Supporting Information

Unraveling the Infrared Detection Properties of Bi_2Te_3 Depending on Thickness from Semiconductor to Metal Surface States

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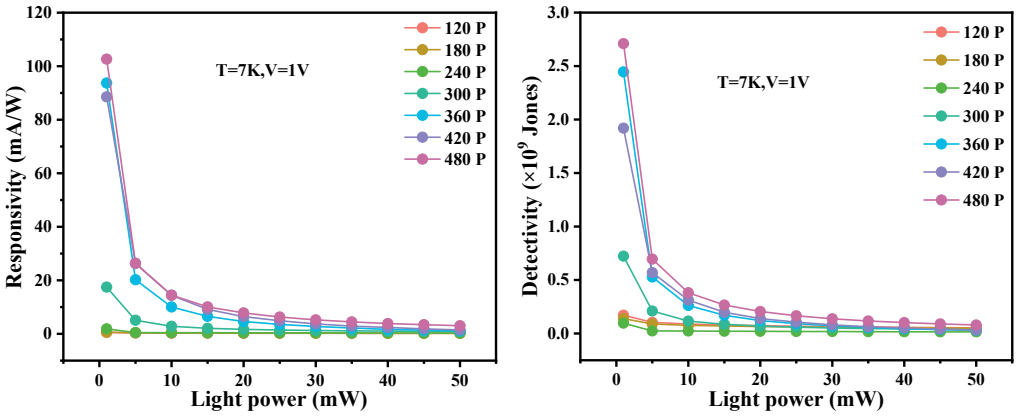
The R and D* of all Bi_2Te_3 samples gradually decrease as the light intensity increases, demonstrating that the device performs better under lower light intensity detection.



S1. Dependence curves of R and D* on incident light power.

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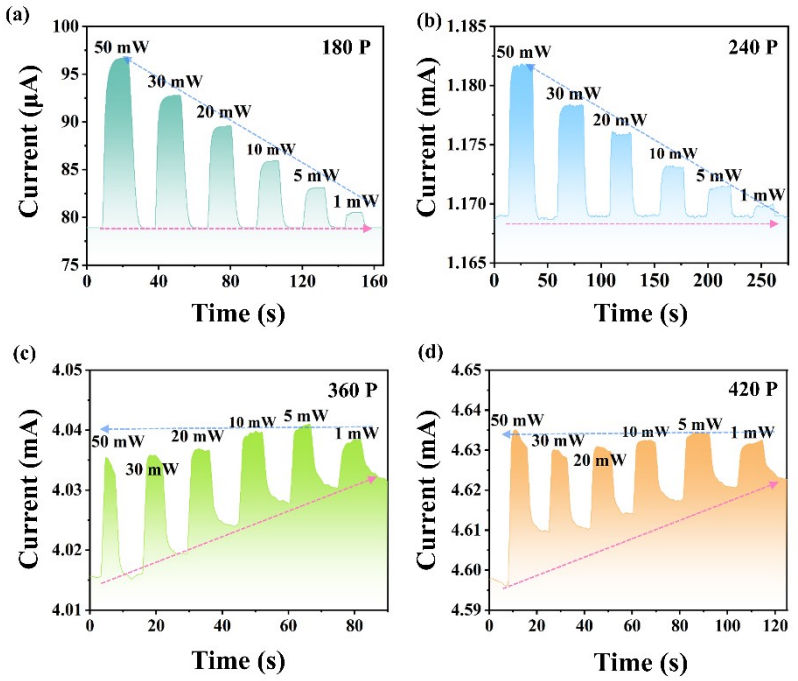
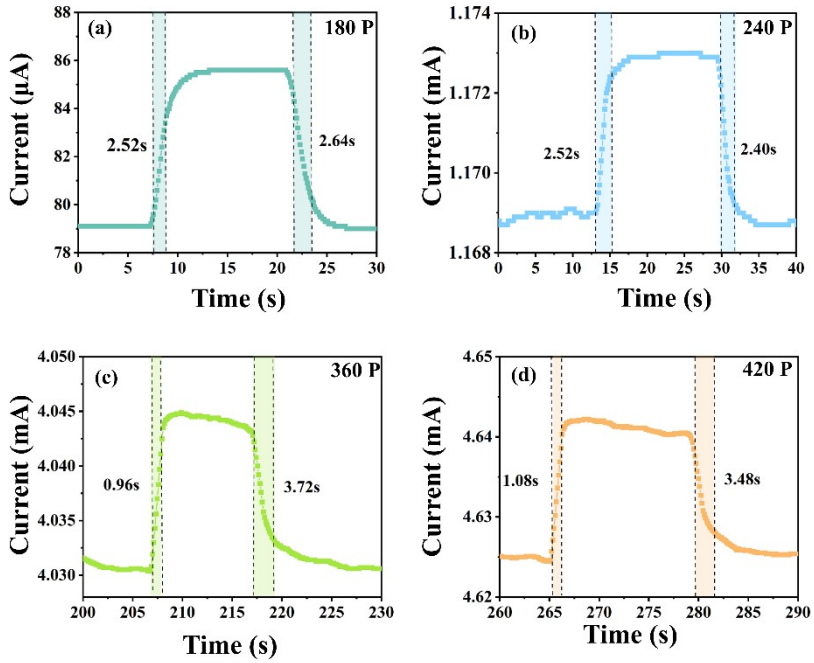
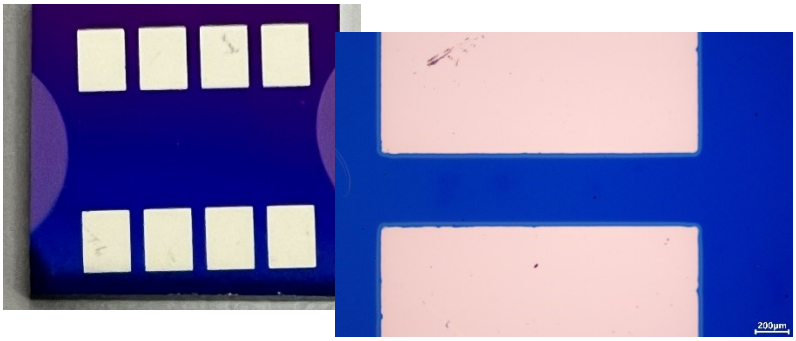


S2. Time cycle curves of Bi_2Te_3 thin films under different light powers (a) 180 P, (b)240 P, (c) 360 P, (d) 420 P.

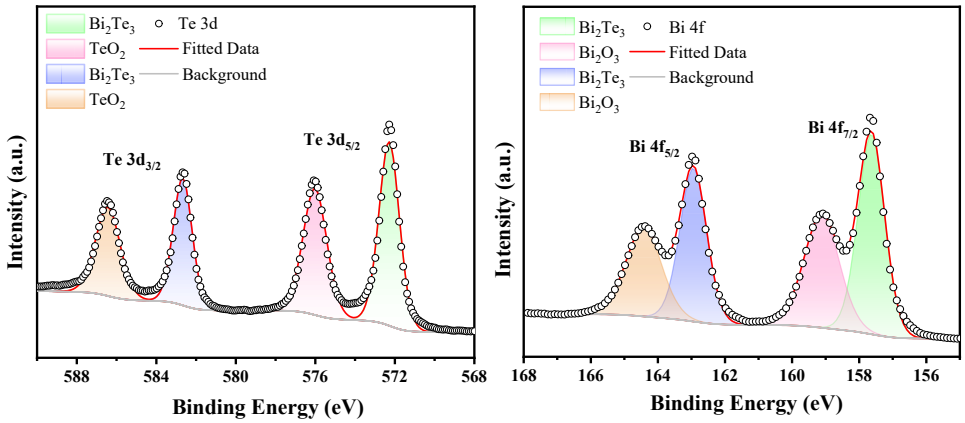


S3. Response time of Bi_2Te_3 films (a) 180P, (b) 240P (c) 360P (d) 420 P.



S4. Schematic diagram of the electrode of Bi_2Te_3 thin film.

The XPS spectra of Bi and Te were measured, revealing that Bi_2Te_3 underwent slight oxidation. The presence of oxygen caused ionization and dissociation during the photoelectric process, which prolonged the response time.



S5. XPS analysis spectra of Te 3d, and Bi 4f.