

Electronic Supplementary Information (ESI)

Reversible charge-polarity control for photo-triggered anti-ambipolar $\text{In}_2\text{Se}_3/\text{WSe}_2$ heterotransistor

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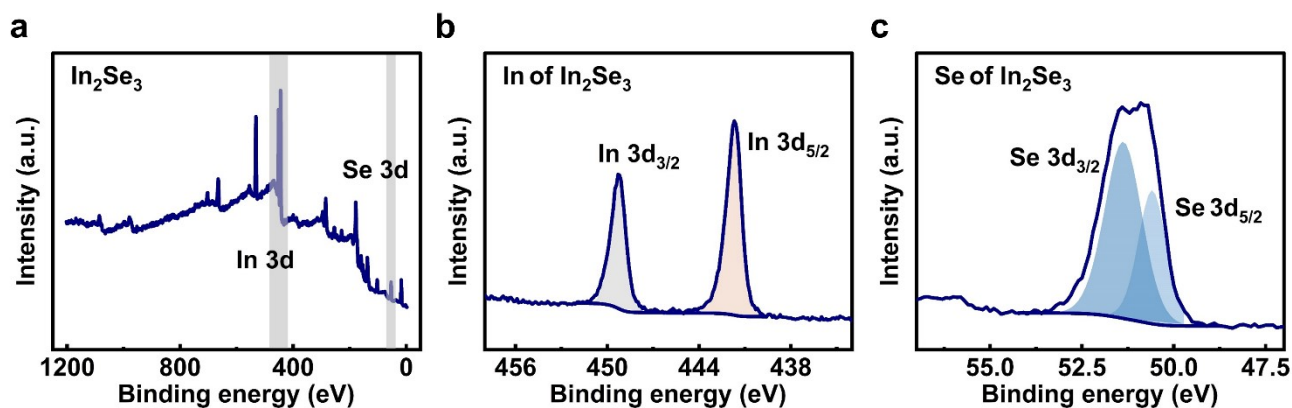


Fig. S1 (a) XPS survey spectra of In_2Se_3 microwire. (b) The fitted In 3d XPS spectrum from In_2Se_3 microwire. (c) The fitted Se 3d XPS spectrum from In_2Se_3 microwire.

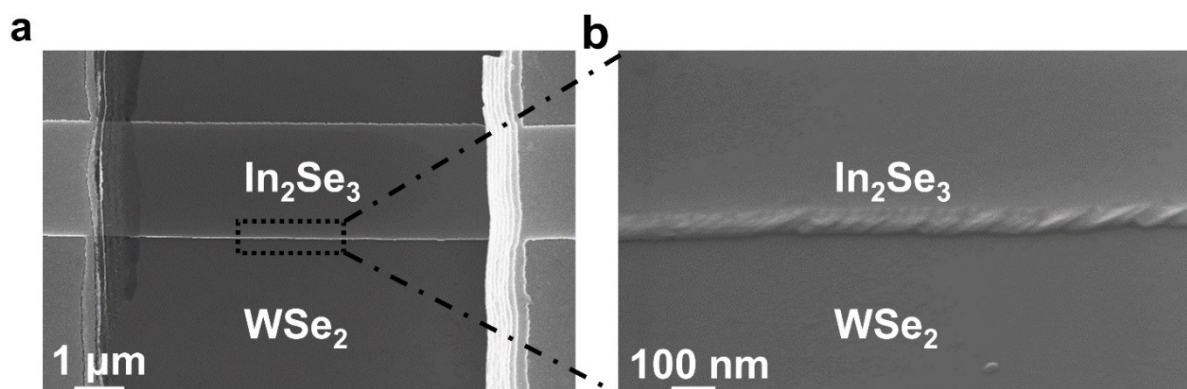


Fig. S2 SEM images of a representative $\text{In}_2\text{Se}_3/\text{WSe}_2$ heterotransistor. (a) Scale bar is 1 μm . (b) Scale bar is 100 nm.

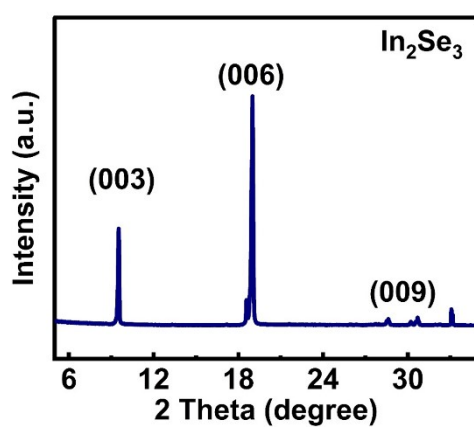


Fig. S3 XRD patterns of In_2Se_3 microwire.

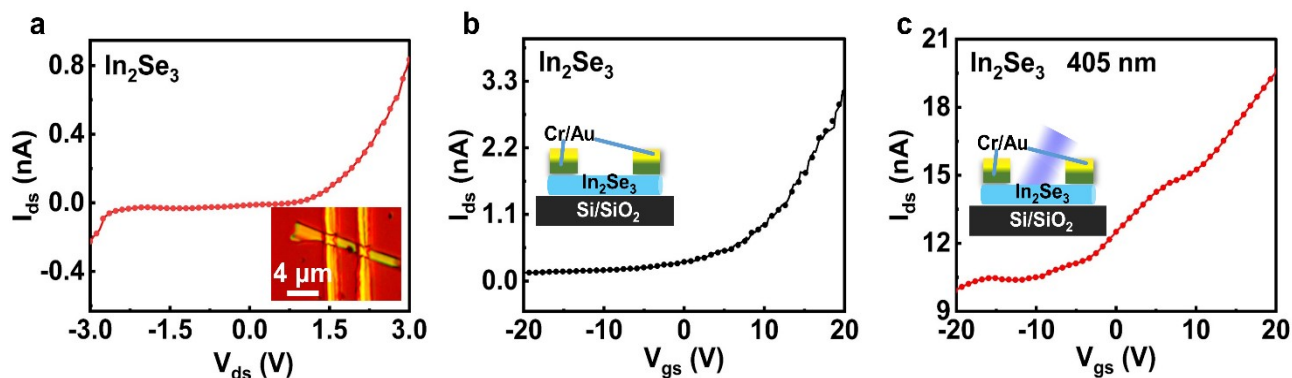


Fig. S4 (a) I - V characteristic curve of In_2Se_3 device under the dark condition. Inset: OM image of In_2Se_3 device. (b) Transfer characteristic of In_2Se_3 device under the dark condition at $V_{ds} = 3$ V. Inset: Schematic structure of In_2Se_3 device. (c) Transfer characteristic of In_2Se_3 device under 405 nm laser illumination (15.9 mW cm^{-2}) at $V_{ds} = 3$ V. Inset: Schematic structure of In_2Se_3 device under laser illumination.

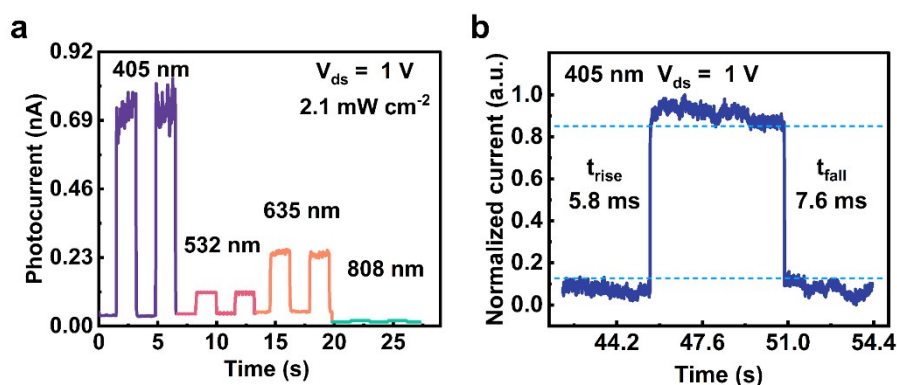


Fig. S5 (a) Photoresponse of In_2Se_3 & WSe_2 heterotransistor under different illumination wavelengths of 405 nm, 532 nm, 635 nm, and 808 nm (2.1 mW cm^{-2}) at $V_{ds} = 1$ V. (b) One cycle of the photoresponse of In_2Se_3 & WSe_2 heterotransistor under 405 nm laser illumination at 1 V for estimating both the rise and fall times.

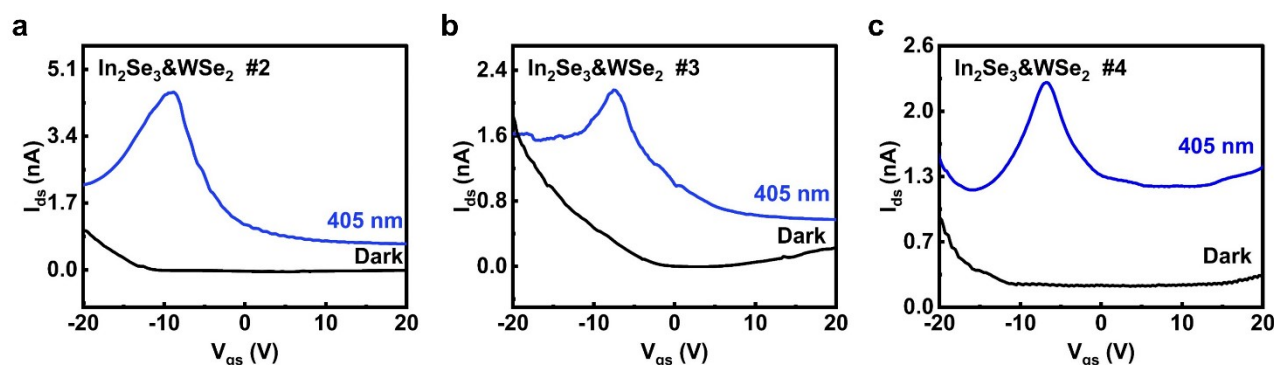


Fig. S6 Transfer curves of other In_2Se_3 & WSe_2 heterotransistor devices under the dark condition and 405 nm laser illumination (4.17 mW cm^{-2}) at $V_{ds} = 1$ V.

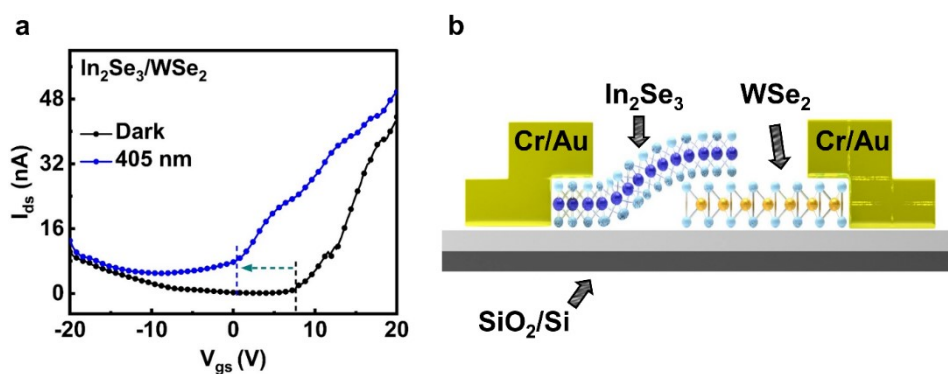


Fig. S7 (a) Transfer characteristic of $\text{In}_2\text{Se}_3/\text{WSe}_2$ device under the dark condition and 405 nm laser illumination (15.9 mW cm^{-2}) at $V_{\text{ds}} = 3 \text{ V}$. (b) Schematic structure of $\text{In}_2\text{Se}_3/\text{WSe}_2$ device.

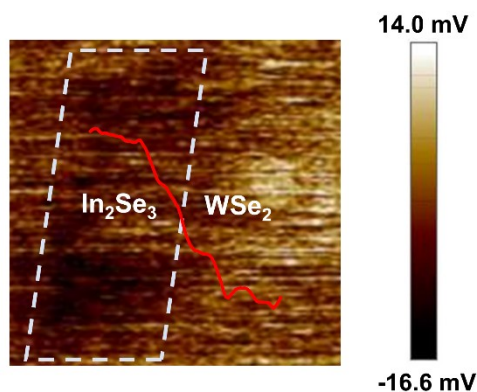


Fig. S8 KPFM mapping images of In_2Se_3 & WSe_2 heterotransistors.

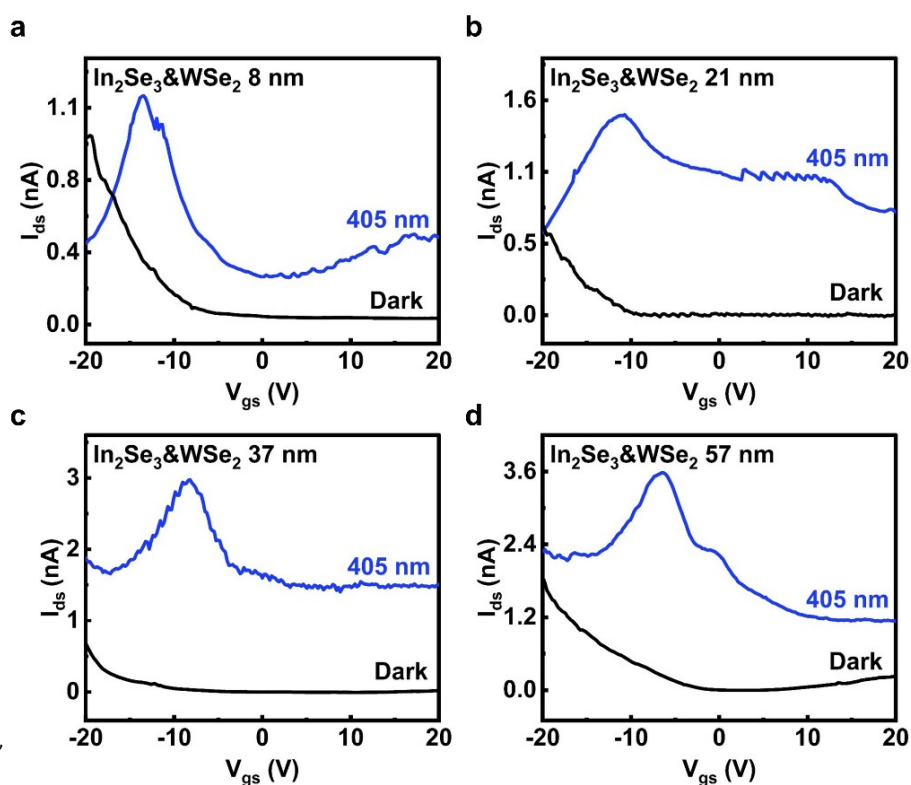


Fig. S9 Transfer curves of $\text{In}_2\text{Se}_3/\text{WSe}_2$ heterotransistors under the dark condition and 405 nm laser illumination (4.17 mW cm^{-2}) at $V_{\text{ds}} = 1 \text{ V}$ in Fig. 5e-f.