Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Vertical oriented MoS_2/Si heterojunction for ultrahigh and ultrafast photoresponse photodetector

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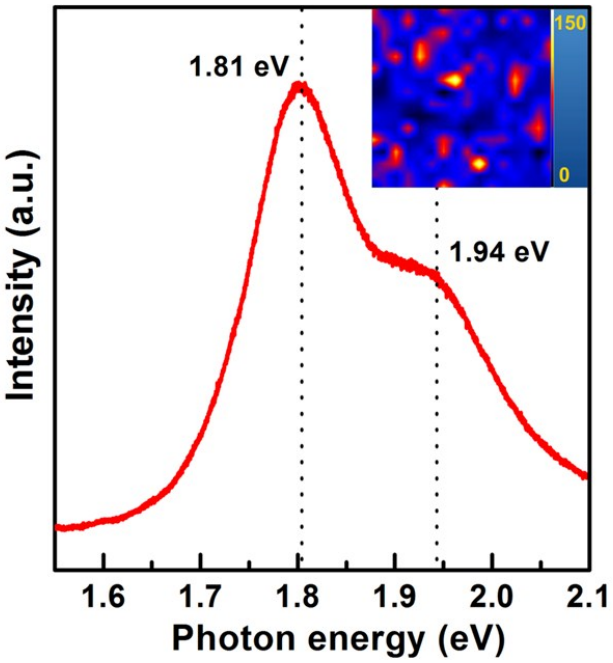


Fig. S1 PL spectra of the V-MoS_2 nanosheets with inset the PL mapping result.

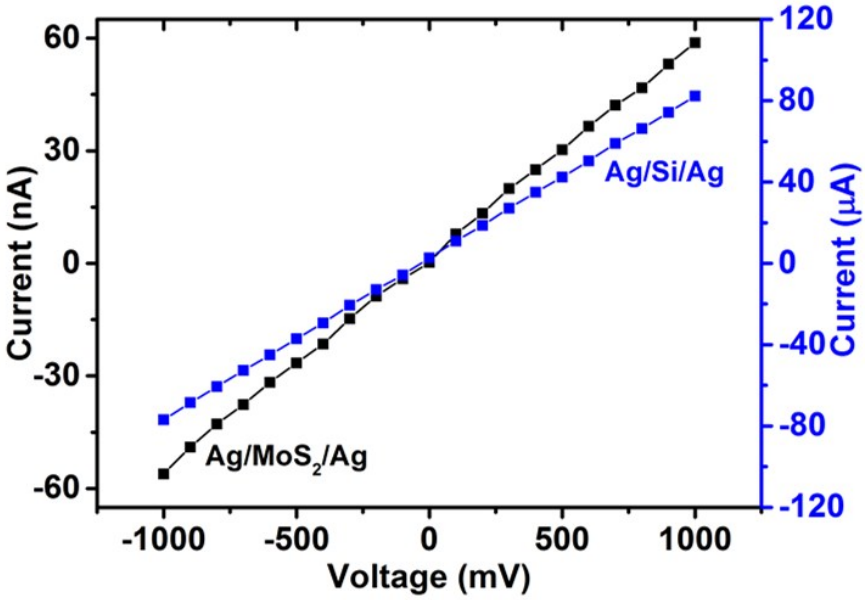


Fig. S2 The I-V curves for the Ag/MoS_2/Ag structure and the Ag/Si/Ag structure, respectively.

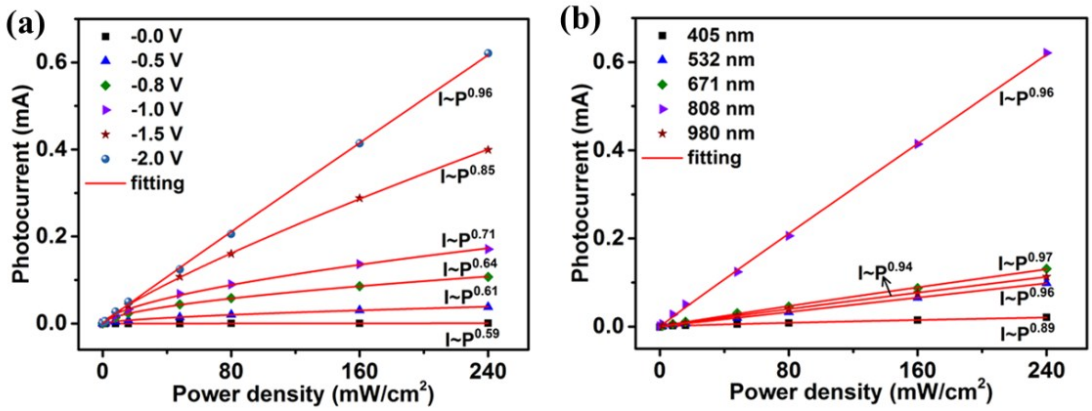


Fig. S3 (a) Photocurrent as a function of incident laserdensity at bias of 0 V, -0.5 V, -0.8 V, -1.0 V, -1.5 V, and -2 V. (b) Photocurrent as a function of incident laser density at bias of -2 V for different laser wavelengthes.

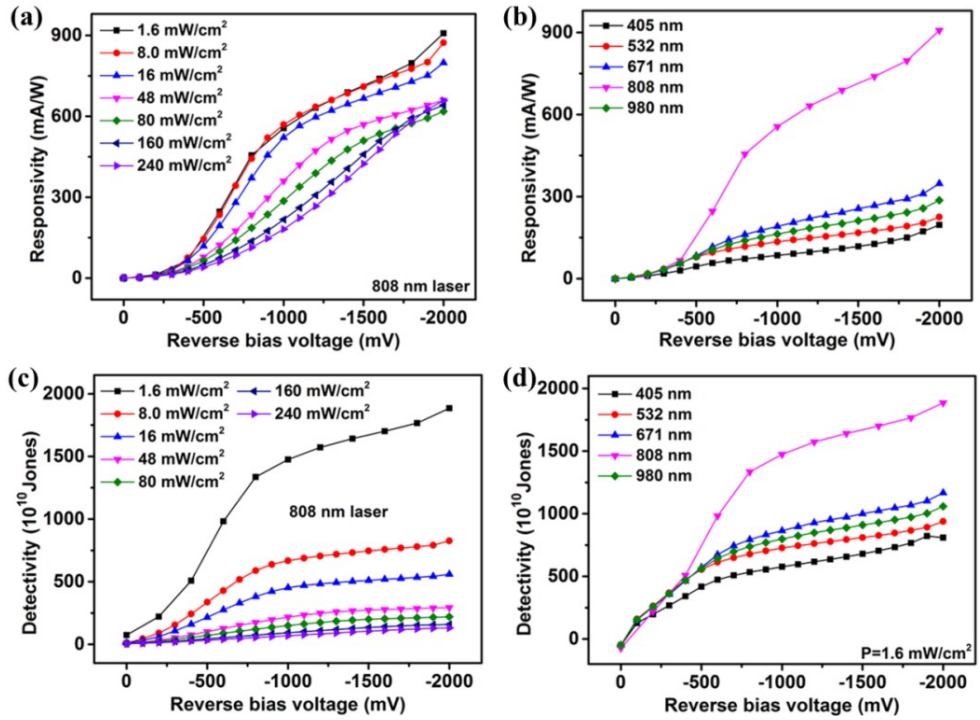


Fig. S4 Responsivity as a function of reverse bias voltage (a) under different illumination densities for 808 nm laser, and (b) under different wavelengthes with illumination density of 1.6 mW/cm^2. Detectivity as a function of reverse bias voltage (c) under different illumination densities for 808 nm laser, and (d) under different wavelengthes with illumination density of 1.6 mW/cm^2.

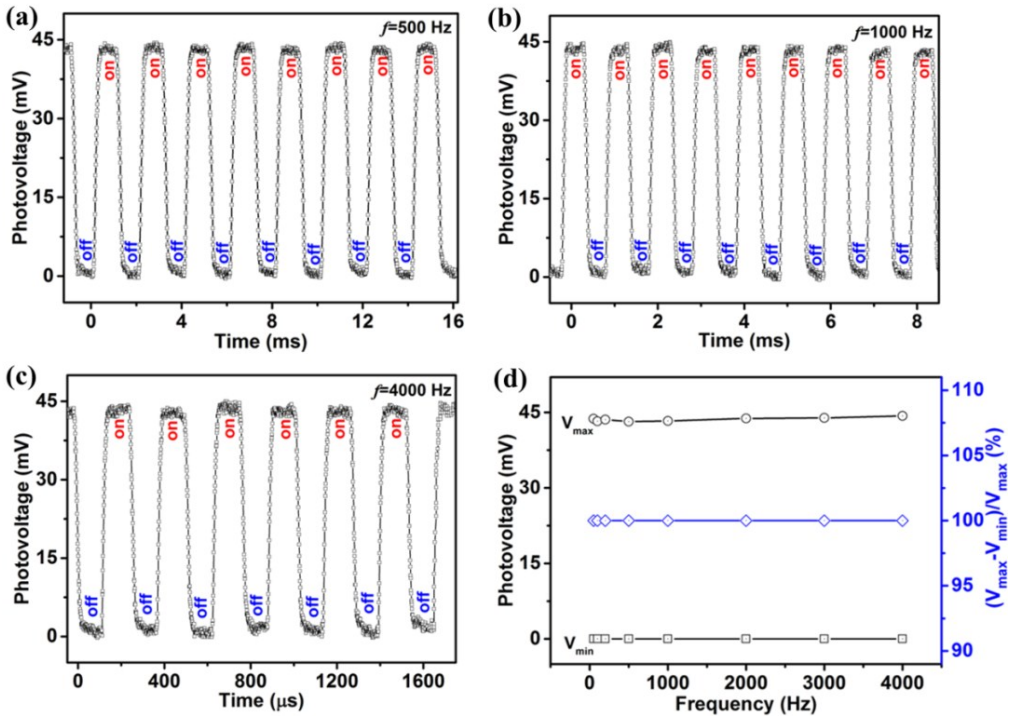
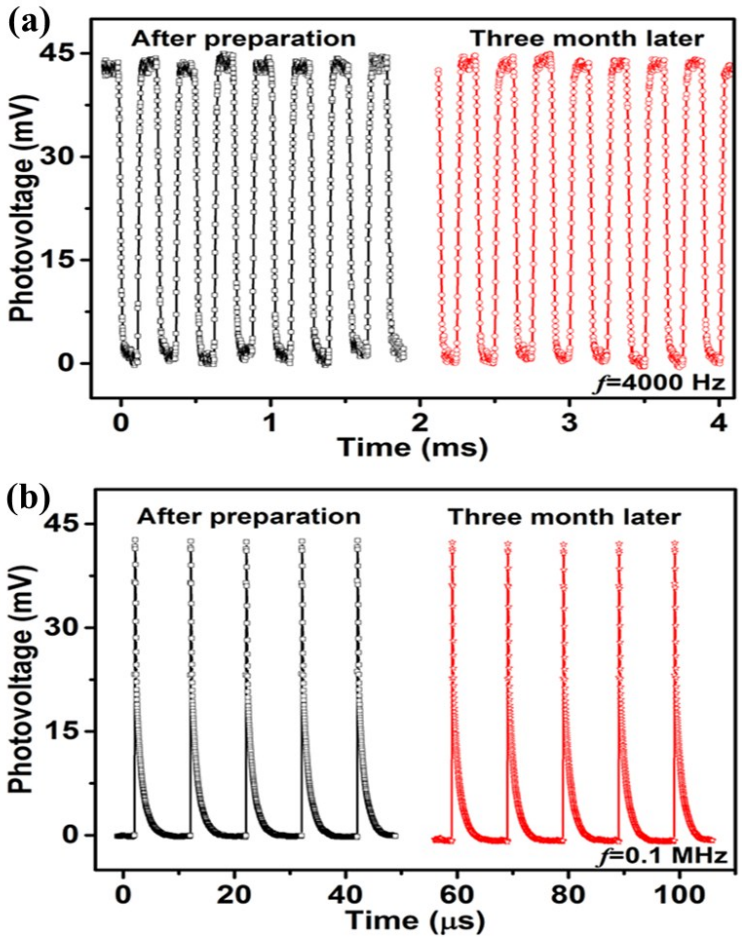


Fig. S5 Time-dependent photovoltages at frequencies of (a) 500 Hz, (b) 1000 Hz, and (c) 4000 Hz. (d) V_{max}, V_{min}, and relative balance $(V_{max}-V_{min})/V_{max}$ as a function of chopper frequency.



Fi. S6 Time-dependent photovoltages of the as-fabricated device and the same device after storage in air for three months under laser pulse frequency of (a) 4000 Hz (by chopper), and (b) 0.1 MHz (by fs-width laser).