

Supporting Information for

High-Performance Photodetectors Based on MoTe₂-MoS₂ van der Waals Heterostructures

Xuan Ji¹, Zongqi Bai¹, Fang Luo¹, Mengjian Zhu^{1,*}, Chucai Guo^{1,*}, Zhihong Zhu¹, Shiqiao

Qin¹

¹ College of Advanced Interdisciplinary Studies & Hunan Provincial Key Laboratory of Novel Nano-Optoelectronic Information Materials and Devices, National University of Defense Technology, Changsha, Hunan, 410073, P.R. China.

* Corresponding to:

M. Zhu (zhumengjian11@nudt.edu.cn) and C. Guo (gcc_1981@163.com)

Figure S1. AFM morphology image of the MoTe₂-MoS₂ heterostructure.

Figure S2. The characterizations of the MoTe₂-MoS₂ heterostructures device.

Figure S3. The I - V curve of the MoTe₂-MoS₂ heterostructures device before annealing.

Figure S4. Spatial distribution of the photocurrent.

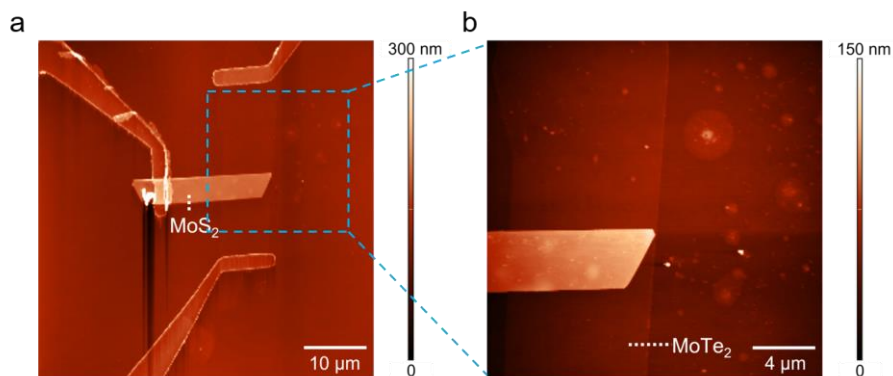


Figure S1. AFM morphology image of the MoTe₂-MoS₂ heterostructure device in Figure 1c in the main text. (a) The AFM height image of device showing the height of MoS₂. (b) The magnified AFM height image of device showing the height of MoTe₂. The white dashed lines correspond to the height measurement of MoTe₂ and MoS₂, respectively.

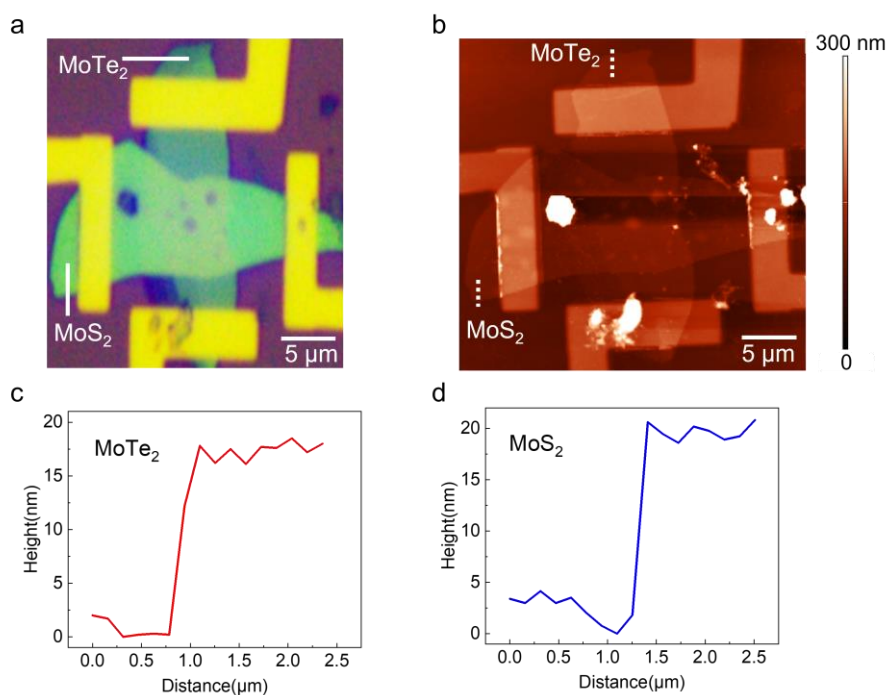


Figure S2. The characterizations of the MoTe₂-MoS₂ heterostructures device. (a) The optical microscopy image of the device in Figure 1g-h and Figure 2e in the maintext. (b) The AFM height image of the device, and the white dashed line corresponds to the

height measurement of MoTe₂ and MoS₂, respectively. (c) The height profile of MoTe₂, and the thickness of MoTe₂ is about 16.7 nm. (d) The height profile of MoS₂, and the thickness of MoS₂ is about 17.3 nm.

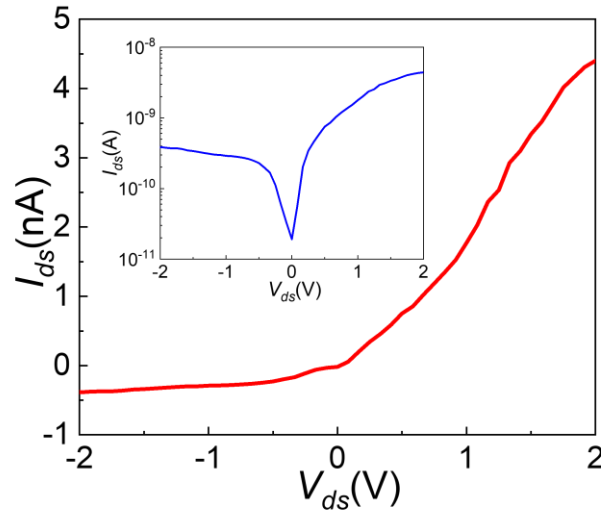


Figure S3. The I - V curve of the non-annealed MoTe₂-MoS₂ heterostructures device.

The inset picture shows the I - V characteristics in logarithmic coordinate.

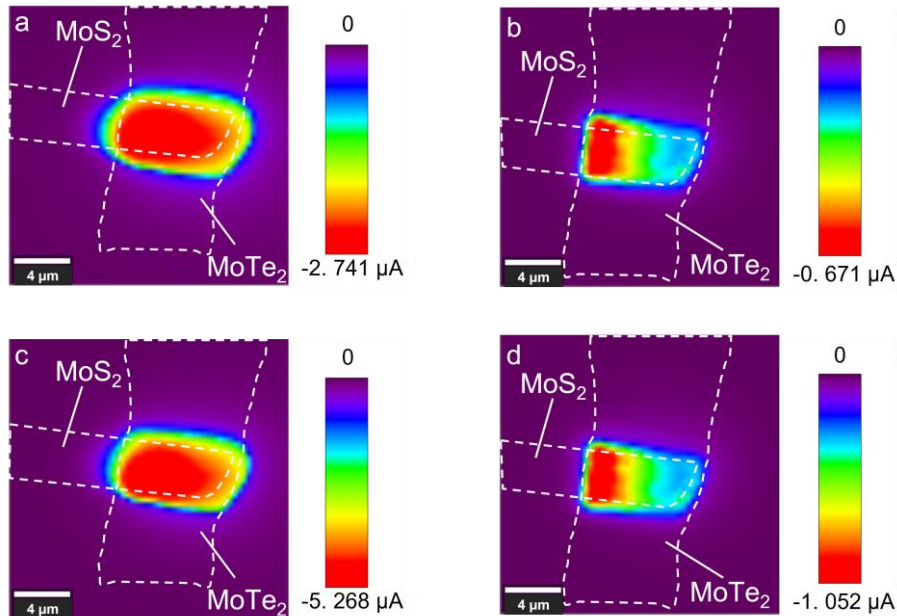


Figure S4. Spatial distribution of the photocurrent. (a) $\lambda = 532$ nm, $V_{ds} = -1$ V. (b) $\lambda = 1064$ nm, $V_{ds} = -1$ V. (c) $\lambda = 532$ nm, $V_{ds} = -2$ V. (d) $\lambda = 1064$ nm, $V_{ds} = -2$ V.