key Laboratory of Silicon and Advanced Semiconductor Materials and School of Materials Science and Engineering, Zhejiang University, Hangzhou 310027, China

#These authors contribute equally to this manuscript.

Corresponding Authors:

E-mail: lujianguo@zju.edu.cn (Jianguo Lu);

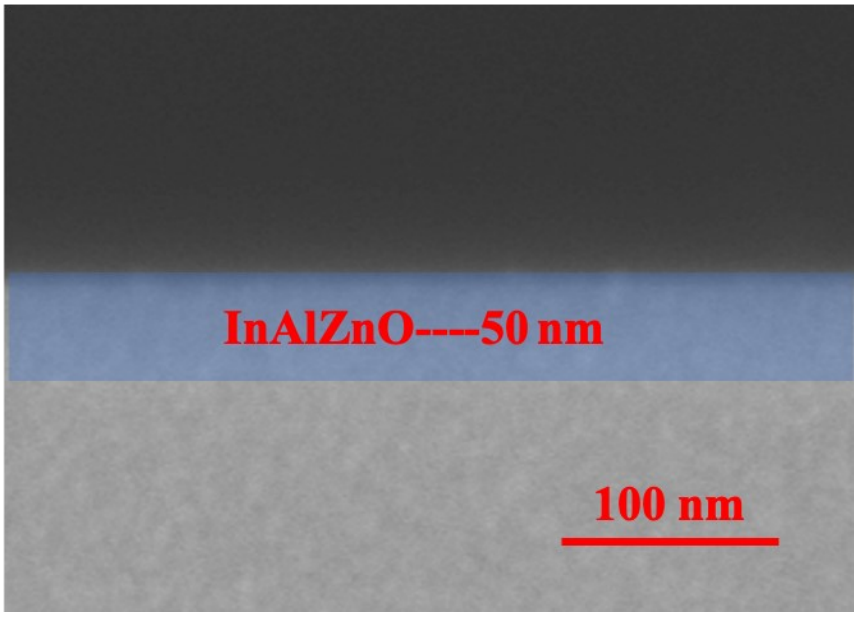

Fig. S1 The SEM of cross-sectional image of the device

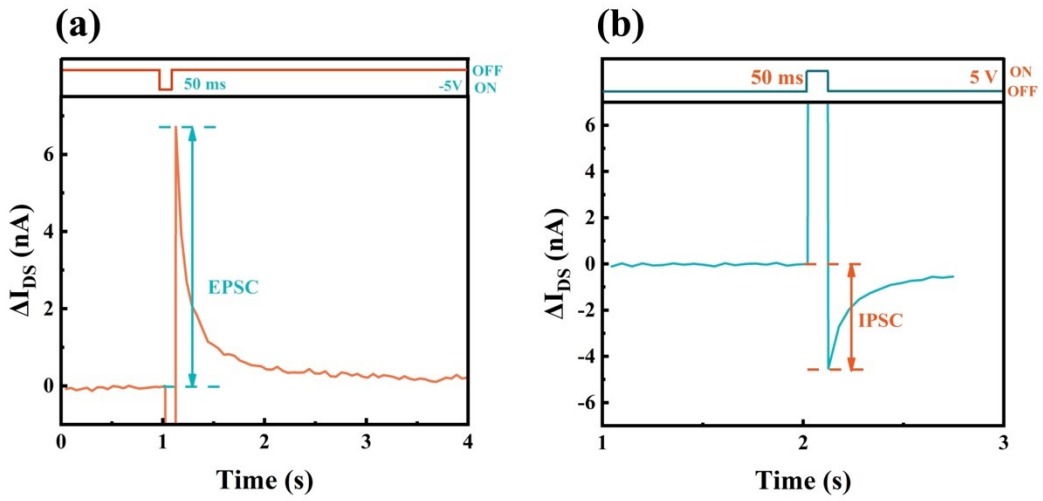

Fig S2 (a) EPSC generated by a single stimulation (-5 V, 50 ms) of the synaptic device b) EPSC generated by a single stimulation (-5 V, 50 ms) of the synaptic device

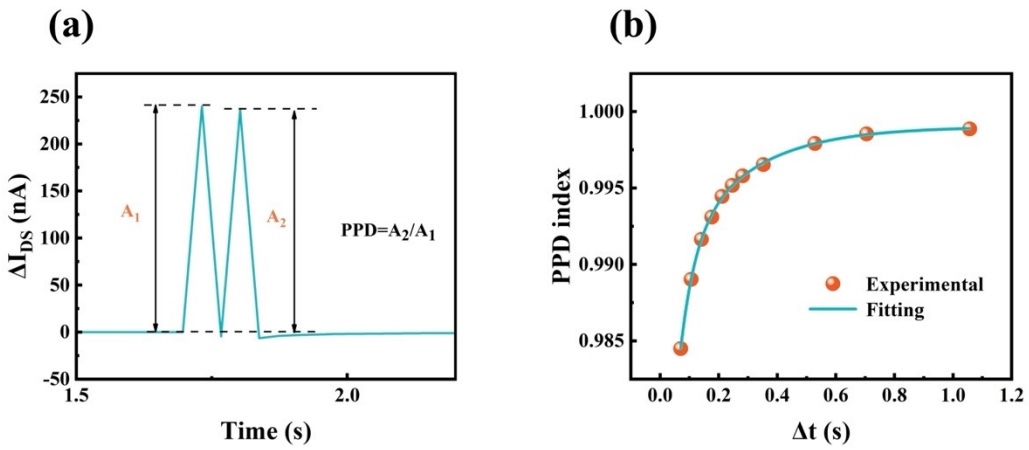

Fig. S3 (a) ΔI_{DS} stimulated by two electrical pulses at V_G = 5 V with the pulse duration of 0.03 s and interval of 0.07 s. (b) PPD index as a function of interval time Δt, where the data are fitted with a double exponential function.

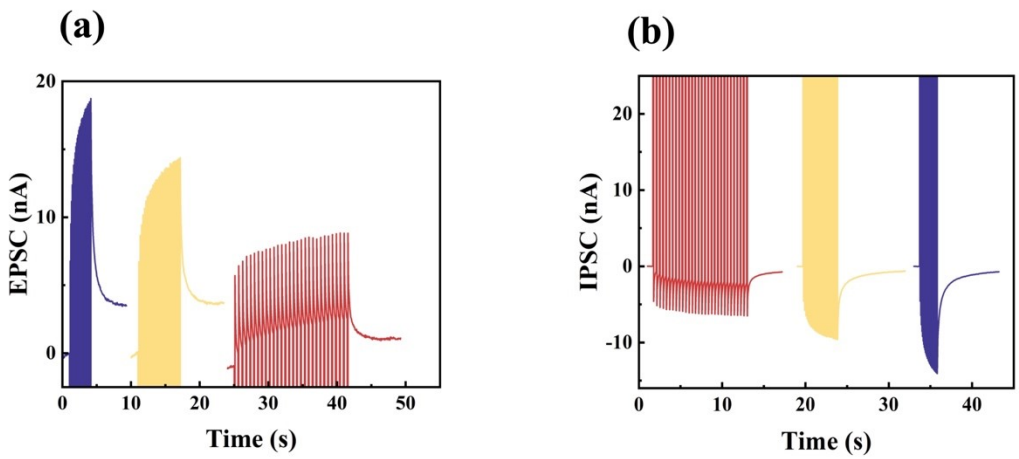

Fig S4 (a) Plot of EPSC as a function of pulse frequency. (b) Plot of IPSC as a function of pulse frequency.

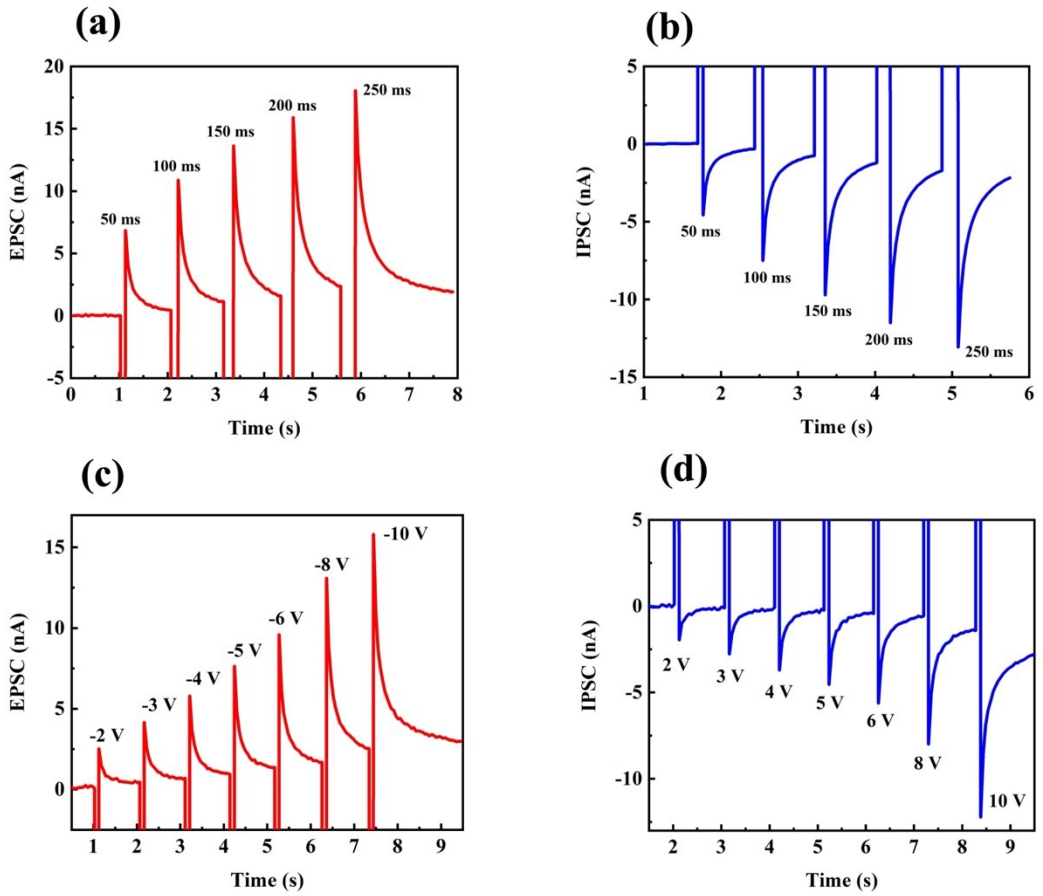

Fig. S5 (a) Original image of EPSC changing with stimulation duration. (b) Original image of IPSC changing with stimulation duration. (c) Original image of EPSC changing with gate voltage. (d) Original image of IPSC changing with gate voltage.

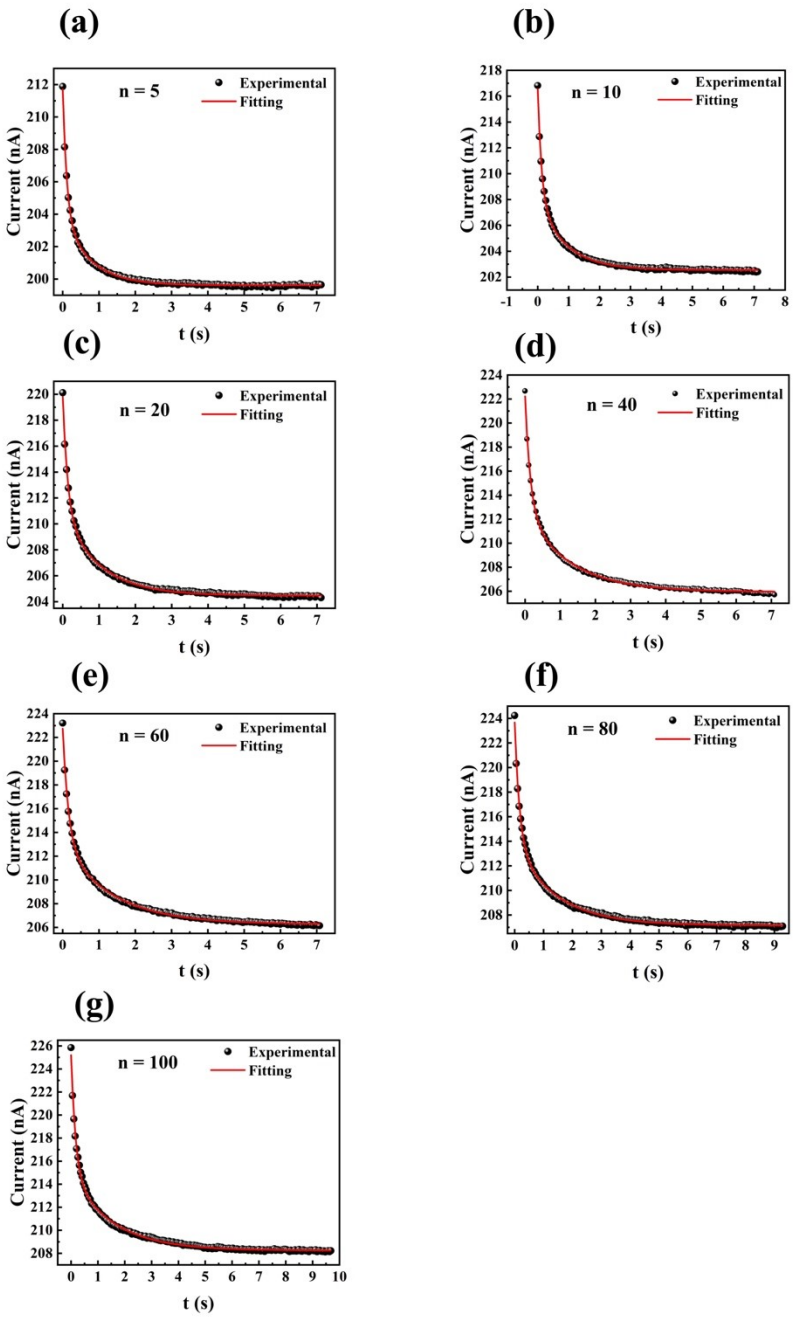

Fig. S6 Current decay curves for different number of positive pulses. It is fitted by equation.3.

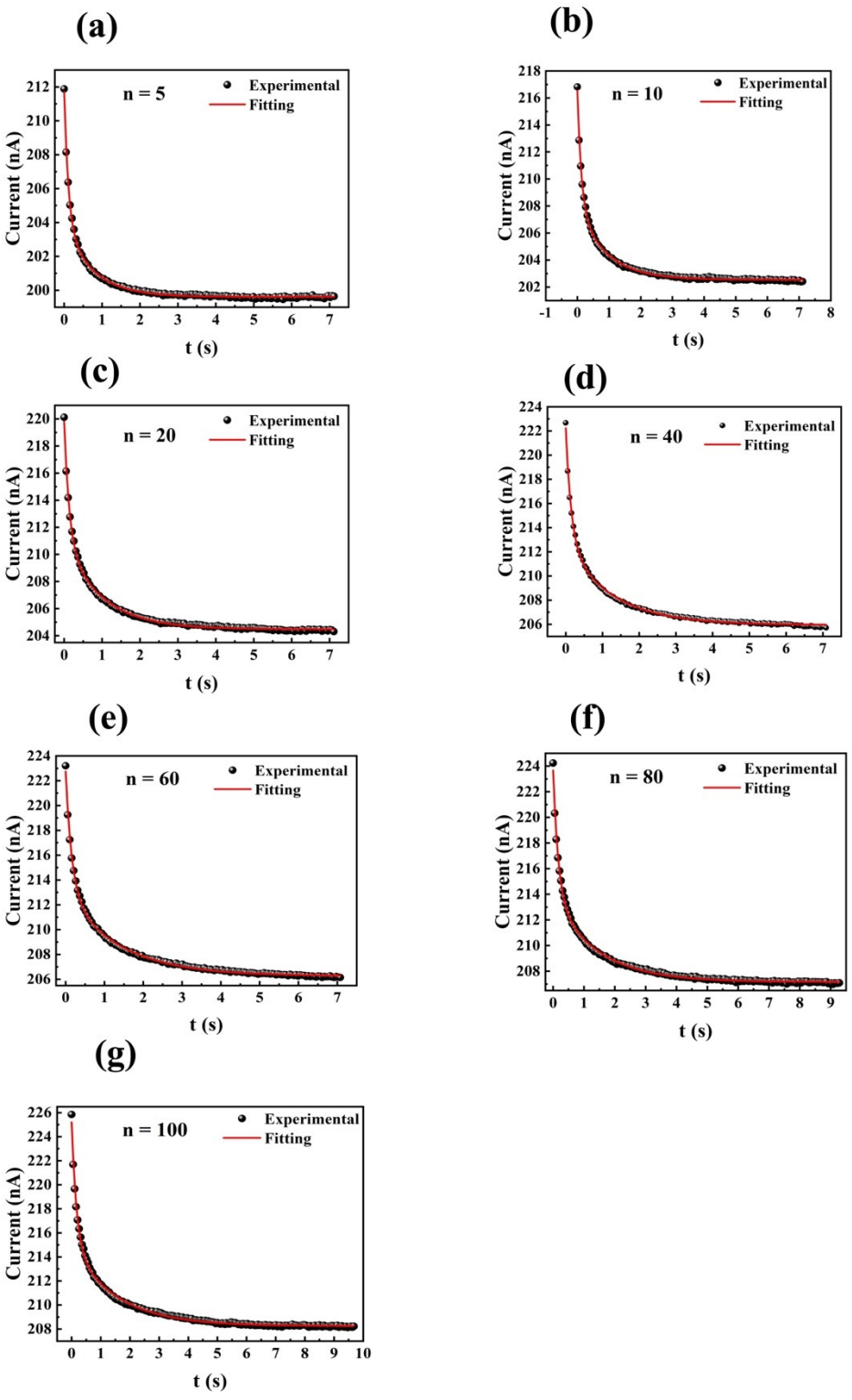

Fig. S7 Current decay curves for different number of negative pulses. It is fitted by eqation.3.

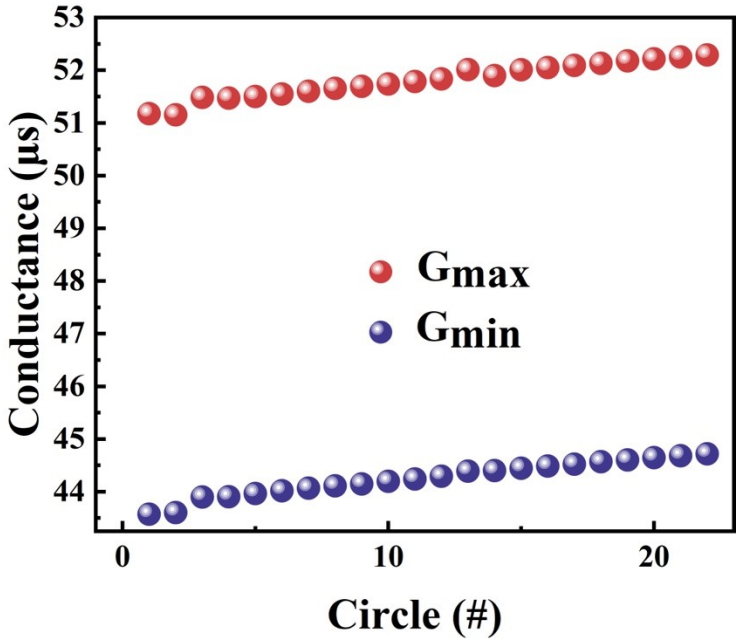

Fig. S8 Variation of G_{max} and G_{min} of LTP/LTD process of 22 cycles.