Supporting Information

Modulation of junction modes in $SnSe_2/MoTe_2$ broken-gap van der Waals heterostructure

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KEYWORDS: transition-metal dichalcogenides, tunnel diode, van der Waals heterostructure, photo-voltaic effect, infrared photo-detector, broken-gap band alignment, anisotype heterojunction

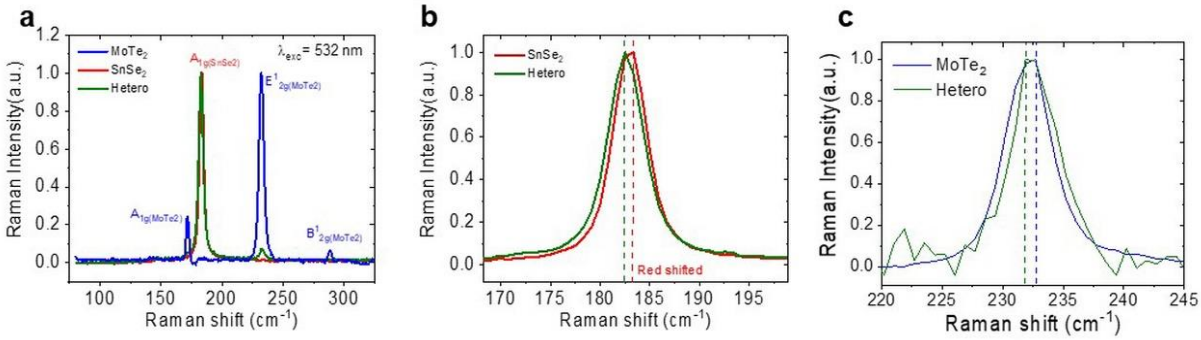

Figure S1. (a) Raman scattering spectra of $MoTe_2$, $SnSe_2$, and heterojunction measured with a 532-nm laser excitation. (b) A_{1g} peaks of $SnSe_2$ measured in the pristine $SnSe_2$ and heterojunction regions. (c) E^1_{2g} peaks of $MoTe_2$ measured in the pristine $MoTe_2$ and heterojunction regions.

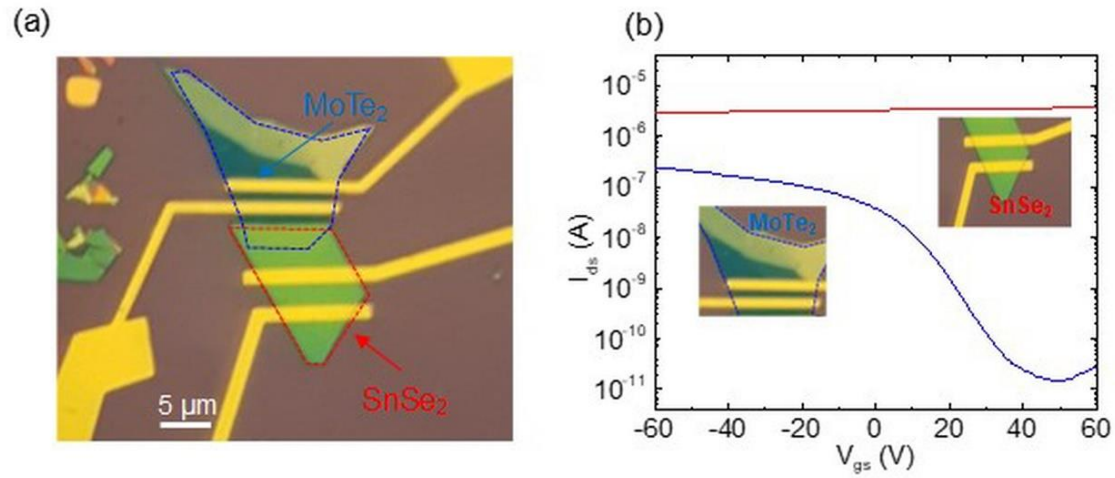

Figure S2. (a) Optical image of the $MoTe_2/SnSe_2$ heterostructure. (b) I_{ds}–V_{gs} characteristics of the single $MoTe_2$ and $SnSe_2$ FETs.

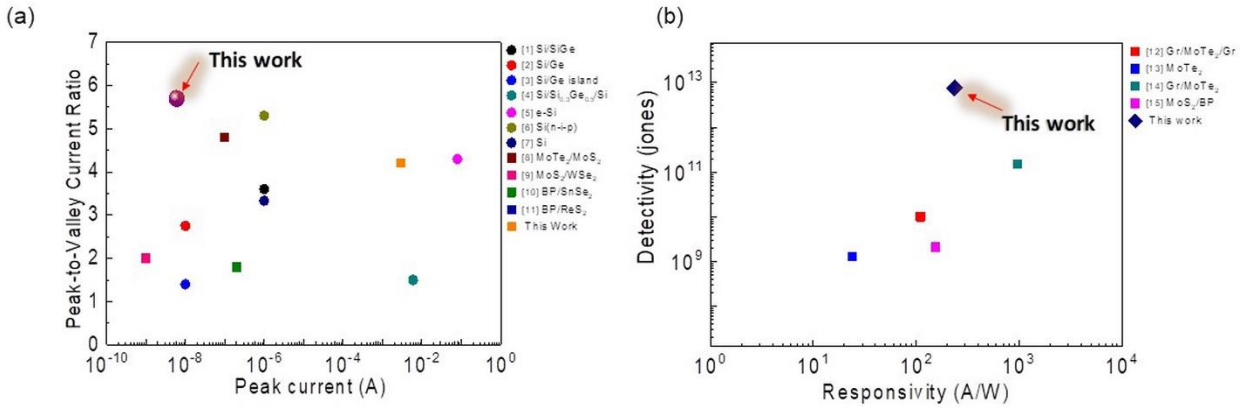

Figure S3. (a) PVCR–peak current and (b) detectivity–responsivity results of this and recent studies.

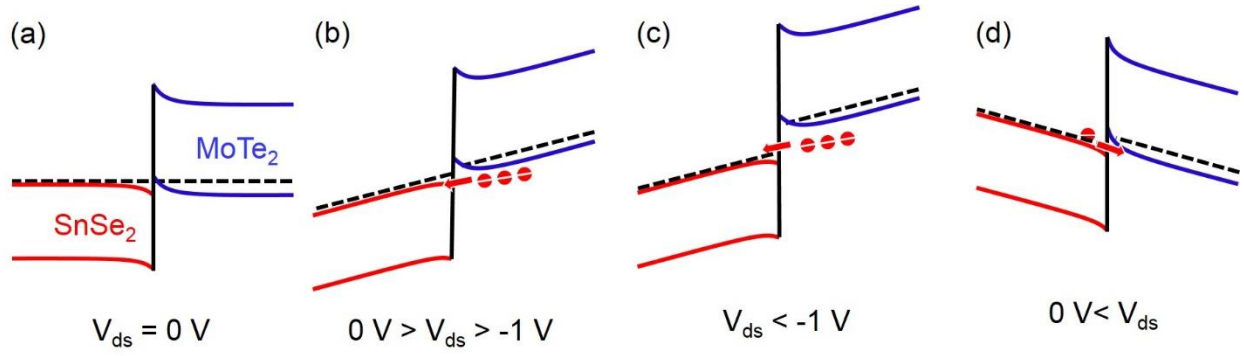

Figure S4. Band alignments of the $MoTe_2/SnSe_2$ heterojunction in the accumulation mode at various V_{ds} values: (a) $V_{ds} = 0$ V (equilibrium), (b) 0 V > V_{ds} > -1 V (small reverse bias), (c) V_{ds} < -1V, (d) 0 V < V_{ds} (forward bias).

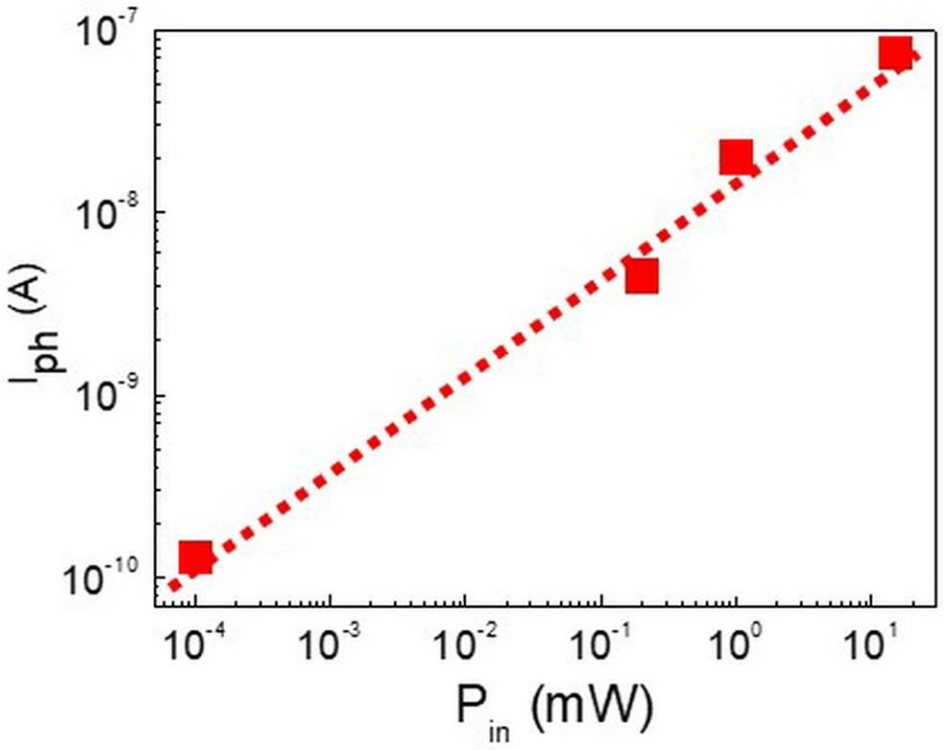

Figure S5. Linear variation in photo-current I_{ph} with the laser power P_{in}.

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