SUPPLEMENTARY MATERIAL

The Lateral Photovoltaic Effect of WSeS/Si Heterojunction

Miaoran Kang[1], Pengbo Zhang[1], Jiarui Guo,[1] Lingli Zhang,[1] Lingling Tao,[1] Qiang Fu,[1] and Xianjie Wang,[1,2,3] **

[1] *School of Physics, Harbin Institute of Technology, Harbin 150001, China*

[2] *Frontiers Science Center for Matter Behave in Space Environment, Harbin Institute of Technology, Harbin 150001, China*

[3] *Zhengzhou Research Institute, Harbin Institute of Technology, Zhengzhou 450046, China*

***Email Correspondence:** zhanglingli@hit.edu.cn and wangxianjie@hit.edu.cn

Keywords: lateral photovoltaic effect; position-sensitive detectors; heterojunction; WSeS

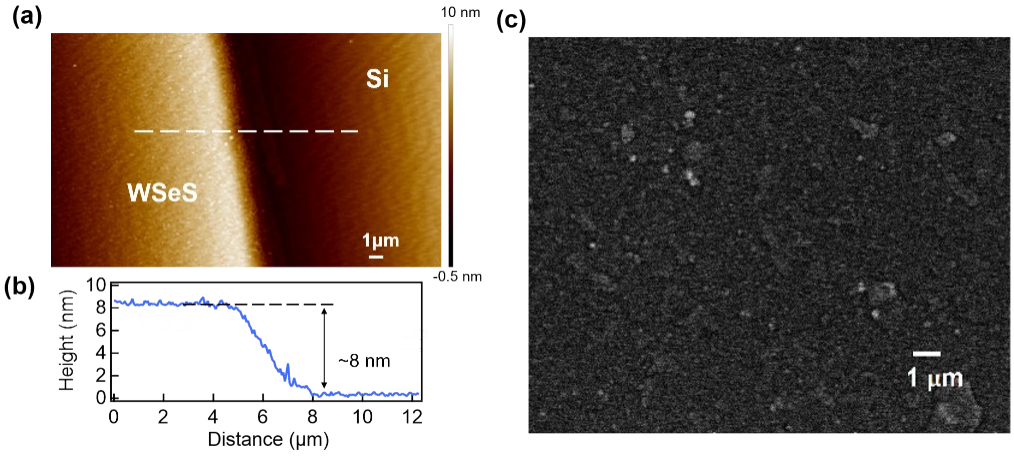

Figure S1. (a) AFM image of the WSeS/Si heterojunction (b) Corresponding Height profiles along the lines drawn in (a). (c) SEM image of the thin film surface.

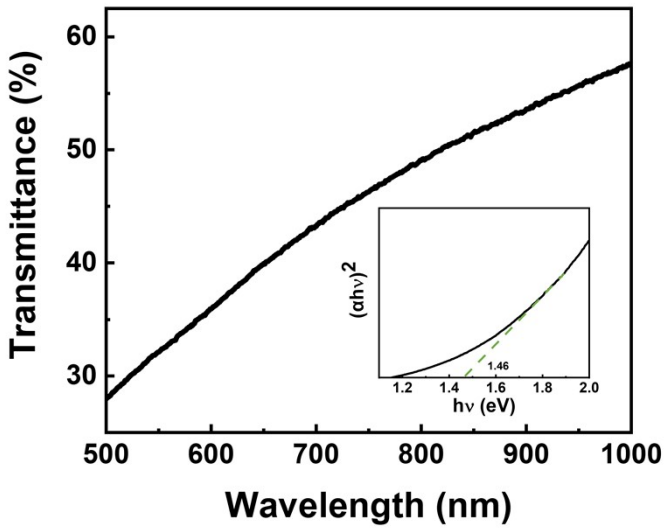

Figure. S2 Transmission spectral testing of WSeS films grown on SiO_2.

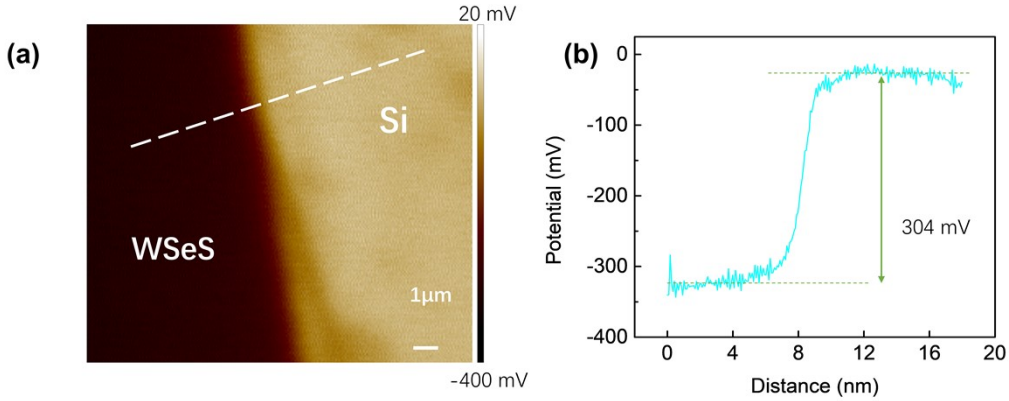

Figure. S3 (a) KPFM image of WSeS/Si. (b) Surface potential difference between WSeS and Si

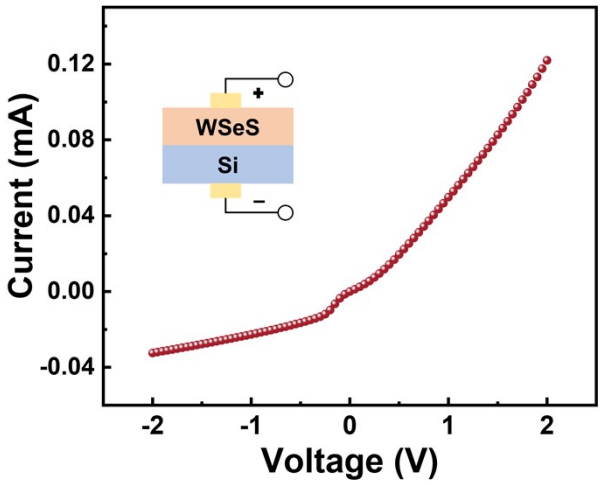

Figure. S4 I-V curve of the WSeS (8 nm)/ Si junction. The inset shows the schematic circuit for the junction measurement for the WSeS/Si junction.

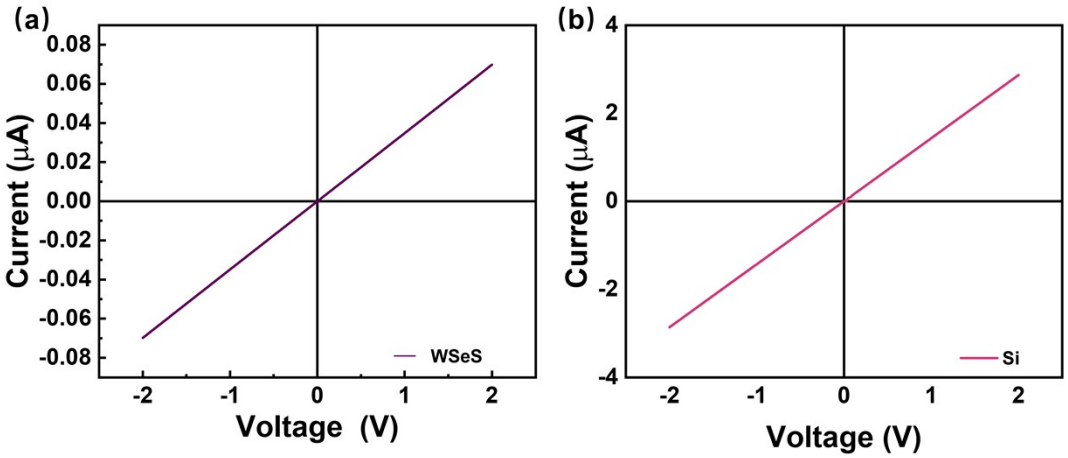

Figure. S5 I-V curves of (a) Au electrodes on WSeS thin film, and (b) Ag electrodes on Si.

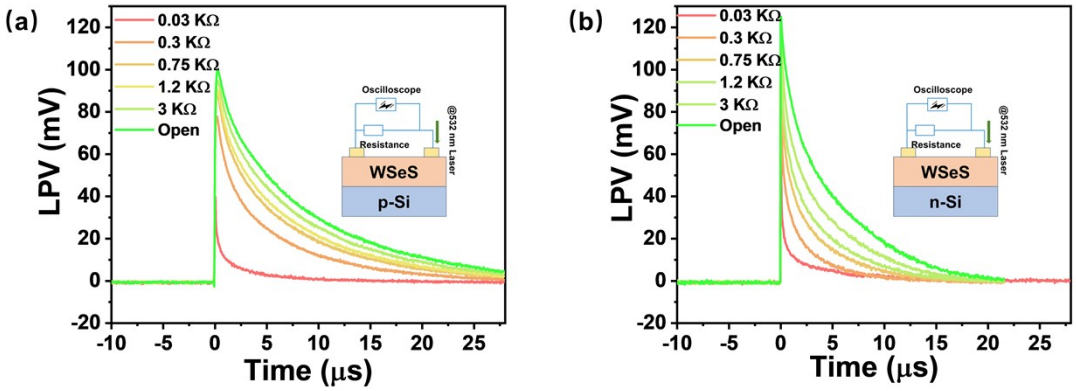

Figure S6. (a, b) LPV response over time for the WSeS/n-Si and WSeS /p-Si heterojunctions under the same 532 nm laser irradiation.

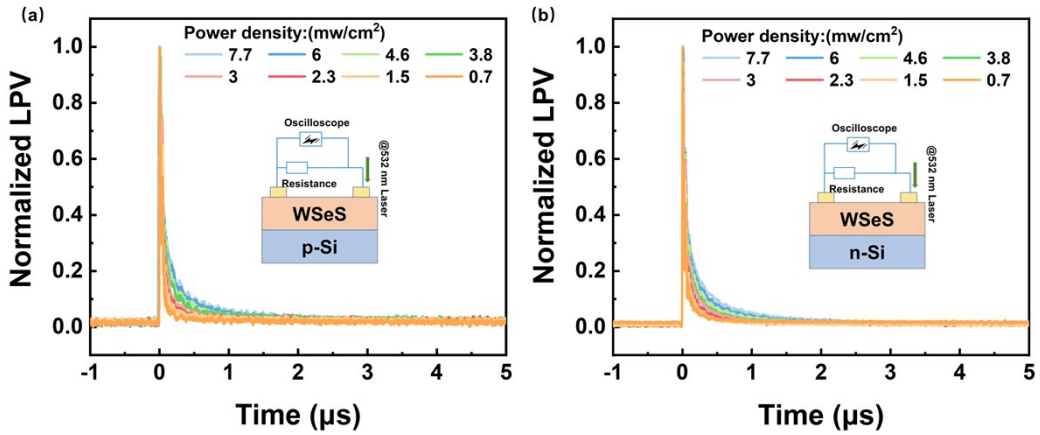

Figure. S7 LPV as a function of time for (a) the WSeS (8 nm)/n-Si and (b) WSeS (8 nm)/p-Si heterojunction under 532 nm laser irradiation with different optical power densities.

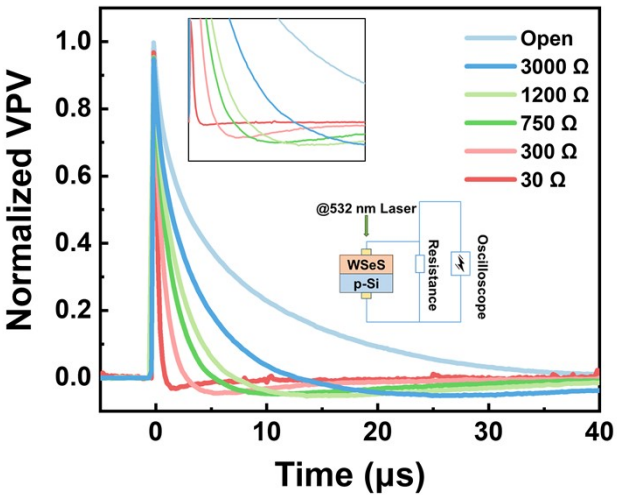

Figure. S8 VPV as a function of time for the WSeS (8 nm)/p-Si heterojunction under 532 nm laser irradiation.

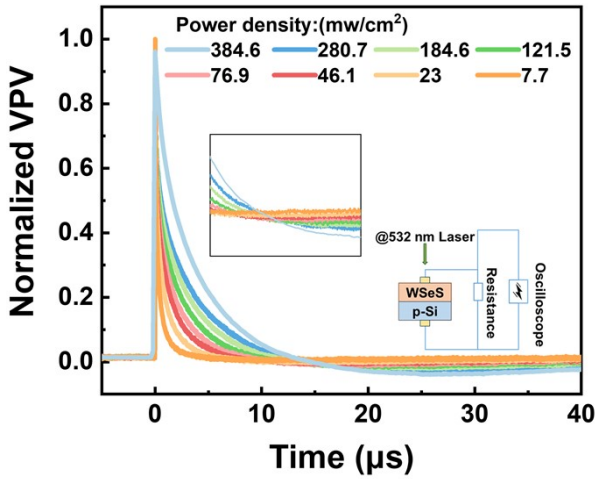

Figure. S9 VPV as a function of time for the WSeS (8 nm)/p-Si heterojunction under 532 nm laser irradiation with different optical power densities.