Electronic Supplementary Information

Visible-light photodetector with enhanced performance based on ZnO@CdS heterostructure

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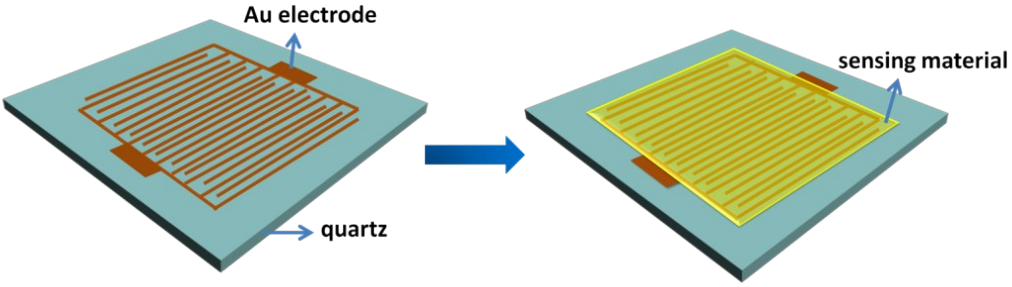

Fig. S1 Schematic diagram illustrating synthesis procedure of PDs.

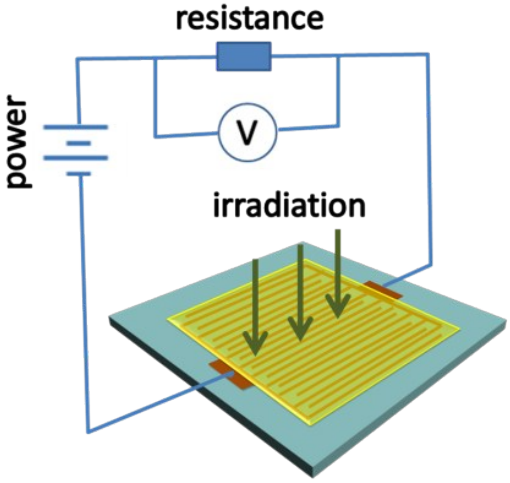

Fig. S2 The test circuitry for time response of PDs.

Calculation of the band position

For an inorganic semiconductor, the energy positions of band edges with respect to Absolute Vacuum Scale (AVS) can be calculated as follow:

$E_C(AVS)=-\chi+0.5E_g$(1)

$E_v(AVS)=-\chi-0.5E_g$(2)

where Eg is the band gap of the semiconductor, χ is the absolute electronegativity, E_C(AVS) and E_v (AVS) is the position of the conduction band edge and the valence band edge with respect to AVS, respectively.

Table S1 Absolute electronegativity (χ), band gap (E_g), energy levels of calculated conduction band edge (E_C) and calculated valence band edge (E_V)

Semiconductor	χ(eV)	E_g(eV)	E_C(AVS)(eV)	E_V(AVS)(eV)
CdS	5.18	2.4	-3.98	-6.38
ZnO	5.79	3.2	-4.19	-7.39

Reference

1. Y. Xu, and M. A. A. Schoonen, *Am. Mineral.*, 2000, **85**, 543.