

## All-inorganic CsPbBr<sub>3</sub>/GaN hetero-structure for near UV to green band photodetector

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### **This file includes:**

Supplementary Text

Fig. S1. Atomic configurations of GaN and CsPbBr<sub>3</sub>; measurement configuration for CsPbBr<sub>3</sub>/GaN heterojunction photodetector.

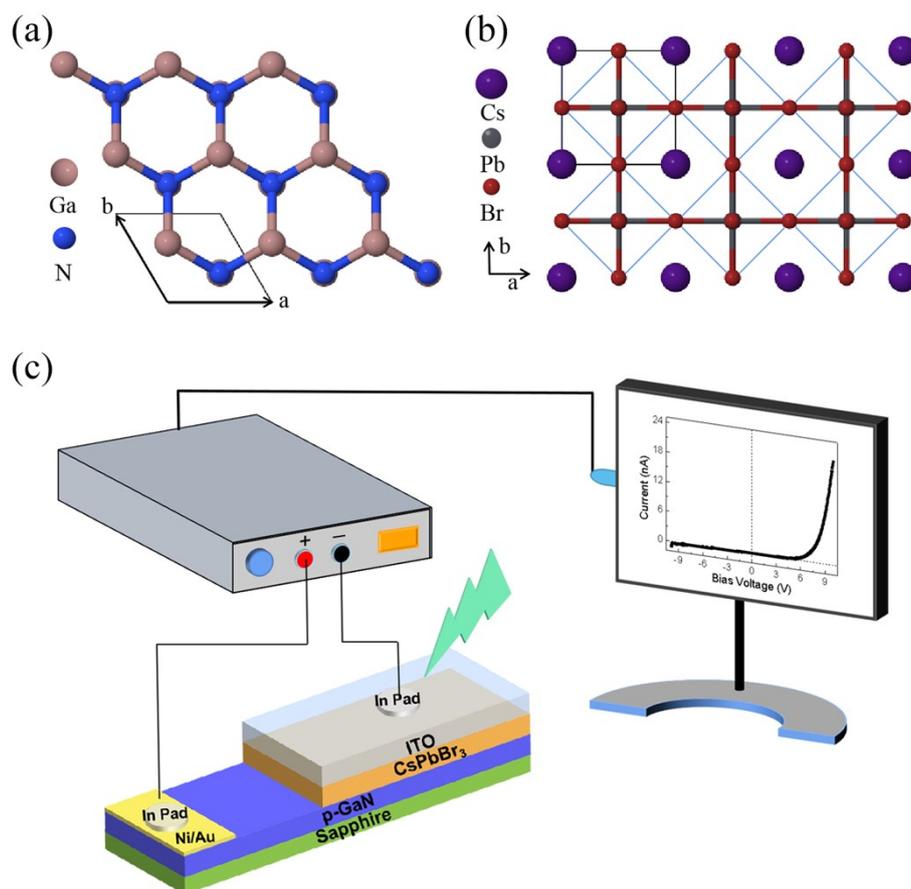
**Fig. S2. The photograph of the CsPbBr<sub>3</sub>/GaN photodetector.**

Fig. S3. Bright-field optical image of CsPbBr<sub>3</sub> monocrystal and schematic view on different facets of corresponding CsPbBr<sub>3</sub> monocrystal.

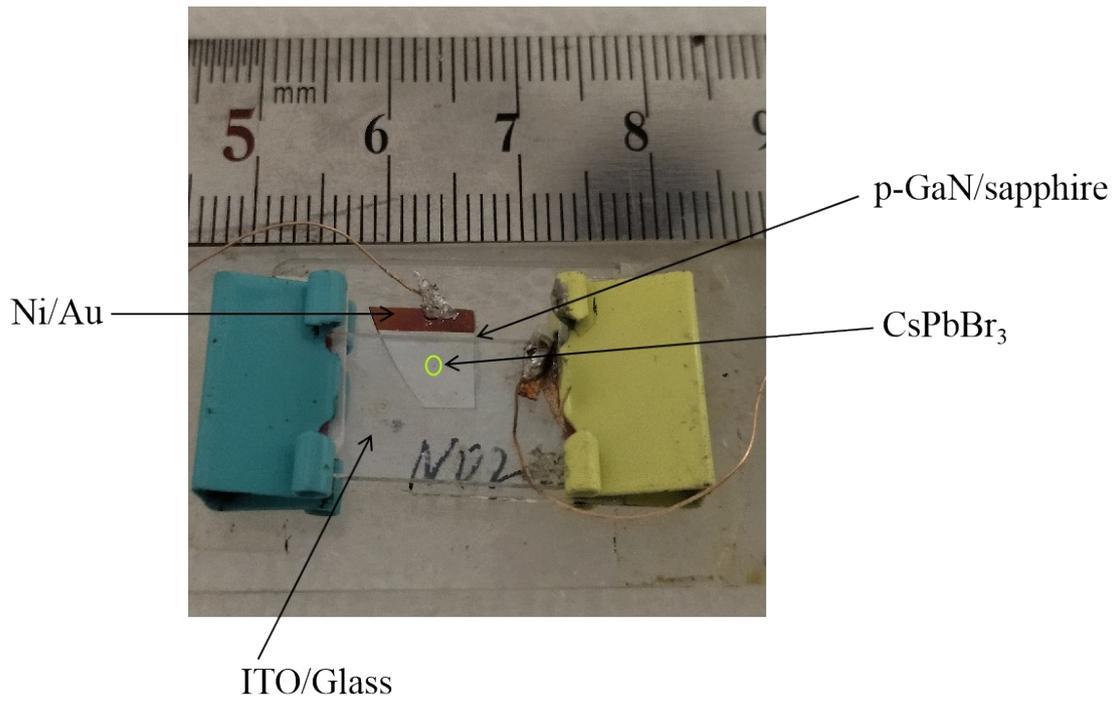
Fig. S4. SEM image and EDS spectra of CsPbBr<sub>3</sub> monocrystal.

**Fig. S5 The *I-V* curves of (a) Ni/Au-GaN-Ni/Au device and (b) ITO-CsPbBr<sub>3</sub>-ITO device under dark.**

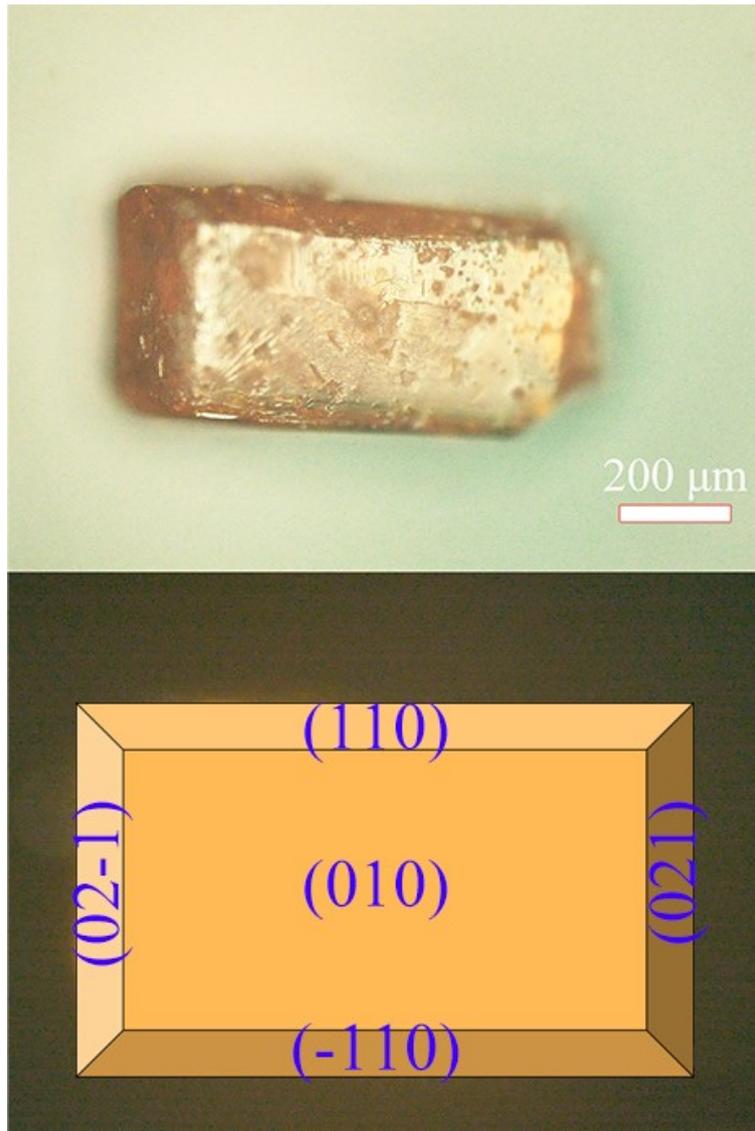
Fig. S6. Detectivity of the CsPbBr<sub>3</sub>/GaN photodetector under different bias voltages.



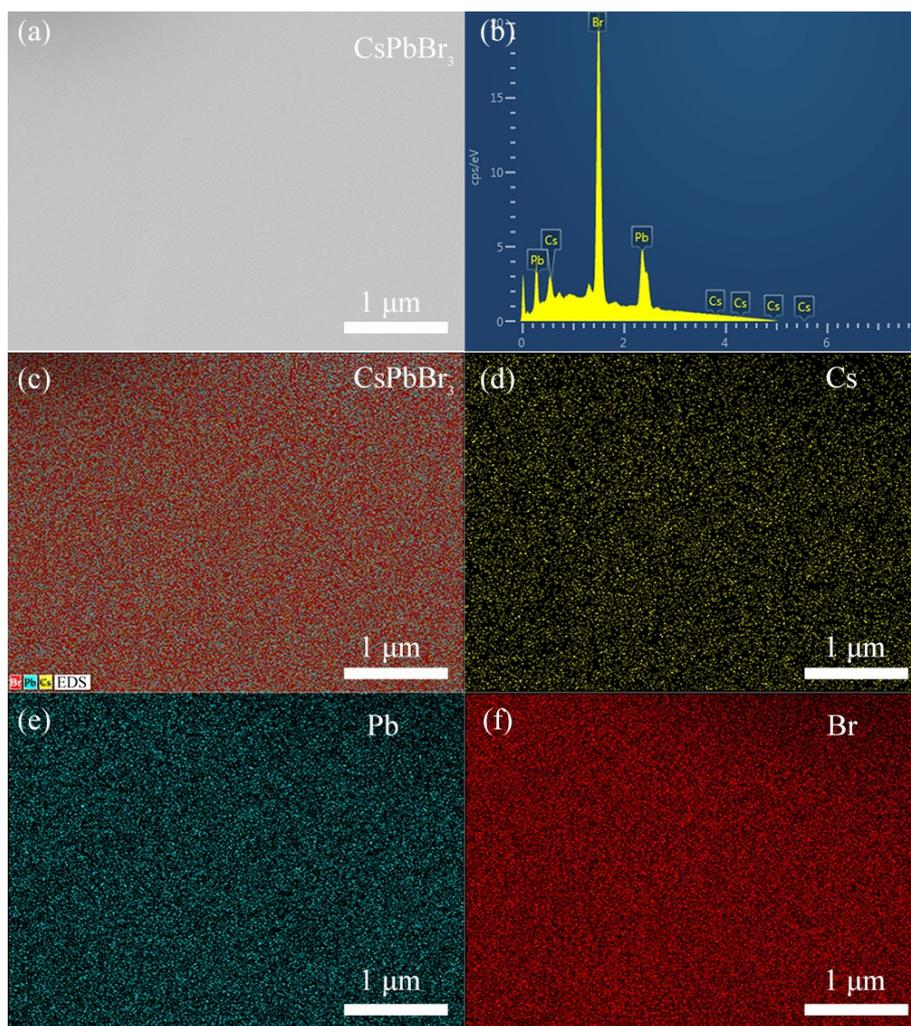
**Fig. S1** Schematic presentation of atomic configuration of (a) hexagonal GaN and (b) orthorhombic CsPbBr<sub>3</sub>; (c) the photoresponse measurement configuration for CsPbBr<sub>3</sub>/GaN heterojunction photodetector.



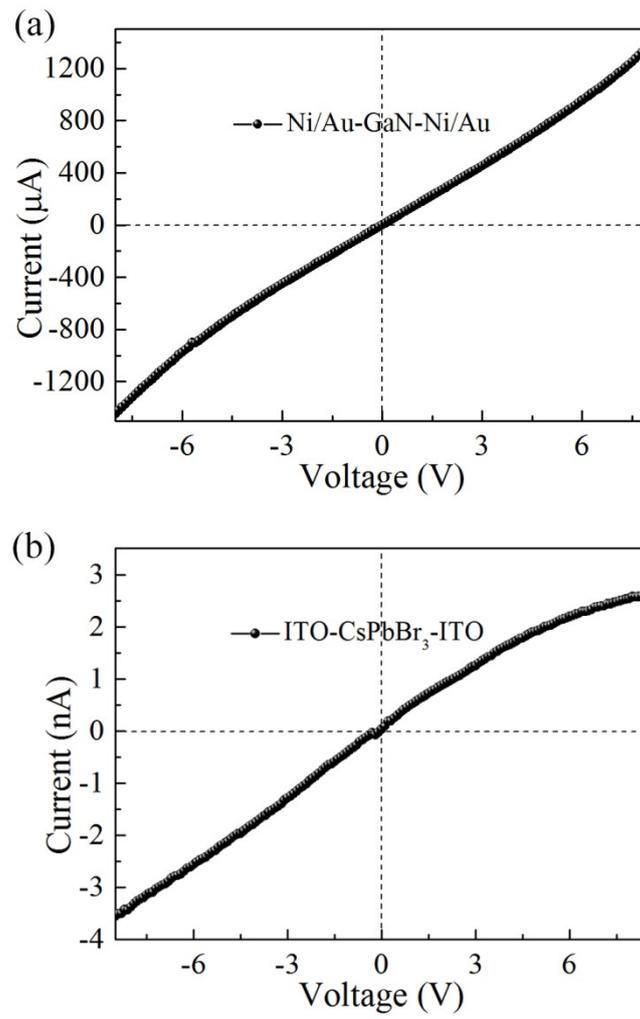
**Fig. S2. The photograph of the CsPbBr<sub>3</sub>/GaN photodetector.**



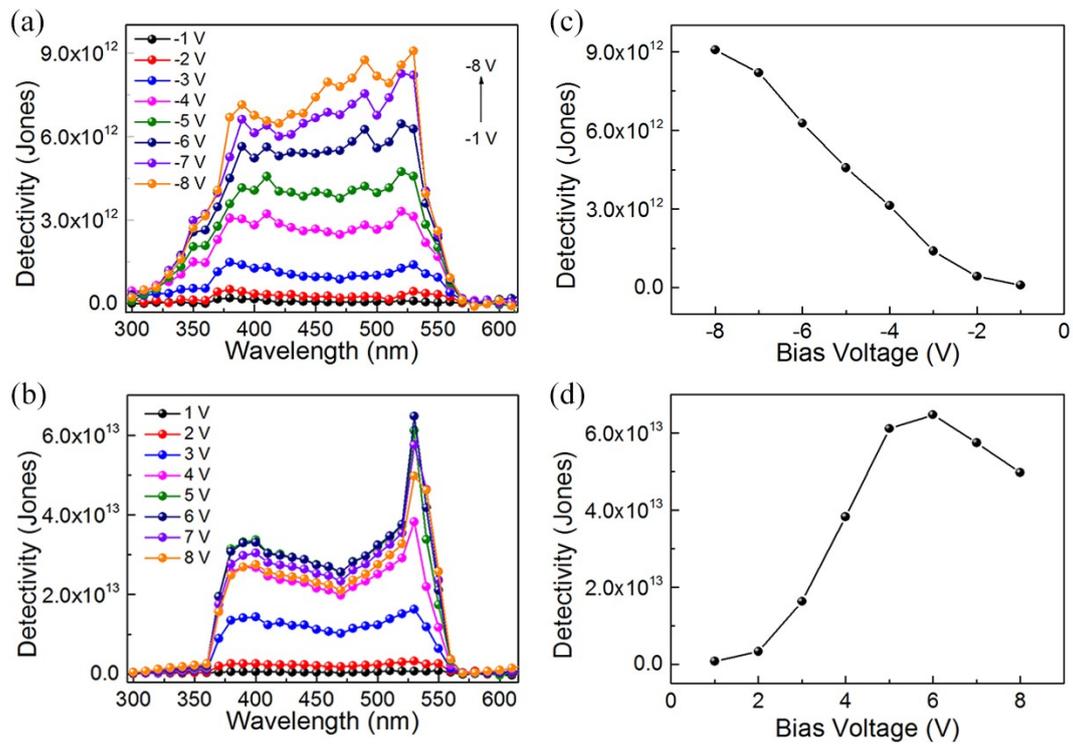
**Fig. S3** Bright-field optical image of CsPbBr<sub>3</sub> monocrystal and schematic view on different facets of corresponding CsPbBr<sub>3</sub> monocrystal.



**Fig. S4** (a) SEM image of CsPbBr<sub>3</sub> monocrystal; (b) EDS spectrum of CsPbBr<sub>3</sub> monocrystal; (c-f) EDS elemental mapping of Cs, Pb, and Br elements on the surface of CsPbBr<sub>3</sub> monocrystal.



**Figure S5** The  $I$ - $V$  curves of (a) Ni/Au-GaN-Ni/Au device and (b) ITO-CsPbBr<sub>3</sub>-ITO device under dark.



**Fig. S6** Detectivity of the device under (a) negative bias voltages and (b) positive bias voltages; Maximum detectivity of the device as a function of (c) negative bias voltages and (d) positive bias voltages.