Supplementary information for

Room Temperature Broadband Bi_2Te_3/PbS Colloidal Quantum Dots Infrared Photodetectors

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S1. Discussion on magnetron sputtering process of Bi_2Te_3 film

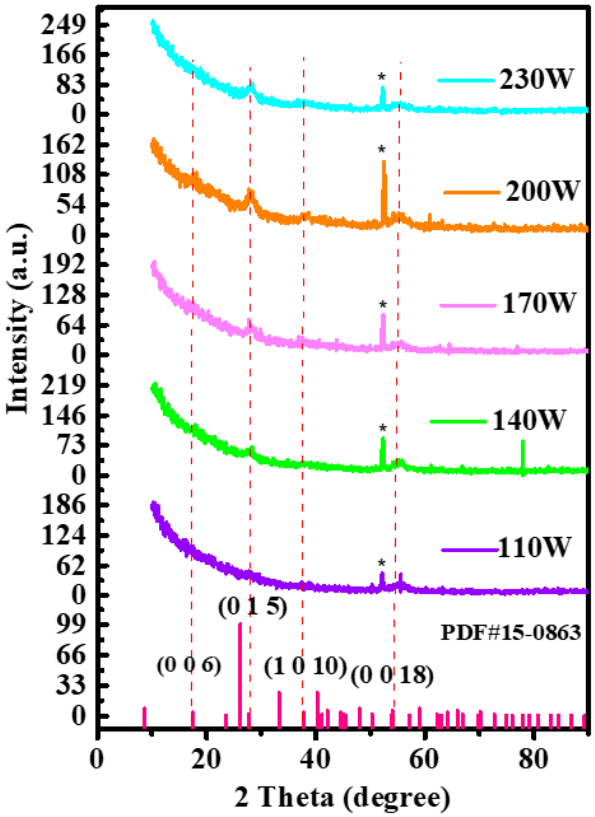

Figure S1. X-ray diffraction (XRD) patterns of Bi_2Te_3 film grown under different sputtering power

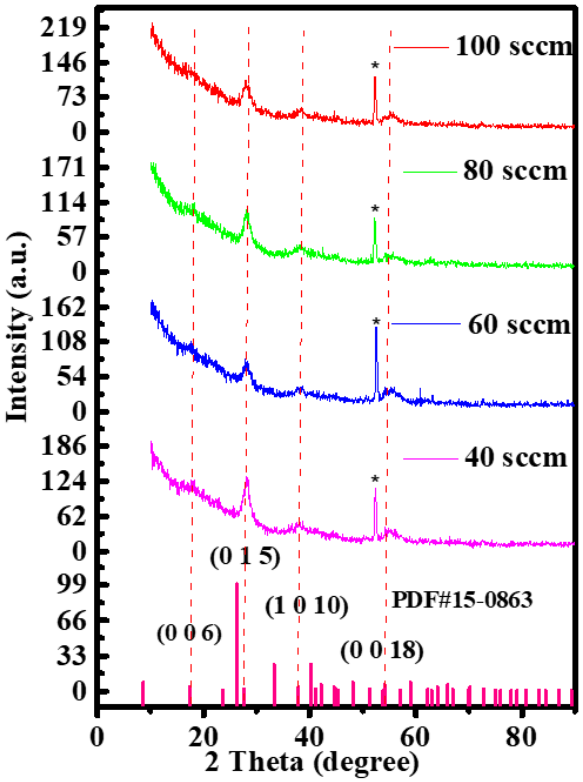

Figure S2. X-ray diffraction (XRD) patterns of Bi_2Te_3 film grown under different gas rate

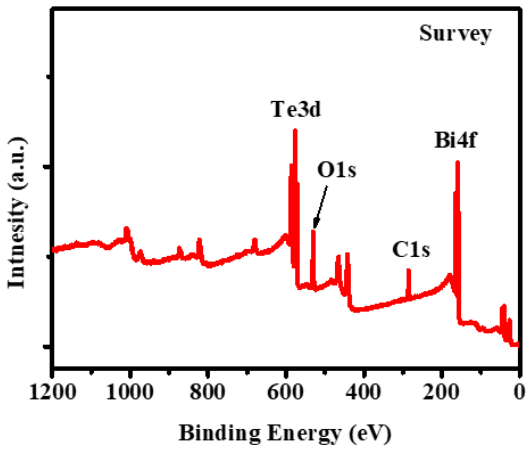

Figure S3. X-ray photoelectron spectroscopy (XPS) survey scan of $Bi2Te_3$ film

S2. Discussion on PbS devices (without Bi_2Te_3)

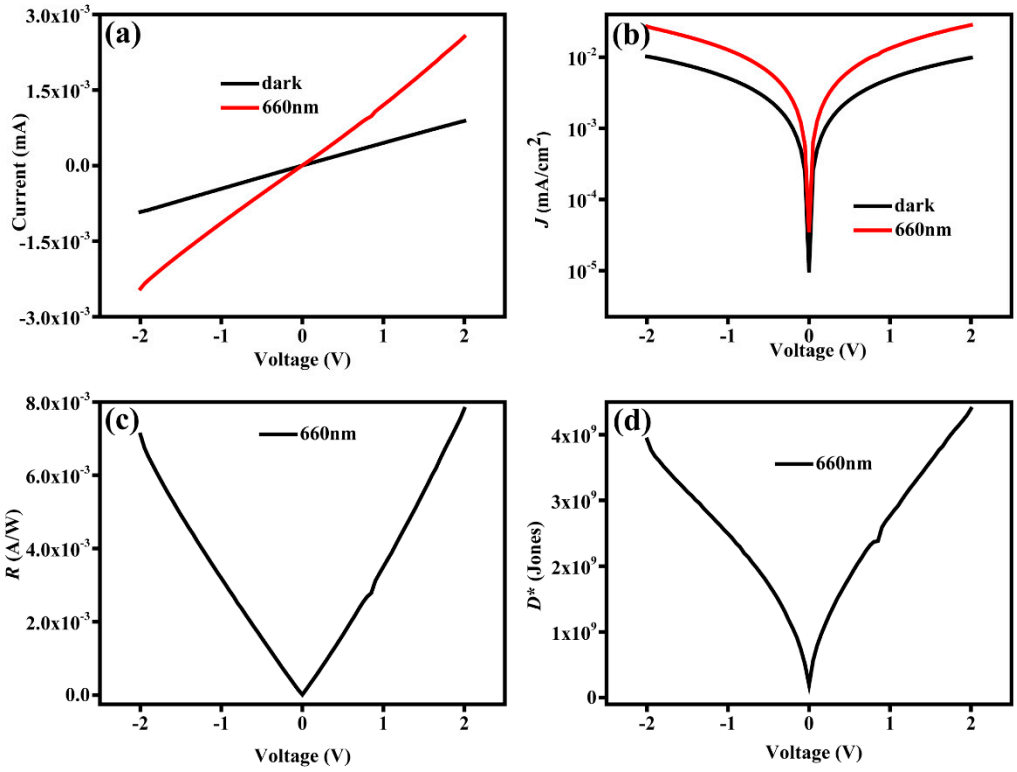

Figure S4. PbS devices without Bi_2Te_3. (**a, b**) *I-V* curves of the photodetector under 660 nm illumination. (**c**) Plot of responsivity (*R*) against voltage (*V*). (**d**) Plot of detectivity (*D**) against voltage (*V*).