Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.
This journal is © The Royal Society of Chemistry 2022

A high-performance self-powered photodetector based on WSe_2-Graphene-$MoTe_2$ van der Waals heterojunction

Pu Feng,[1] Sixian He,[1] Sixiang Zhao,[1] Congcong Dang,[1] Ming Li,[1] Liancheng Zhao,[1] Hong-Liang Lu *[2] and Liming Gao *[1]

1. State Key Laboratory of Metal Matrix Composites, School of Material Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China
2. State Key Laboratory of ASIC and System, Shanghai Institute of Intelligent Electronics & Systems, School of Microelectronics, Fudan University, Shanghai 200433, China.

Table of contents:

1. *I-V* output and transfer curves of WSe_2-Graphene-$MoTe_2$ photodetector in the dark.

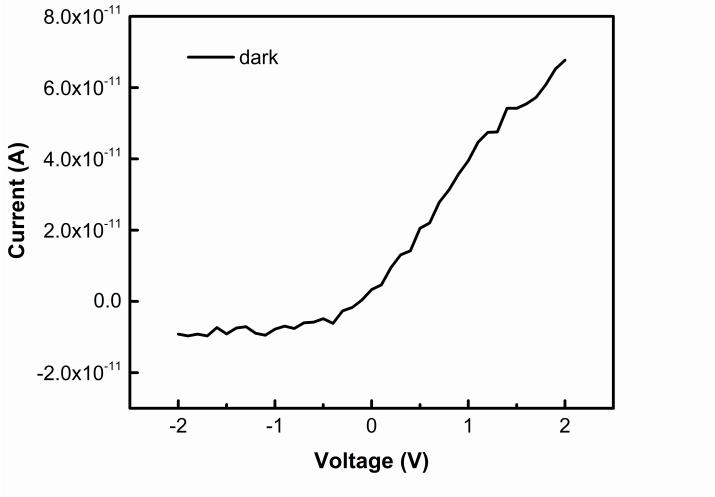

Figure S1. *I-V* output curve of WSe_2-Graphene-$MoTe_2$ photodetector in the dark (without gate voltage).

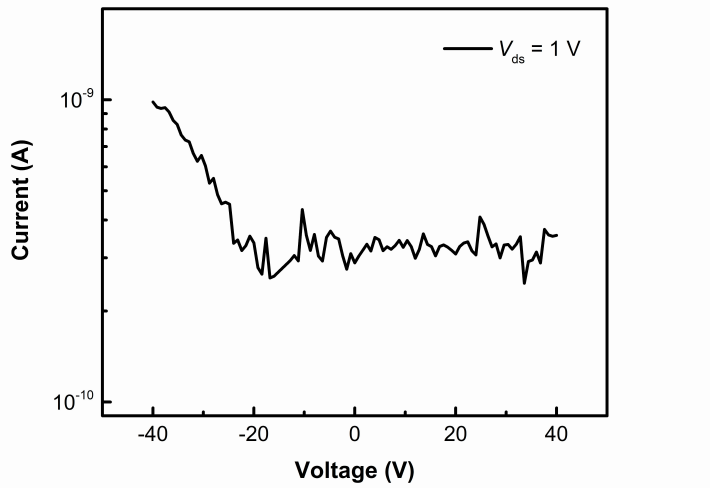

Figure S2. *I-V* transfer curve of WSe_2-Graphene-$MoTe_2$ photodetector in the dark.

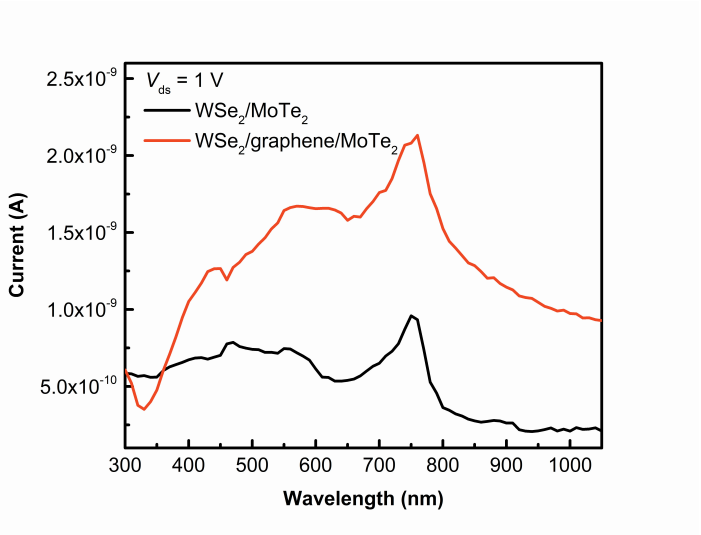

Figure S3. The incident light wavelength-current curves of $WSe_2/MoTe_2$ and WSe_2/graphene/$MoTe_2$.

2. ***I-V* curves of WSe_2-$MoTe_2$ photodetector under light illumination and the corresponding responsibility and detectivity.**

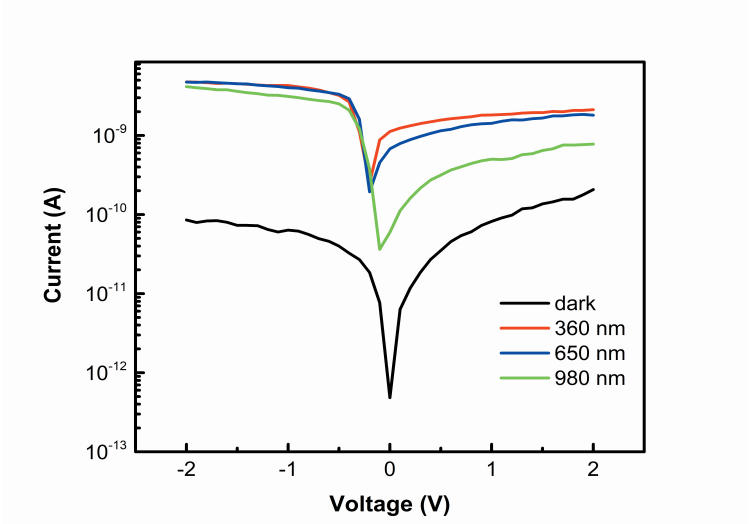

Figure S4. *I-V* curves of WSe_2-$MoTe_2$ photodetector under light illumination.

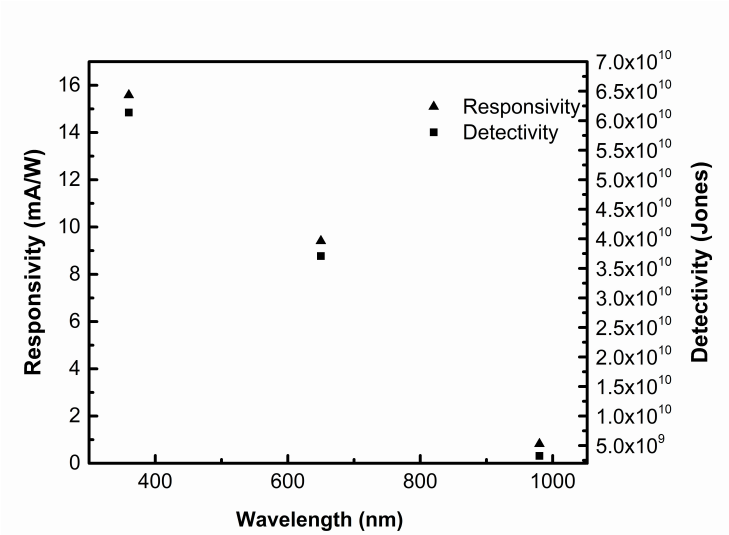

Figure S5. Responsivity and detectivity of WSe_2-$MoTe_2$ photodetector under light illumination at 0 V.

3. KPFM measurement of WSe_2-Graphene-$MoTe_2$.

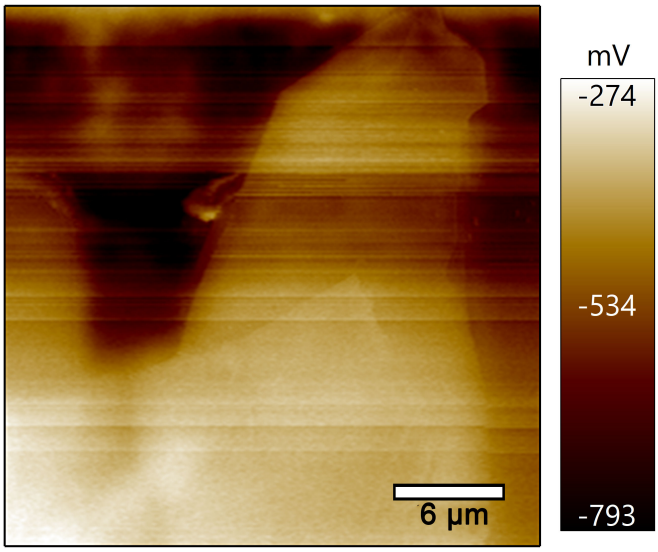

Figure S6. The diagram of surface potential distribution.