Supplementary Information to “A visible light-triggered artificial photonic nociceptor with adaptive tunability of threshold”

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Fig. S1 XRD spectrum of the CeO\textsubscript{2-x} thin film deposited on a glass substrate.
Fig. S2 Surface morphology of the CeO$_{2-x}$ thin film.
Fig. S3 Photocurrent response of the device under different read voltages but a fixed green optical intensity of 90 pW/μm². The inset shows the magnified current relaxation processes after removal of the optical irradiation.
**Fig. S4** Photocurrent response of the device to multiple green optical pulses with the intensities of 5 (a) and 11 (b) pW/μm². Pulse width, 0.2 s.
**Fig. S5** Schematic mechanism for the relaxation process of the device. After the removal of optical irradiation, the re-trapped free electrons can be gradually detrapped from the shallow oxygen vacancies due to metastability, thus generating a notable relaxation current.
**Fig. S6** Raw data for demonstrating the allodynia and hyperalgesia characteristics in Fig. 4d. (a-f) The damaging illumination intensity is 110 pW/μm². (g-j) The damaging illumination intensity is 130 pW/μm².
Fig. S7. Photocurrent response of the device under different read voltages of (a) 0.2 V, (b) –0.1 V, and (c) –0.2 V. Light color, green; pulse width, 3.6 s; light intensity, 0.5 to 11 pW/μm².