Supplementary information

UV Damage Sensing Nociceptive Device for Bionic Application

Li Zhou,¹,ᵃ Shi-Rui Zhang,¹,ᵇ Jia-Qin Yang,ᵃ Jing-Yu Mao,ᵇ Yi Ren,ᵇ Haiquan Shan,ᶜ Zongxiang Xu,ᶜ Ye Zhou*b and Su-Ting Han*a

ᵃ Institute of Micro Optoelectronics (IMO), Shenzhen University, Shenzhen, 518060, China.

*. Email: sutinghan@szu.edu.cn

ᵇ Institute for Advanced Study, Shenzhen University, Shenzhen, 518060, China.

*. Email: yezhou@szu.edu.cn

ᶜ Department of Chemistry, Southern University of Science and Technology of China, Shenzhen, 518060, China.

1. These authors contributed equally to this work.
Fig. S1. $I$–$V$ curves of Al/PMMA/ITO device.

Fig. S2. $I$–$V$ curves under compliance current ($I_{cc}$) of 0.1 mA
**Fig. S3.** $I$-$V$ characteristic of memristor with various concentration of Azo-Au NPs.

**Fig. S4.** Current-voltage characteristics, for 30 memristors tested (a) after UV irradiation (20 mW/cm$^2$) for 30 mins and (b) Distribution of SET voltage of memristors.
Fig. S5. Fitted $I$–$V$ characteristics in a log-log scale before UV irradiation.
Fig. S6. Fitted I–V characteristics in a log-log scale after UV irradiation.
**Fig. S7.** The calculated highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) of Azo ligand

**Fig. S8.** The typical $I-V$ curves from 25 °C to 105 °C
Fig. S9. The output current of the nociceptor under electrical pulses with a different pulse width (from 0.01s to 2s).
Fig. S10. Histogram of the ON and OFF states for 100 memristors tested (a) in dark and (b) after UV irradiation. (Voltage from 2.2 V to 2.8 V)