Supporting Information

Long-wave infrared photothermoelectric detectors with resonant nanophotonics

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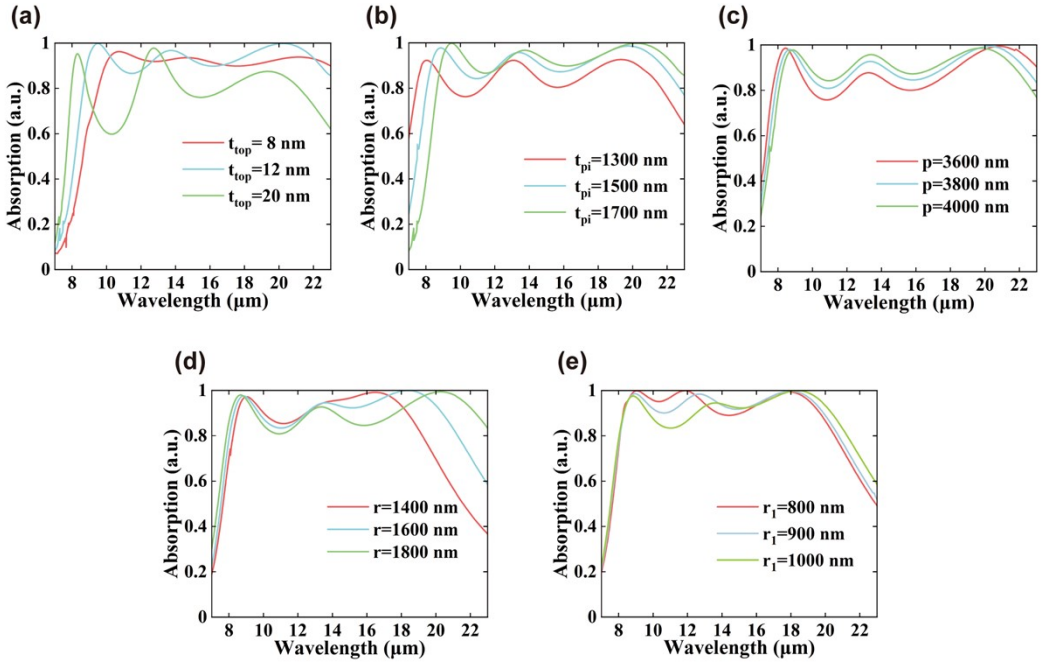

Figure S1. Schematic parameters optimization of perfect absorber. (a) Absorption curve of top metal layers with different thicknesses. (b) Absorption curve of PI with different thicknesses. (c) Absorption curve of discs with different spacing sizes. (d) Absorption curve for different large disc radii. (e) Absorption curve for different small disc radii.

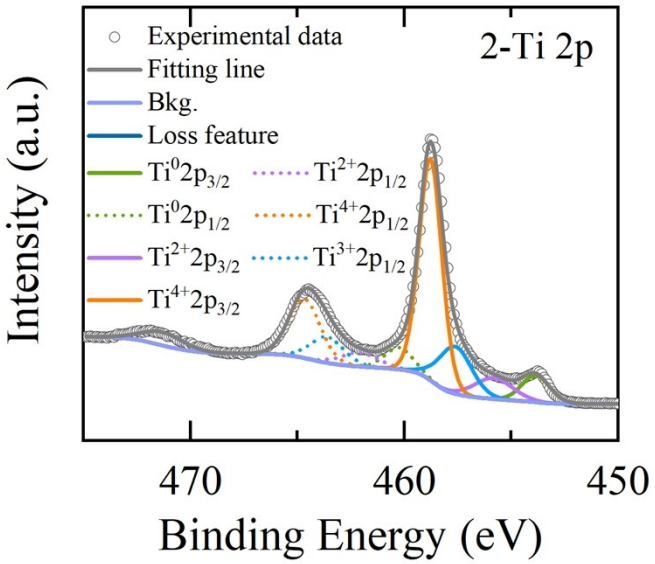

Figure S2. XPS analysis of the metasurface.

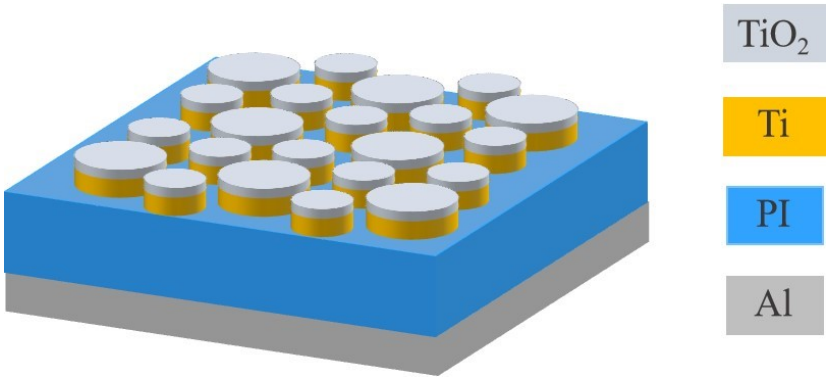

Figure S3. Revised theoretical model according to the experimental result.

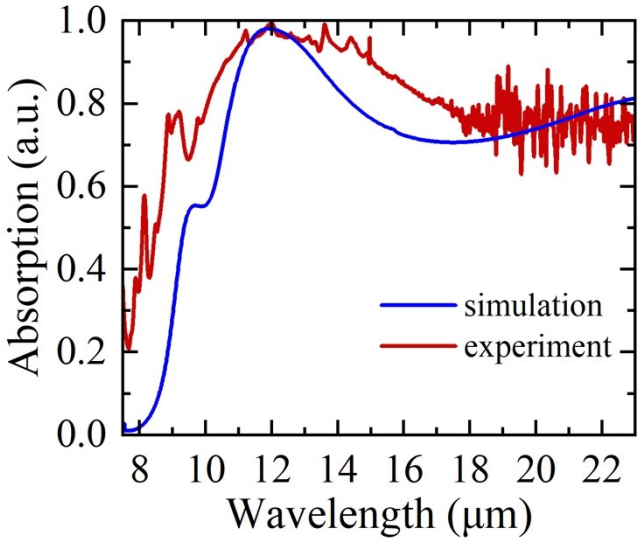

Figure S4. Comparison between simulated and experimental absorption characterization.

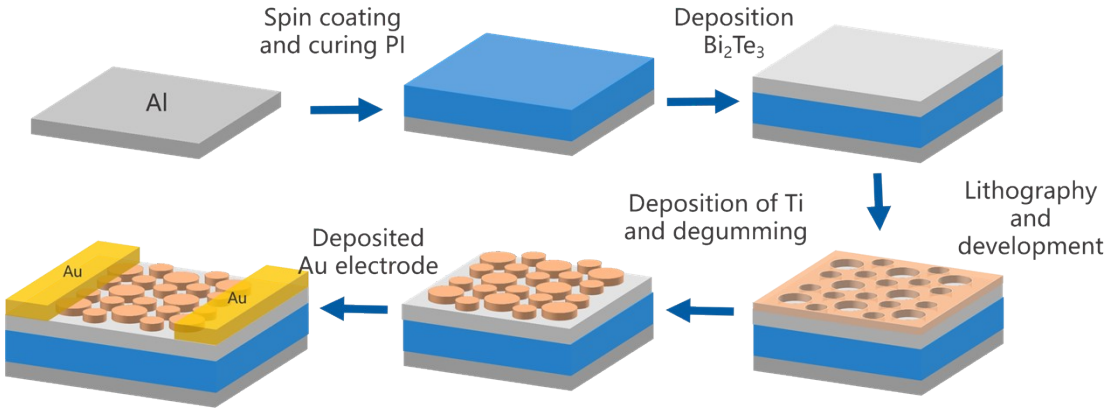

Figure S5. Device Fabrication Process Schematic.

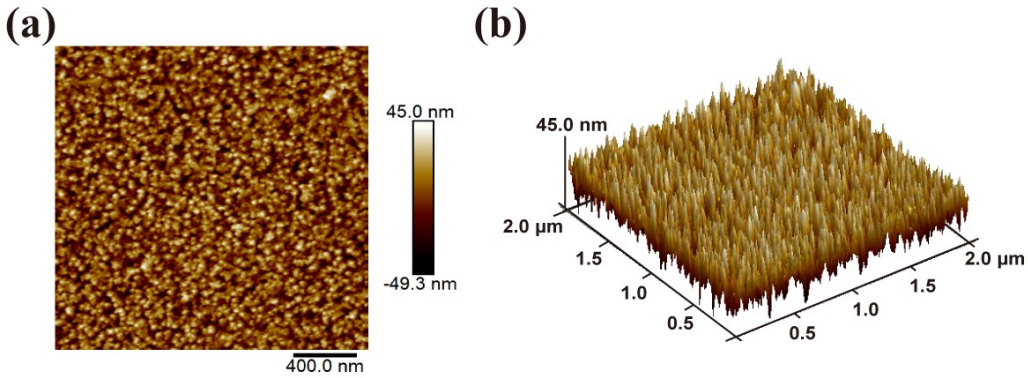

Figure S6. AFM characterization of Bi_2Te_3 film: (a) 2D view, (b) 3D view.

Table S1. Summary of Seebeck coefficient of heat-sensitive materials.

Temperature (°C)	Resistivity (u Ohm*m)	Rel. Seebeck (uV/K)	Wire seebeck (uV/K)	Seebeck coefficient (uV/K)
3.13E+01	1.61E+03	1.59E+02	-5.39E+00	1.53E+02

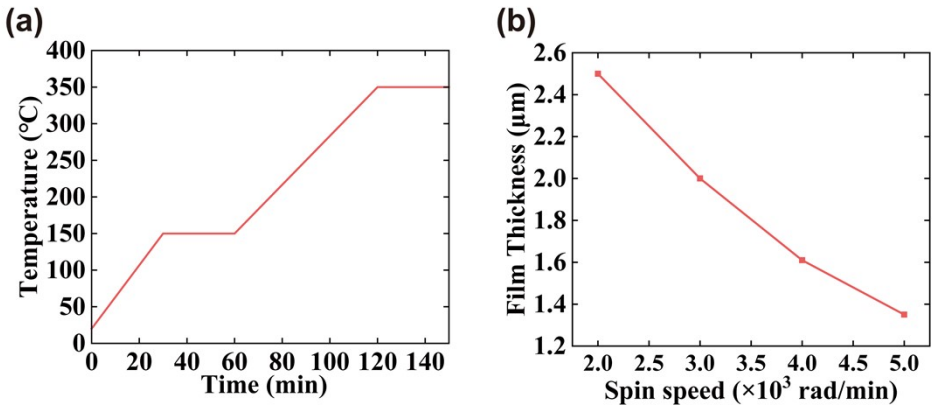

Figure S7. Heating process and thickness analysis of the polyimide (PI) film. (a) Temperature rise curve of the high temperature oven. (b) The relationship between thickness of PI and rotational speed.

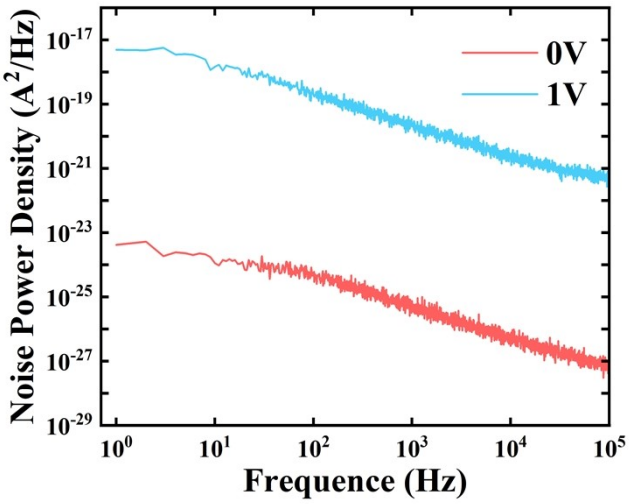

Figure S8. Noise spectral of the device at different bias voltages.

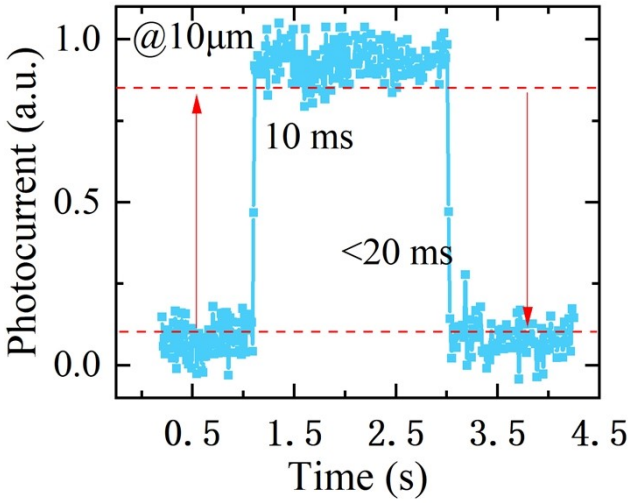

Figure S9. The time-resolved photocurrent of the device under 10 μm stimulation for analyzing its response speed.

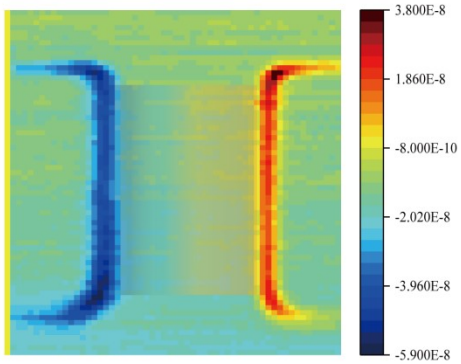

Figure S10. Photocurrent mapping of the device.