Supporting Information

Intrinsic Vacancy in 2D Defective Semiconductor In_2S_3 for Artificial Photonic Nociceptor

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Keywords: defective semiconductor, In_2S_3, intrinsic vacancy, artificial photonic nociceptors

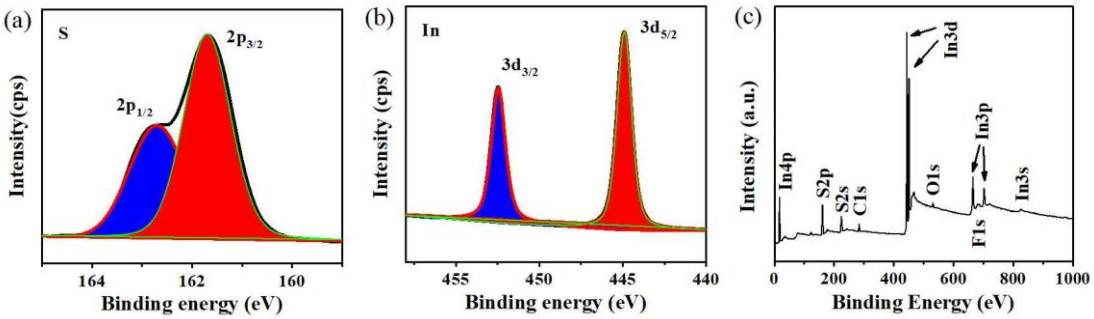

Figure S1. XPS spectrums of as-grown In_2S_3 nanosheet.

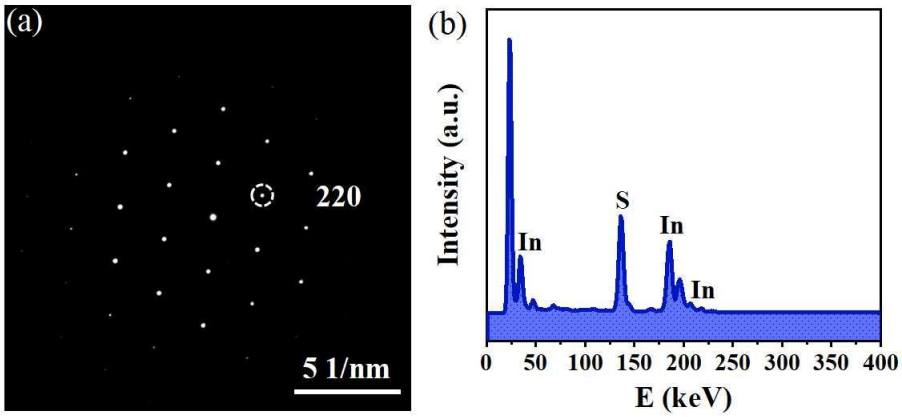

Figure S2. (a) The SAED pattern and (b) the EDS spectrum of the In_2S_3 nanosheet.

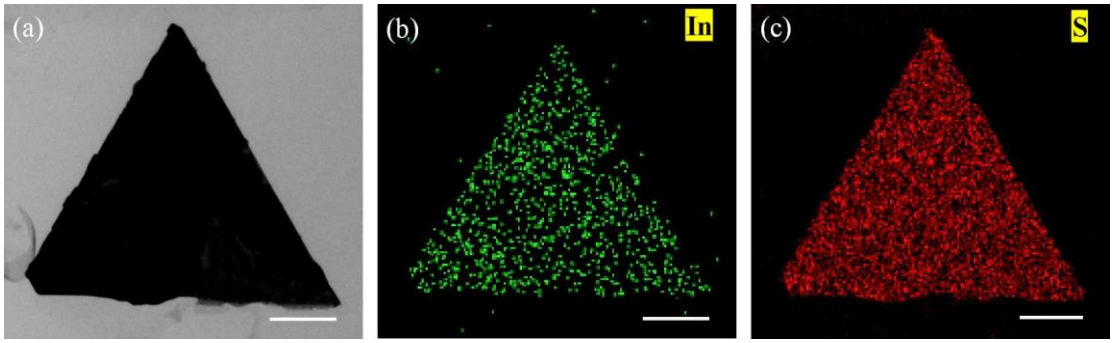

Figure S3. (a) Low-resolution TEM, (b) In-K and (c) S-K edges mapping images of the In_2S_3 triangular nanosheet (Scale bar: 1 μm). In and S elements have good uniformity, indicating a uniform distribution of defects.

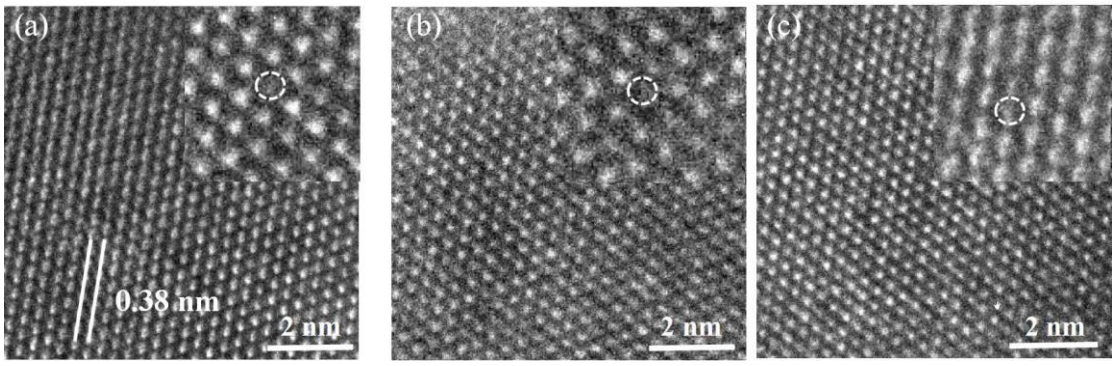

Figure S4. HRTEM images of different positions of In_2S_3 nanosheet with the lattice spacing of 0.38 nm corresponds to the (220) crystal planes. The vacancy-defects highlighted by white circles.

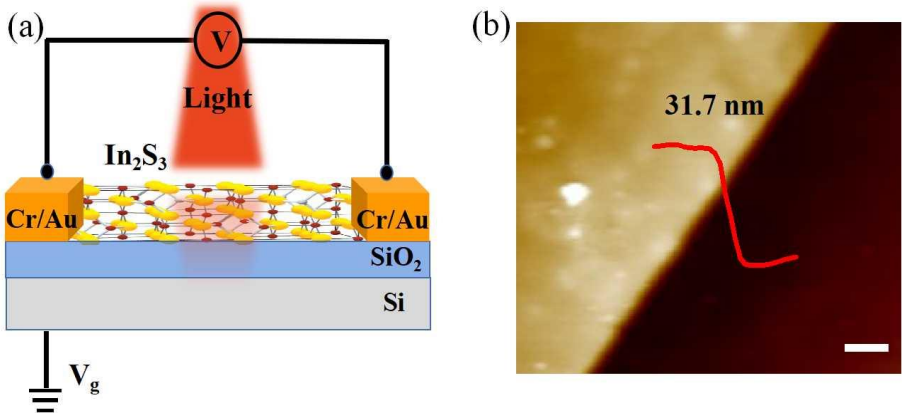

Figure S5. (a) Schematic diagram of In_2S_3 device. (b) The thickness of the In_2S_3 in the device (Scale bar: 0.5 μm).

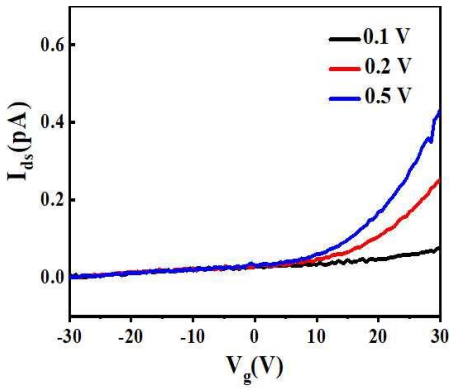

Figure S6. The transfer curves of In_2S_3 devices.

From the transfer curves of the In_2S_3 nanosheet, when sweeping V_g from -30 V to 30 V with different V_{ds}, I_{ds} in the channel increases significantly, when applying more positive gate voltages to inject electrons into the In_2S_3 crystals, which indicates a typical n-type semiconducting behavior.

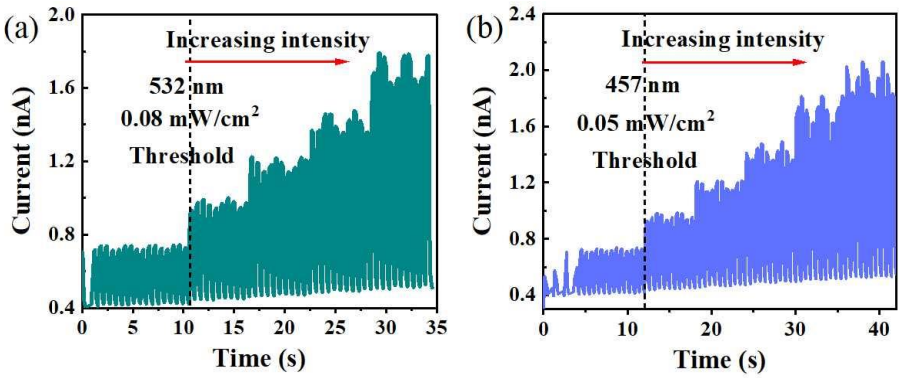

Figure S7. Threshold characteristics of the device under 532 nm and 457 nm optical pulses.

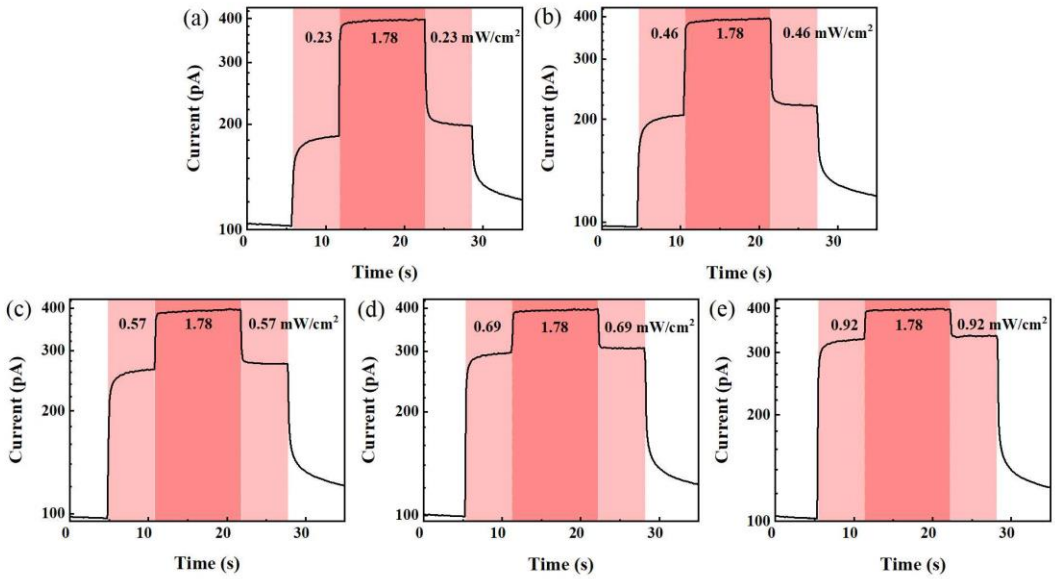

Figure S8. The photoresponse characteristics of the In_2S_3 device after the different light intensity illuminations.