

Synthesis and improved photoelectrochemical performances of TiO₂/Black-BaTiO₃/CdS multiple-heterojunction nanoarrays

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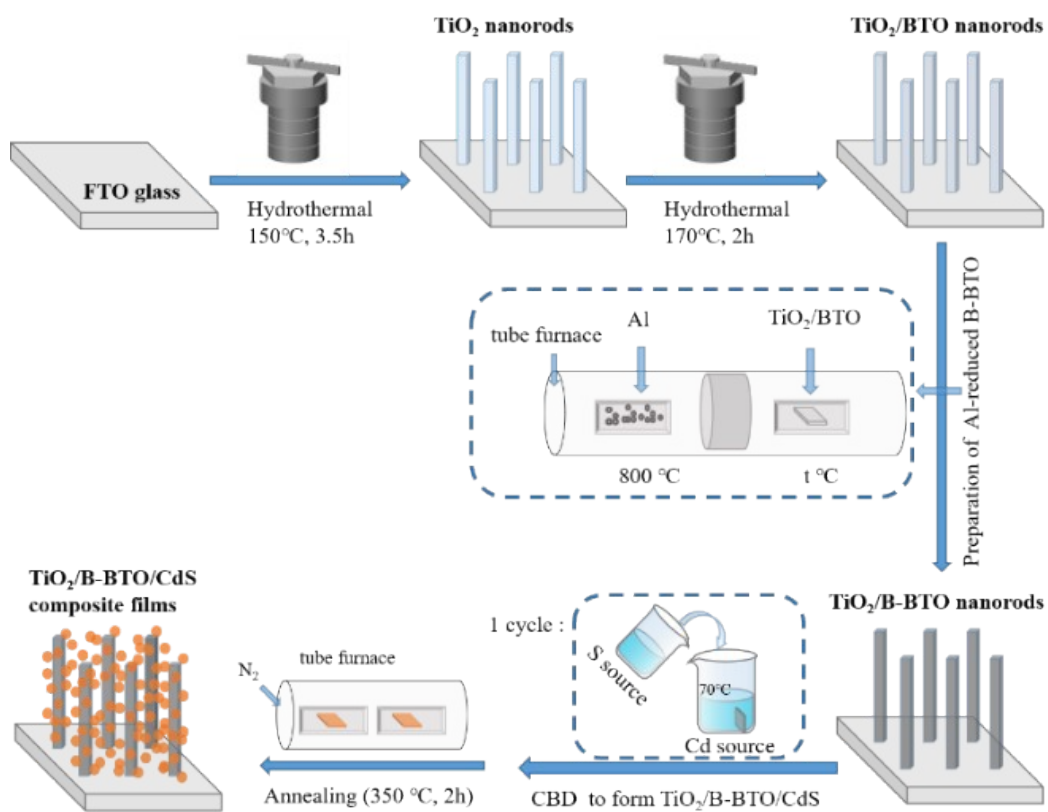


Fig. S1. Schematic synthesis process of $\text{TiO}_2/\text{B-BTO}/\text{CdS}$ composite films.

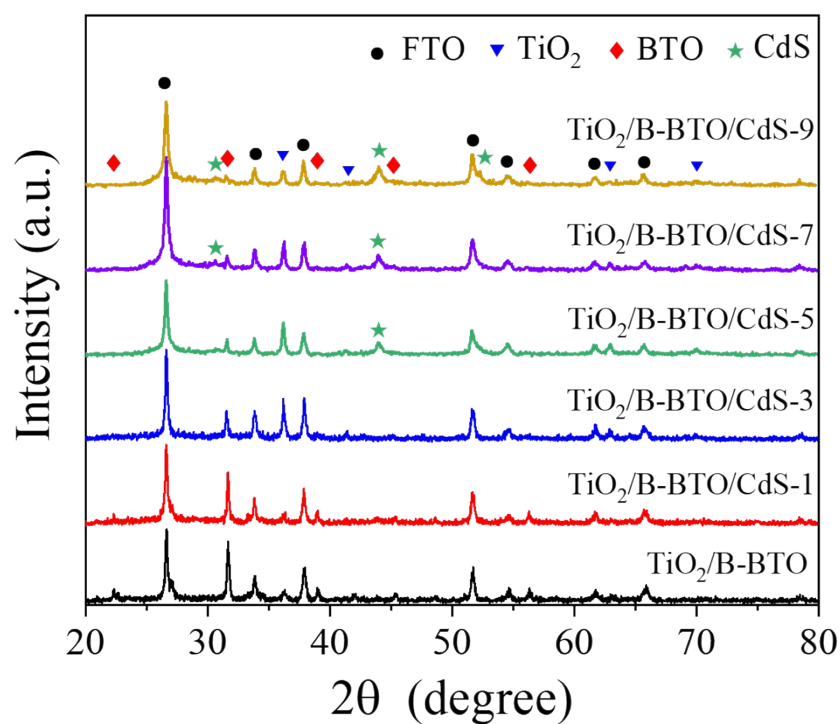


Fig. S2. XRD plots of TiO₂/B-BTO and TiO₂/B-BTO/CdS film samples with different deposition times for CdS layer.

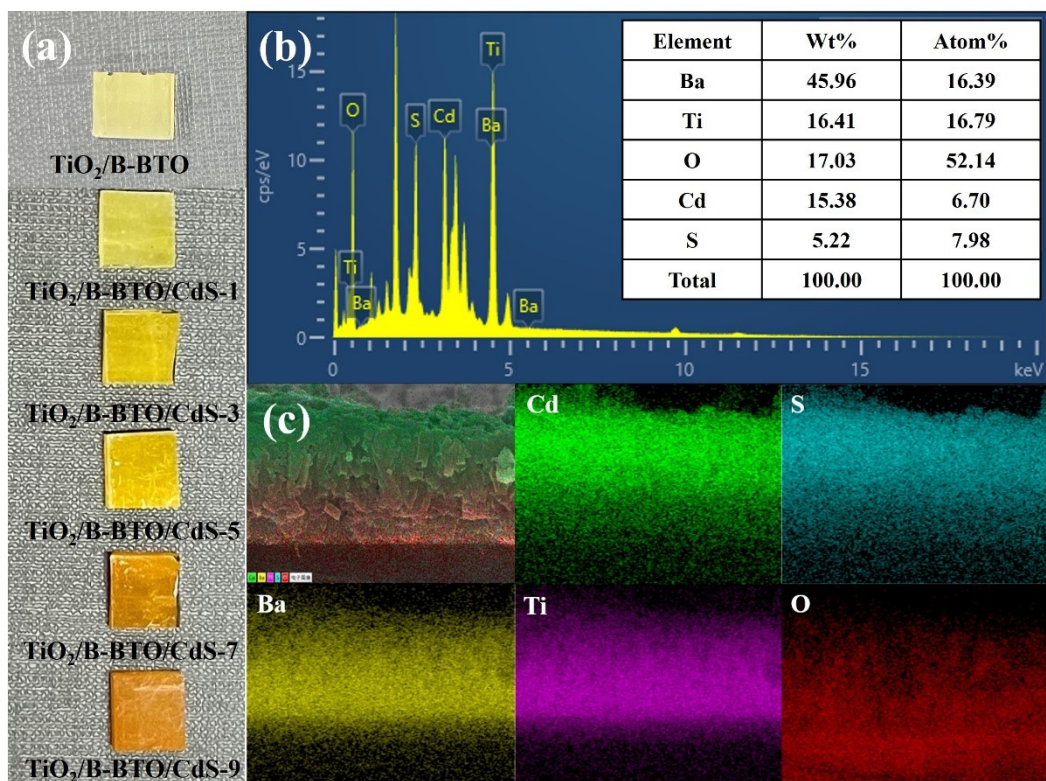


Fig. S3. (a) Optical photographs of TiO₂/B-BTO/CdS composite films with different deposition times for CdS layer. (b) EDS results and (c) elemental mapping images of TiO₂/B-BTO/CdS composite film.

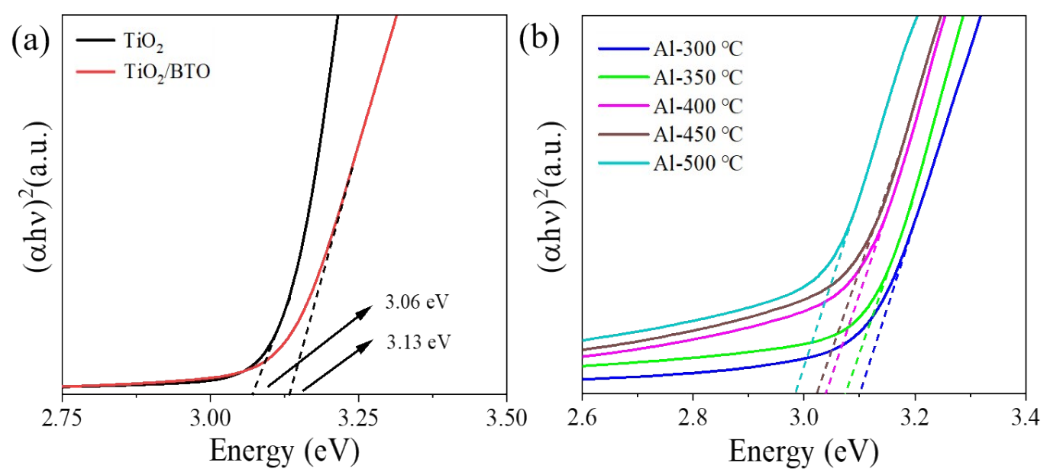


Fig. S4. The optical bandgaps of TiO_2 , TiO_2/BTO (a) and $\text{TiO}_2/\text{B-BTO}$ (b) film samples.

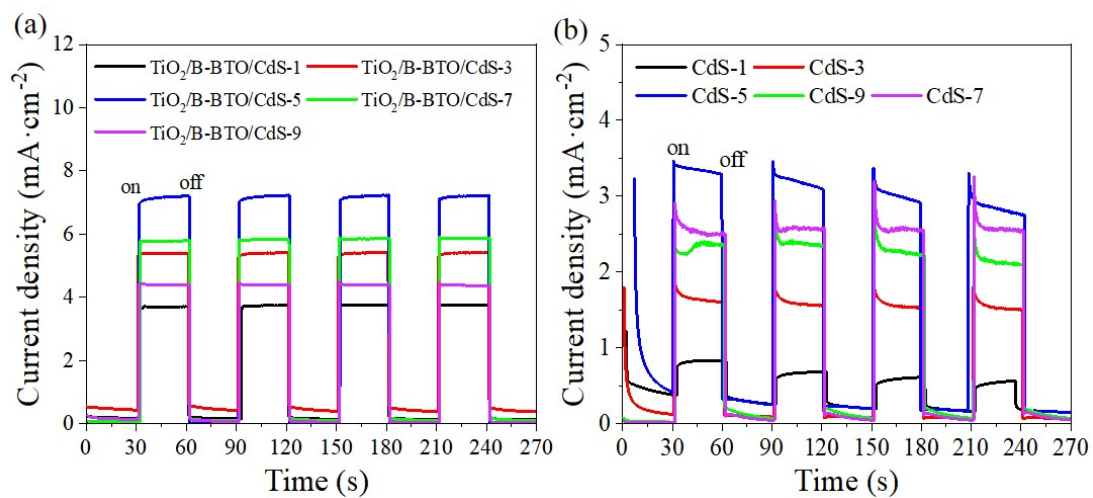


Fig. S5. Photocurrent densities of TiO₂/B-BTO/CdS (a) and CdS (b) photoelectrodes with different deposition times for CdS layer.

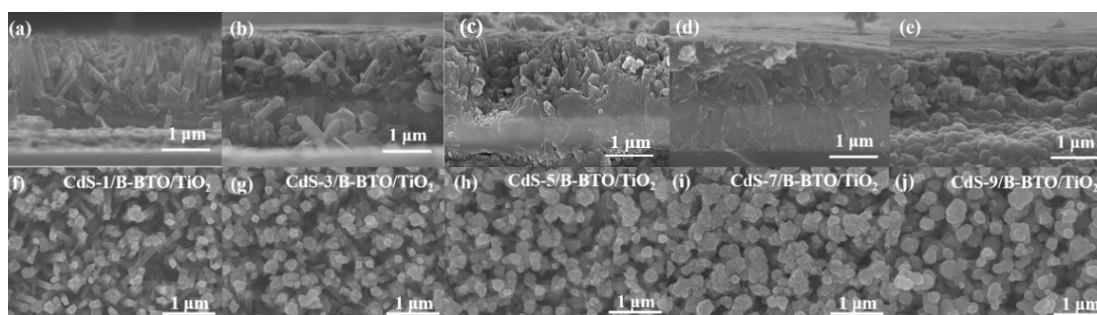


Fig. S6. SEM images of cross-section (a-e) and corresponding surface (f-j) diagram of TiO₂/B-BTO/CdS film samples with different deposition times for CdS layer.

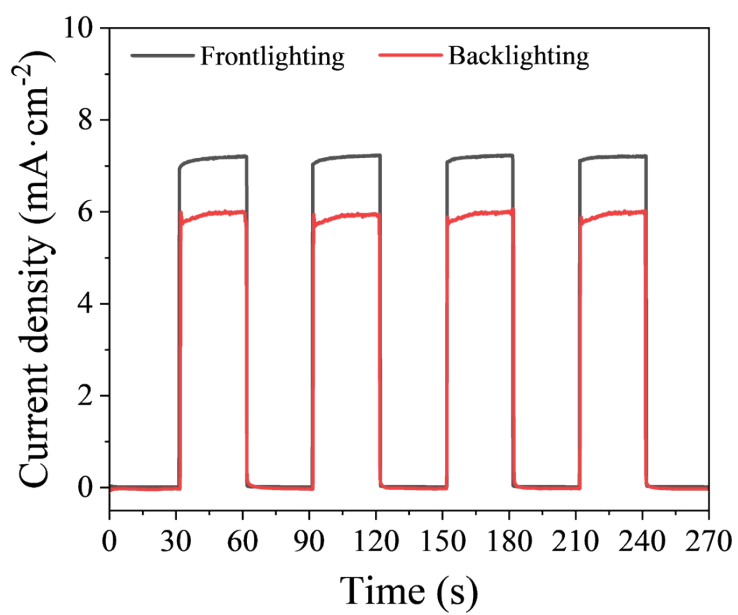


Fig. S7. Photocurrent density of TiO₂/B-BTO/CdS-5 samples under frontside and backside illumination.

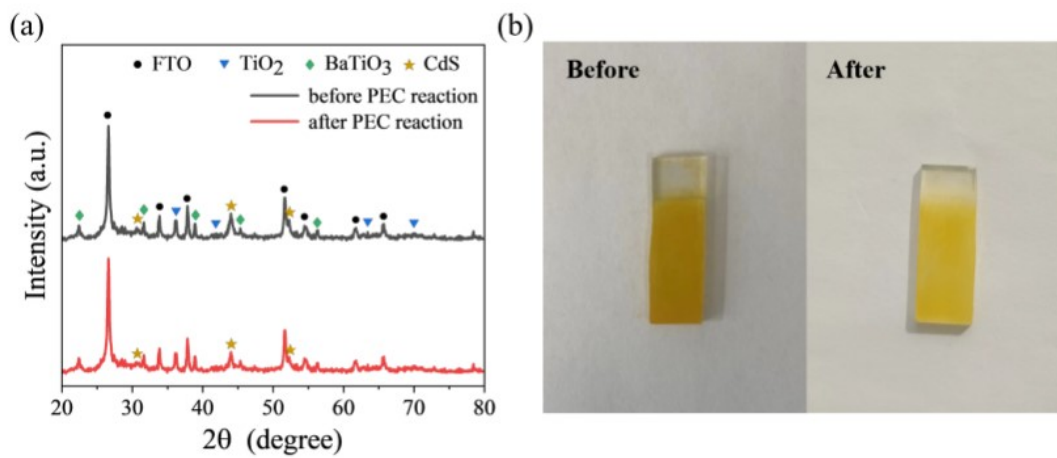


Fig. S8. The XRD patterns (a) and optical photographs (b) of TiO₂/B-BTO/CdS composite films before and after PEC reactions.

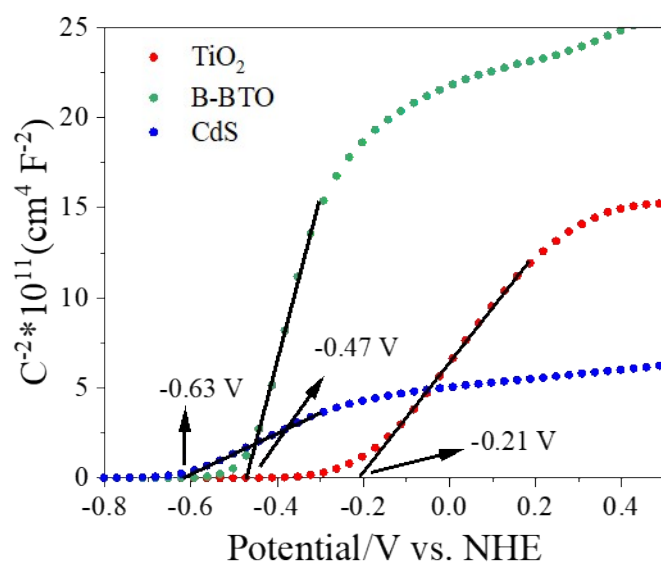


Fig. S9. The Mott-Schottky plots of TiO_2 , B-BTO and CdS film samples.

Table S1. PEC performance comparison of recent reports from literatures.

Materials	Photocurrent density (mA cm ⁻²)	Potential (V vs. RHE)	refs
TiO ₂ TASNTPC	1.1	1.22	[1]
TiO ₂ NTAs	0.73	1.23	[2]
BaTiO _{3-x} -5%	0.77	1.23	[3]
BaTiO ₃	0.35	1.23	[3]
BaTiO ₃ /CdS	0.5	0.96	[4]
BaTiO ₃ /BaTiO _{3-x} /CdS	0.1	0.96	[5]
BaTiO ₃ @ α -Fe ₂ O ₃	0.37	0.96	[6]
H:TiO ₂	1.97	0.4	[7]
TiO ₂ /BTO NW	1.3	1.23	[8]
TiO ₂ -SrTiO ₃ NWs	1.43	1.23	[9]
TiO ₂ /BTO/Ag ₂ O	1.8	1.8	[10]
TiO ₂ /B-BTO/CdS	7.14	0.96	this work

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