Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Tailoring the interface assembly of mesoporous TiO_2 on BTO film toward high performance UV photodetectors

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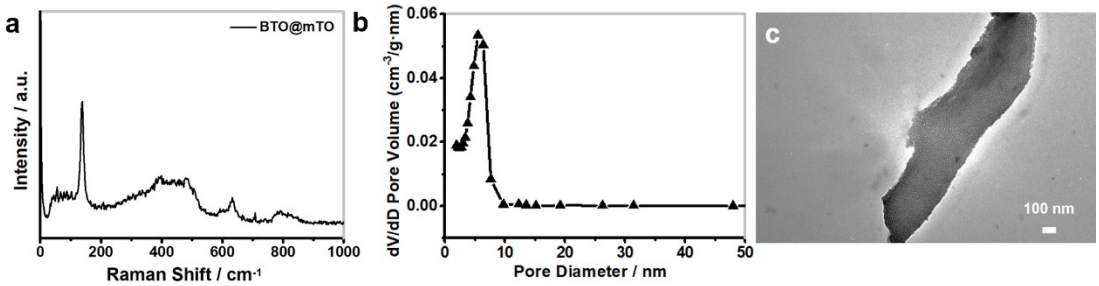

Fig. S1 (a) Raman spectroscopy under an excitation wavelength of 532 nm of BTO@mTO. (b) Pore size distribution curve of mTO film. (c) TEM image of mTO scraped from substrate.

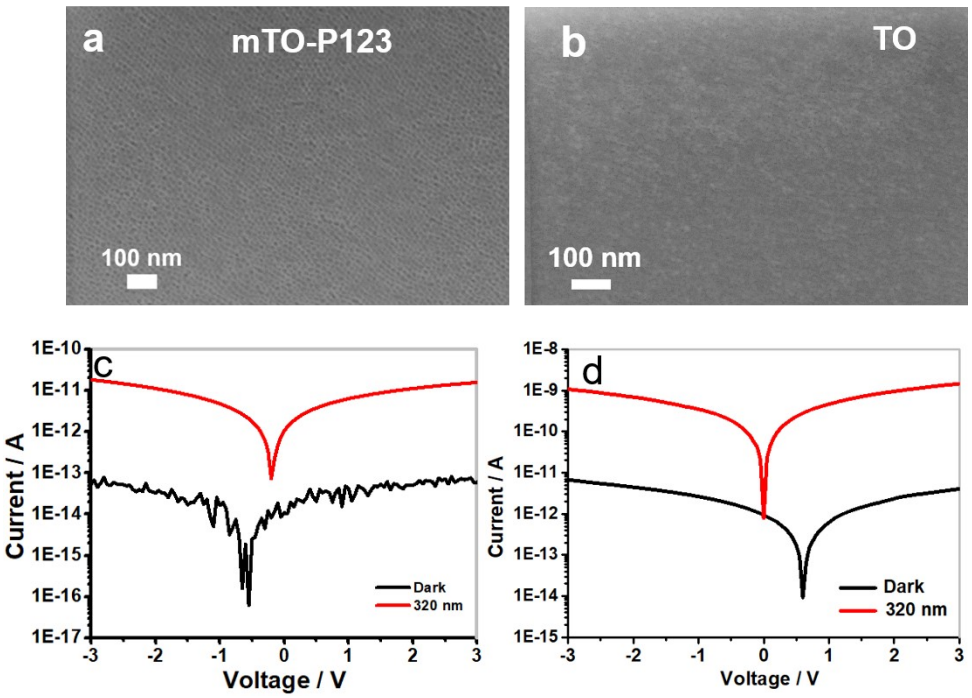

Fig. S2 The SEM images and the corresponding I-V curves: (a) and (c) mTO-P123 film, (b) and (d) TO film.

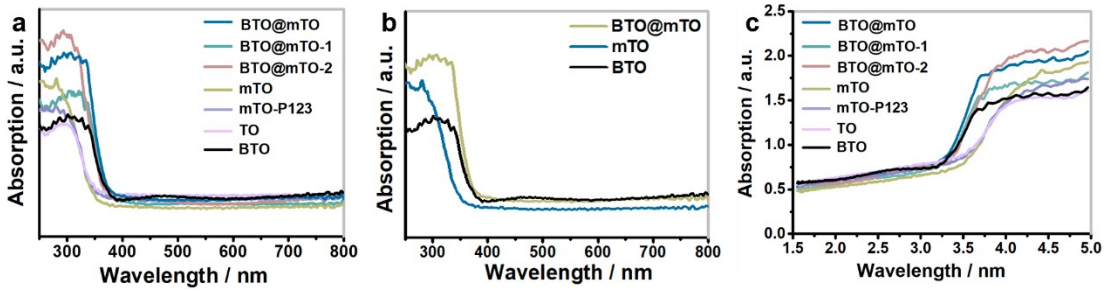

Fig. S3 (a) and (b) UV-vis diffuse reflectance spectra of TO film, BTO film and various BTO@mTO films. (c) the corresponding Tauc curves.

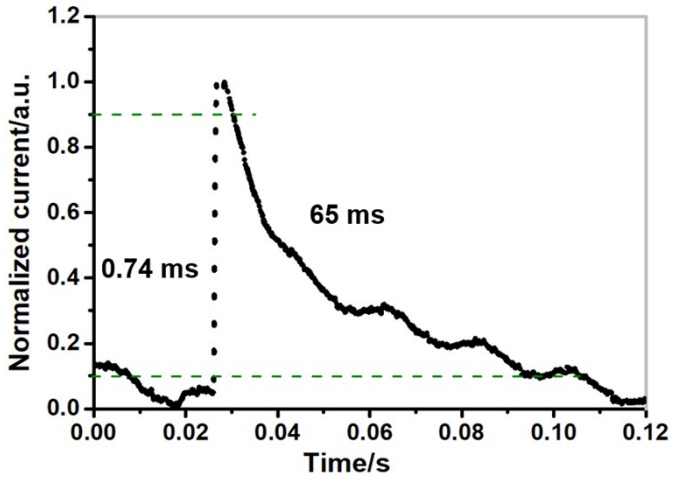

Fig. S4 The pulse response of BTO@mTO PD at 1 V bias.

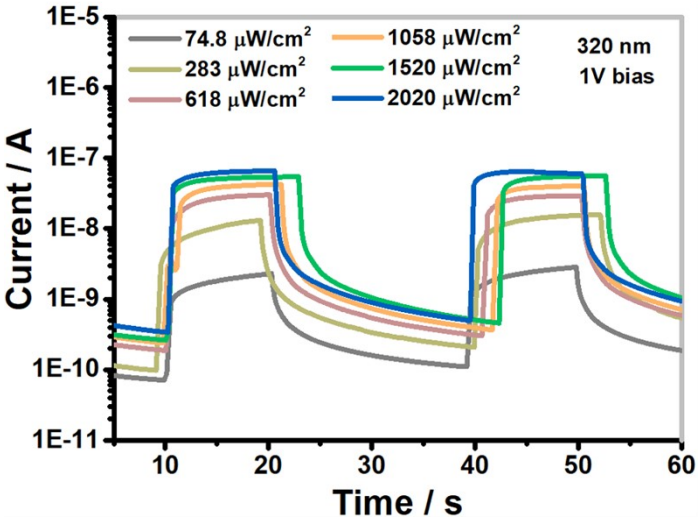

Fig. S5 The time-dependent photocurrent response at 1 V bias for BTO@mTO upon light illumination under 320 nm.

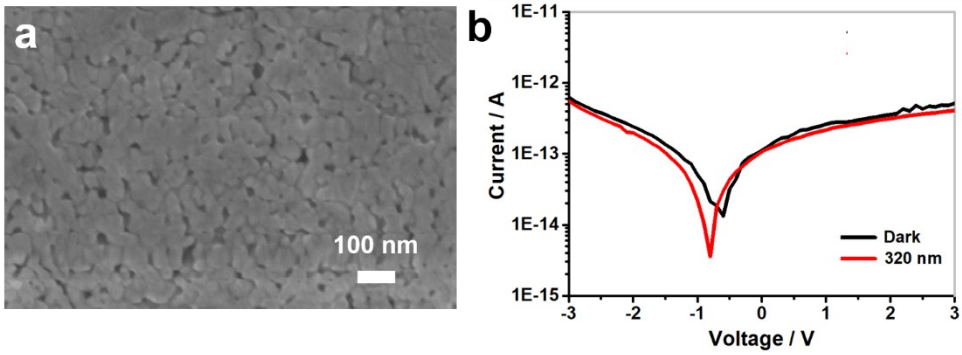

Fig. S6 (a) SEM image of BTO film. (b) the corresponding I-V curve.

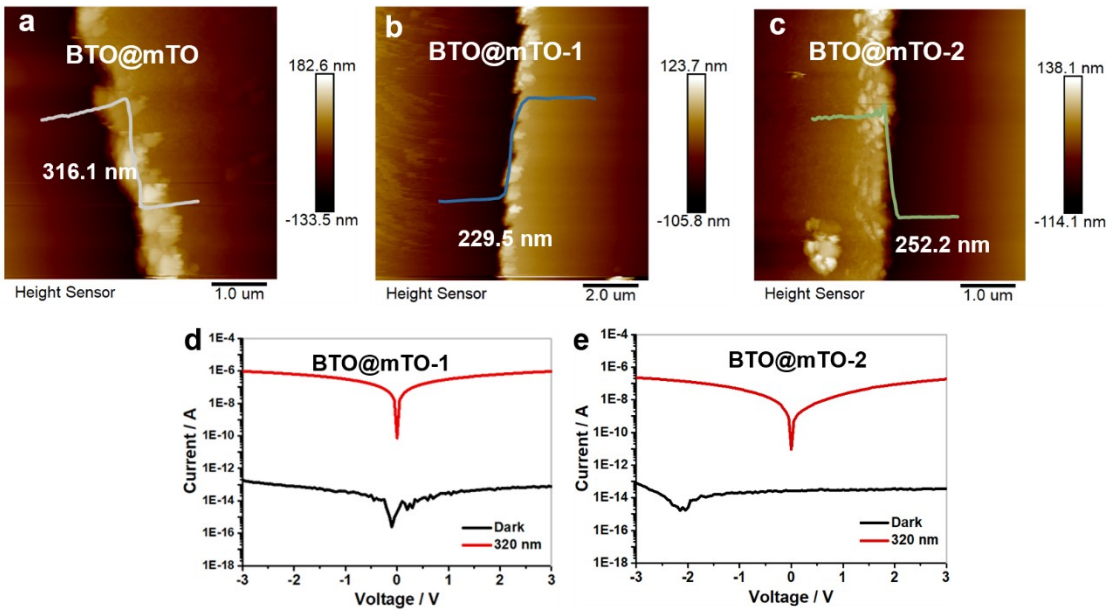

Fig. S7 The AFM images: (a) BTO@mTO, (b) BTO@mTO-1, (c) BTO@mTO-2. The corresponding I-V curves: (d) BTO@mTO-1, (e) BTO@mTO-2.

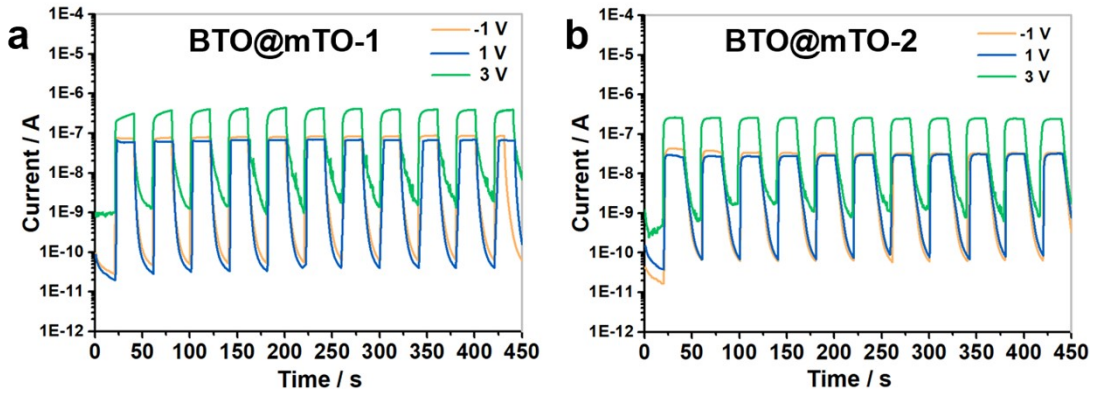

Fig. S8 (a) and (b) The semilogarithmic I-t curves under 320 nm illumination on/off switching at different bias of BTO@mTO-1 and BTO@mTO-2.

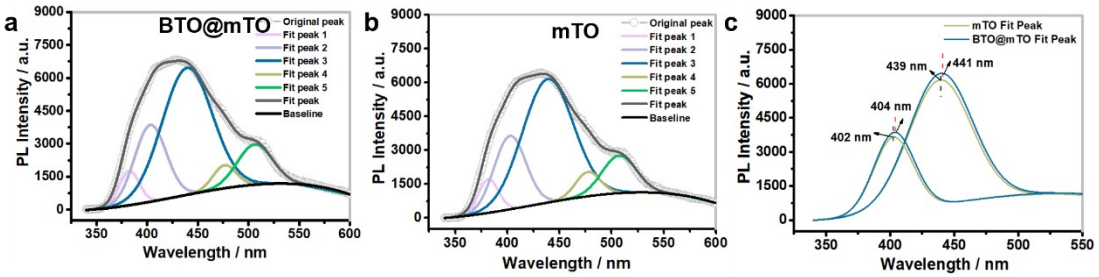

Fig. S9 (a) and (b) The Gaussian-fitted low-temperature PL emission spectrum of BTO-mTO film and mTO film, (c) The fit PL peaks.

Table S1. Comparison of photoelectric performances for TiO_2-based photodetectors.

Device	Bias /V	Wavelength /nm	Responsivity /AW^{-1}	Detectivity /Jones	I_{ph} /A	Ref
Pristine TiO_2 nanofiber array	10	254	/	/	3.6×10^{-8}	1
TiO_2 nanofiber film	5	350	4×10^{-3}	/	7.0×10^{-8}	2
Y^{3+}-doped TiO_2 nano fiber film	3	350	4.5	1.6×10^{11}	1.6×10^{-6}	3
TiO_2/perovskite nanotube array	1	350	3	/	4.0×10^{-8}	4
TiO_2/CuZnS	0	320	2.1×10^{-3}	/	/	5
TiO_2/P3HT	0	350	0.037×10^{-3}	1.63×10^{10}	/	6
Au/TiO_2/P3HT	0	350	0.25×10^{-3}	2.9×10^{10}	/	6
mTO	1	280	0.29×10^{-3}	1.27×10^{10}	3.2×10^{-8}	This work
BTO@mTO	1	310	8.9×10^{-3}	5.8×10^{10}	1.7×10^{-8}	This work

References

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