

## **Electronic Supplementary information**

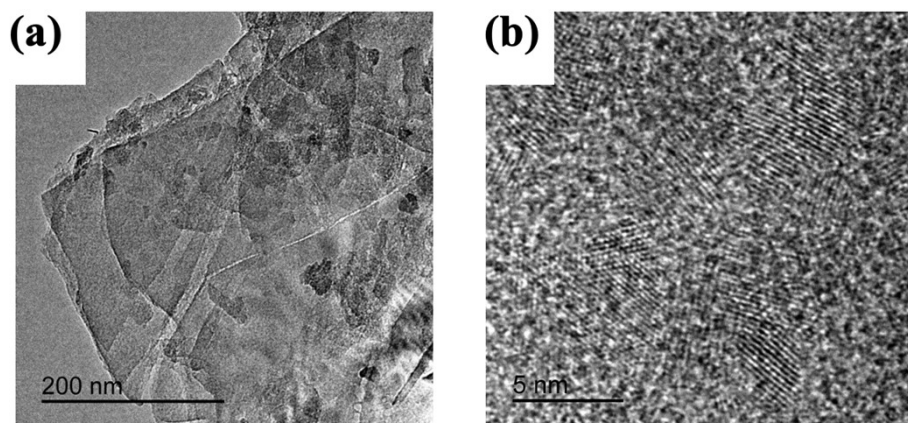
# **Passivation Strategy Assisting Robust and Low Consumption Power BP-based Optical Synaptic Device for Neural Computing**

Jiahao Zeng<sup>a</sup>, Liping Ding<sup>\*a</sup>, Shuai Yuan<sup>a</sup>, Zhe Feng<sup>b</sup>, Liyan Dong<sup>a</sup>, Weikang Shen<sup>a</sup>, Pan Wang<sup>a</sup>, Zuheng Wu<sup>b</sup>, and Guodong Wei<sup>a</sup>

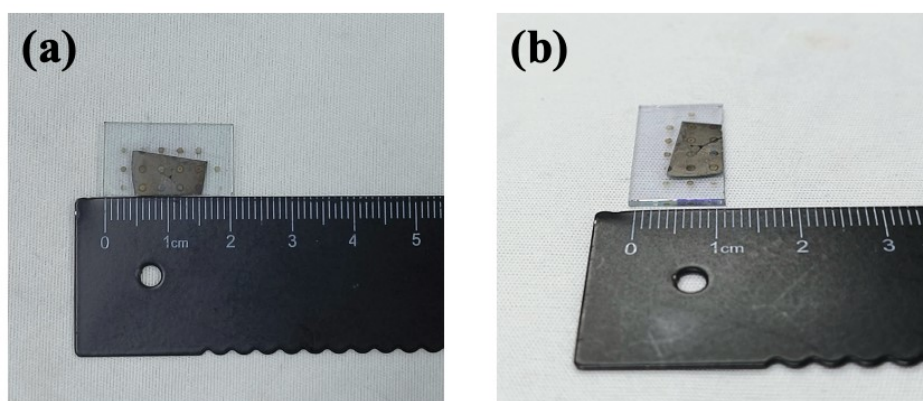
<sup>a</sup> *Institute of Electronic Information and Artificial Intelligence, Shaanxi University of Science and Technology, Xi'an 710021, Shaanxi, P.R. China.*

<sup>b</sup> *School of Integrated Circuits, Anhui University, Hefei 230601, Anhui, P.R. China.*

*\*Corresponding Author: [scu\\_ding@163.com](mailto:scu_ding@163.com)*



**Fig. S1** (a) The TEM image of the original black phosphorus nanosheets. (b) The TEM image of graphene oxide quantum dot material.



**Fig.S2** Stored at room temperature for over thirty months, the synaptic devices of BP-GOQDs are shown in (a) top view and (b) side view.

**Table S1** Comparison of response time, memory characteristics and stability of artificial synapse devices.

Artificial synapse device	Synaptic behavior	Response time (s)	paired-pulse facilitation	Logical operation	Stability
MgO-GOQDs <sup>1</sup>	Yes	$2.2 \times 10^{-3}$	144.2%	No	/
N-GOQDs <sup>2</sup>	Yes	$1.6 \times 10^{-3}$	67.3%	No	/
Ti <sub>3</sub> C <sub>2</sub> -MXene <sup>3</sup>	Yes	3.92	132.1%	Yes	/
BP-SnSe junction synaptic device <sup>4</sup>	Yes	1.76	/	No	/
BP based floating gate synaptic <sup>5</sup>	Yes	/	/	No	/
Cr-Ti-OSC nanoscopic vertical transistor <sup>6</sup>	Yes	9.74	158.7%	No	/
HfSe <sub>2-x</sub> O <sub>x</sub> memristor <sup>7</sup>	Yes	4.08	/	Yes	10 <sup>4</sup> s
MoS <sub>2</sub> -SiO <sub>2</sub> memristor <sup>8</sup>	Yes	1.09	108.5%	No	/
This work	Yes	3.15	168.7%	Yes	30 months

## Ref.

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