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(54) **VERSATILE ANTI-AMBIPOLAR
PHOTOTRANSISTORS BASED ON
MIXED-DIMENSIONAL
HETEROJUNCTIONS**

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(57)

ABSTRACT

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Mixed-dimensional heterostructure nano-devices with multi-functionality for use in semiconductors. Specifically, a gate-tunable and anti-ambipolar phototransistor is devised based on 1D p-type GaAsSb nanowire/2D n-type MoS₂ nanoflake mixed-dimensional van der Waals (vdW) heterojunctions. Methods of making the mixed-dimensional heterostructure nano-devices with multi-functionality, gate-tunability and anti-ambipolar phototransistor.

