

Supporting Information

Defects-induced broadband photodetector based on WS₂/pyramid Si 2D/3D mixed-dimensional heterojunction with light confinement effect

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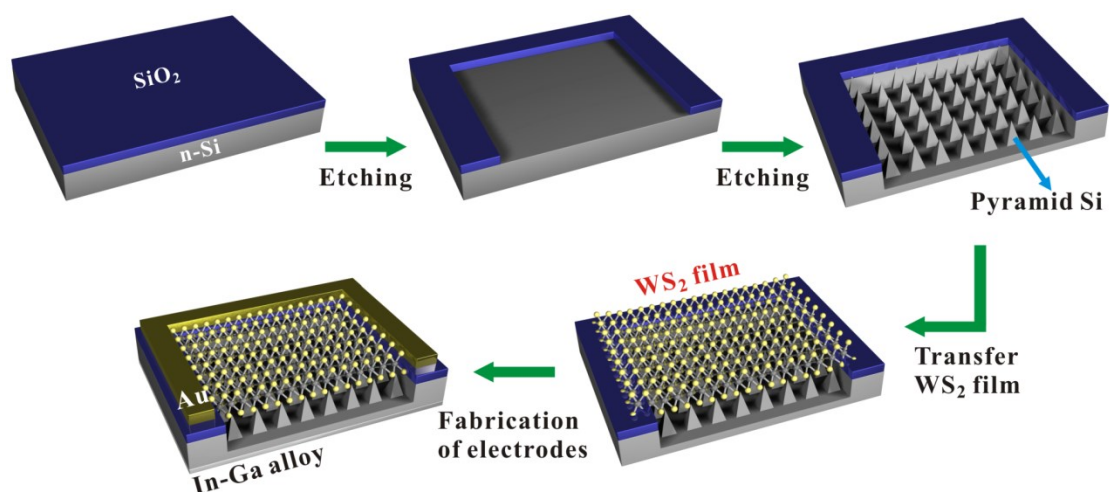


Fig. S1 Schematic diagrams of fabrication process of the WS_2 /pyramid Si heterojunction device.

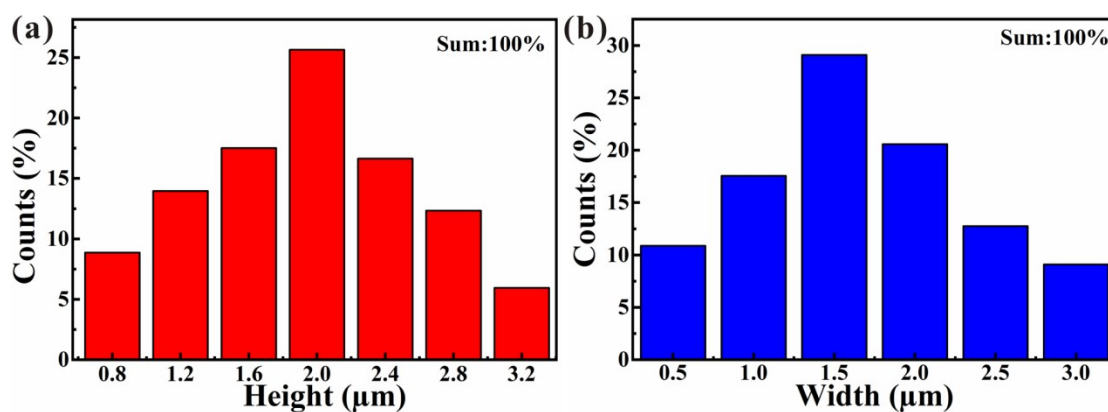


Fig. S2 The height and width distribution statistics of the pyramid Si.

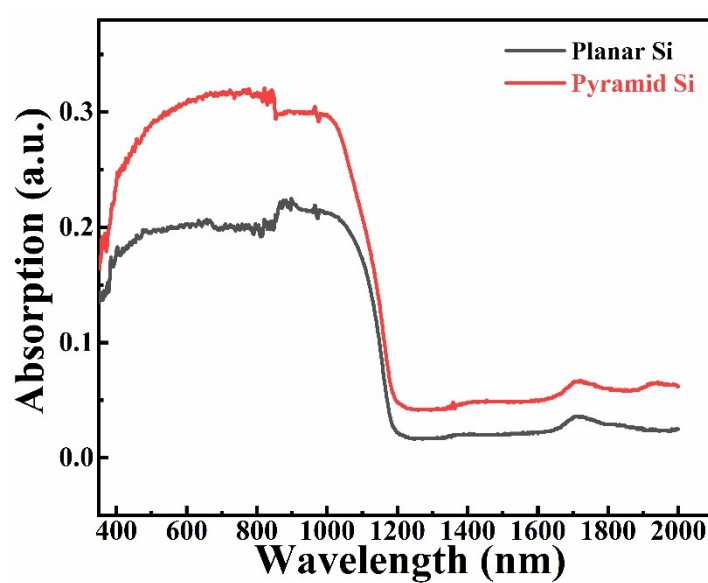


Fig. S3 The light absorption spectra of planar Si and pyramid Si.

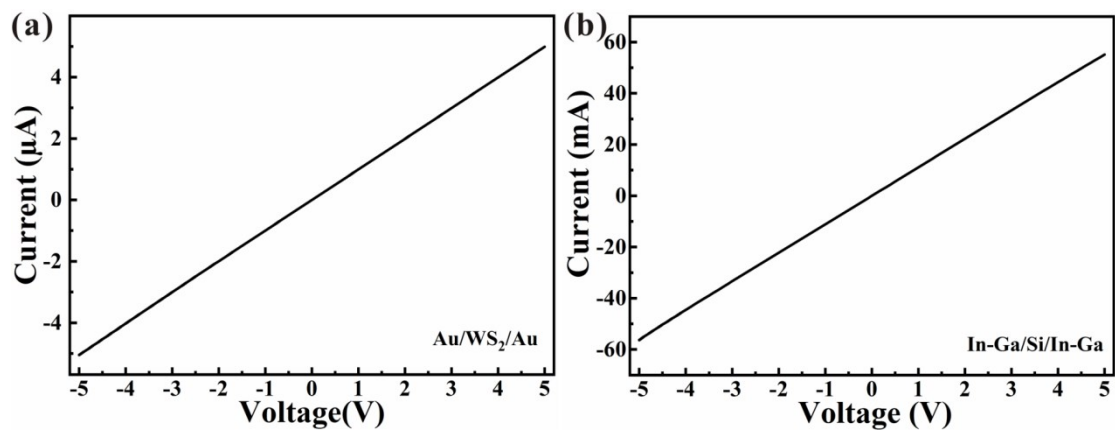


Fig. S4 The I - V curves of Au/WS₂/Au and In-Ga/Si/In-Ga.

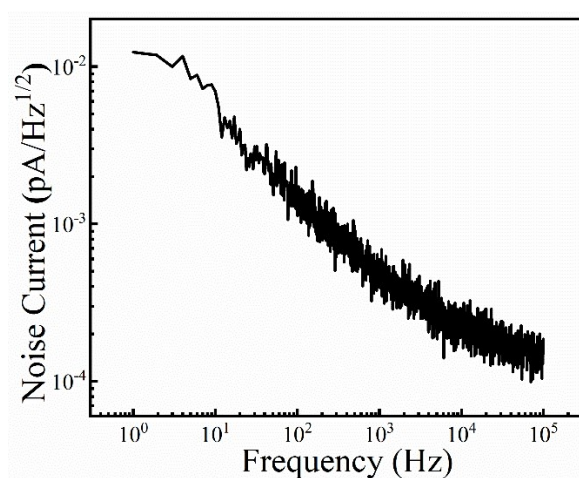


Fig. S5 The measured current noise power spectrum of the WS₂/pyramid Si heterojunction device at zero bias.

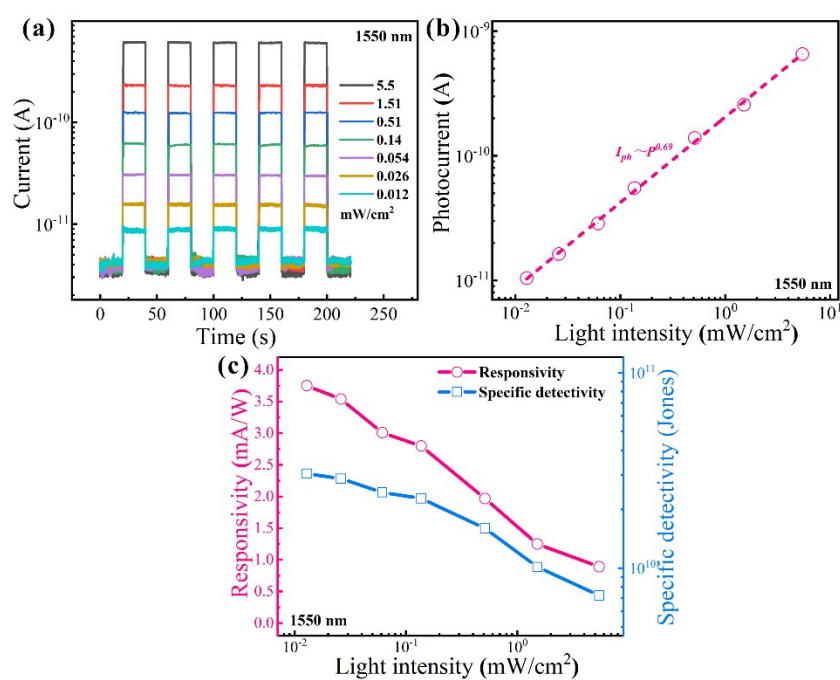


Fig. S6 (a) The time-resolved photoresponse of the WS₂/pyramid Si heterojunction device under light illumination of 1550 nm with varied light intensities. (b) Logarithmic plot of the photocurrent versus light intensity. (c) Responsivity and specific detectivity of the photodetector as a function of light intensity.

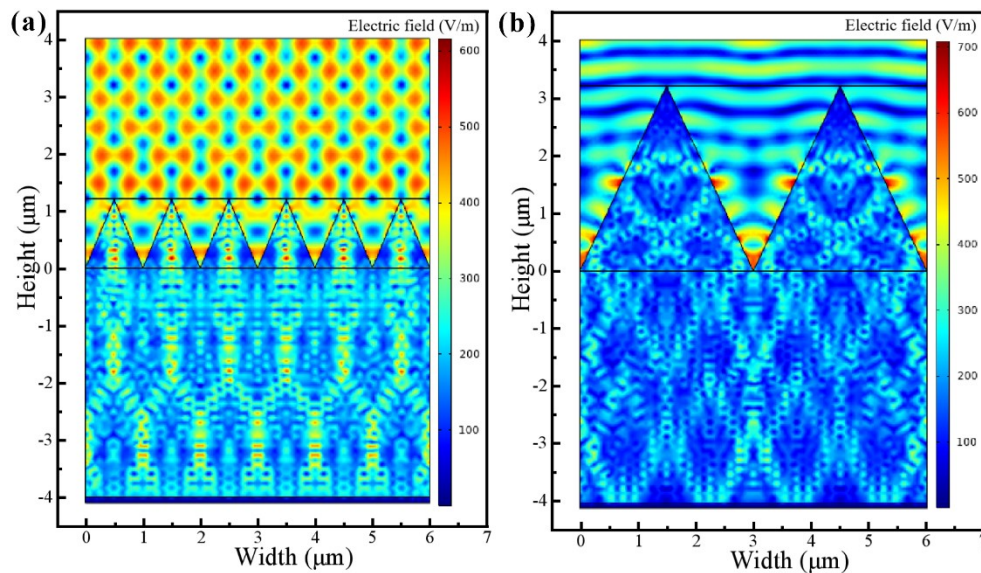


Fig. S7 Simulated electric field energy density distribution of the WS₂/pyramid Si heterojunction device under light illumination of 980 nm for the pyramid Si with height/width of (a) 1.2/1.0 μm and (b) 3.2/3.0 μm.