Electronic Supplementary Material (ESI) for RSC Advances.

SUPPORTING INFORMATION

Violet Light Stimulated Synaptic and Learning Functions in Zinc-Tin Oxide Photoelectric Transistor for Neuromorphic Computation

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This supplementary material contains:

(1) UV-Vis transmission spectrum of ZTO thin film and the extraction of optical bandgap. (Fig. S1)

(2) O1s XPS spectrum of ZTO thin film. (Fig. S2).

(3) Temperature-dependent photocurrent decay time for ZTO transistor and extraction of thermal activation energy for the neutralization of ionized oxygen vacancies. (Fig. S3)

(4) Post-synaptic current of the ZTO phototransistor responses to 405nm light spikes of different power densities. (Fig. S4)

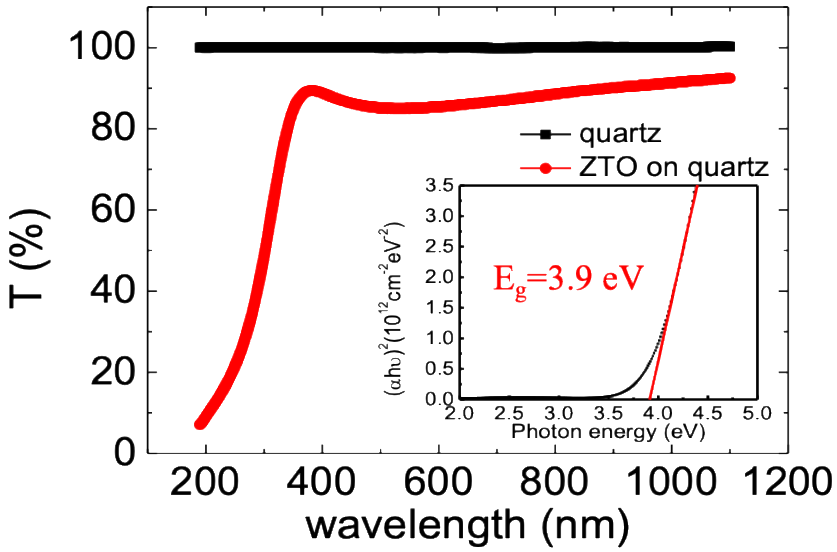
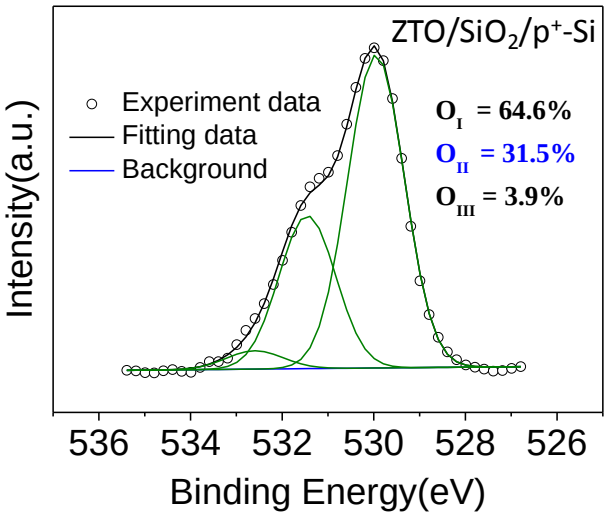


Figure S1 UV-Vis transmission spectrum of the solution-processed 15-layer ZTO thin film; the inset shows the corresponding tauc plot of $(\alpha h\upsilon)^2$ as a function of photon energy for determination of the optical bandgap.



O1s	BE (eV)
Lattice oxygen, O_I	530.1
Oxygen deficiency, O_{II}	531.8
-OH group, O_{III}	532.6

Figure S2 Deconvolution of the O1s XPS spectrum of ZTO deposited on the SiO_2/p^+-Si substrate.

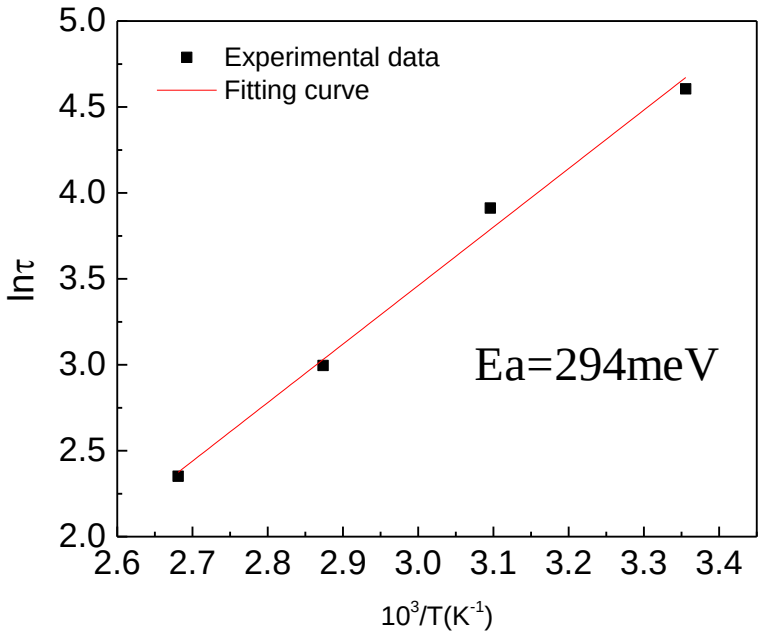


Figure S3 The temperature-dependent photocurrent decay time for ZTO transistor under 405 nm light illumination and extraction of thermal activation energy for the neutralization of ionized oxygen vacancies.

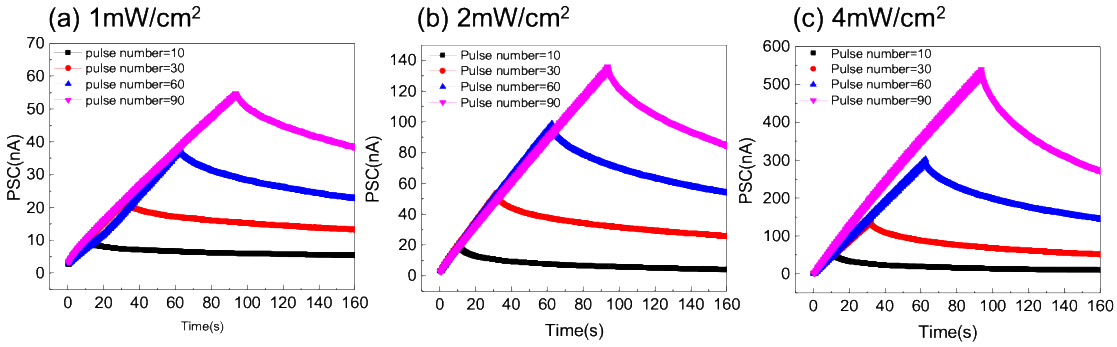


Figure S4 Post-synaptic current (PSC) of the ZTO phototransistor responses to 405nm light spikes of different power densities. (a) 1 mW/cm^2, (b) 2 mW/cm^2, (c) 4 mW/cm^2 (spike duration = 0.5 s, spike interval =0.5 s, V_D = 10V and V_G = 0V).