

Supporting Information

In situ construction of Bi₅O₇I/Bi₄Ti₃O₁₂ heterostructure composite with plentiful phase interfaces for boosted selective oxidation of benzylic alcohols under visible light

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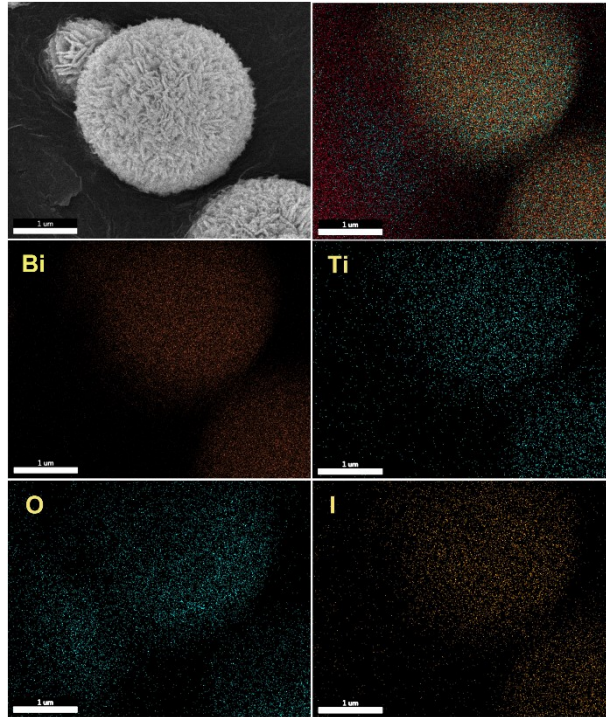


Fig. S1 SEM/EDS mapping of BOI/BTO-1.5.

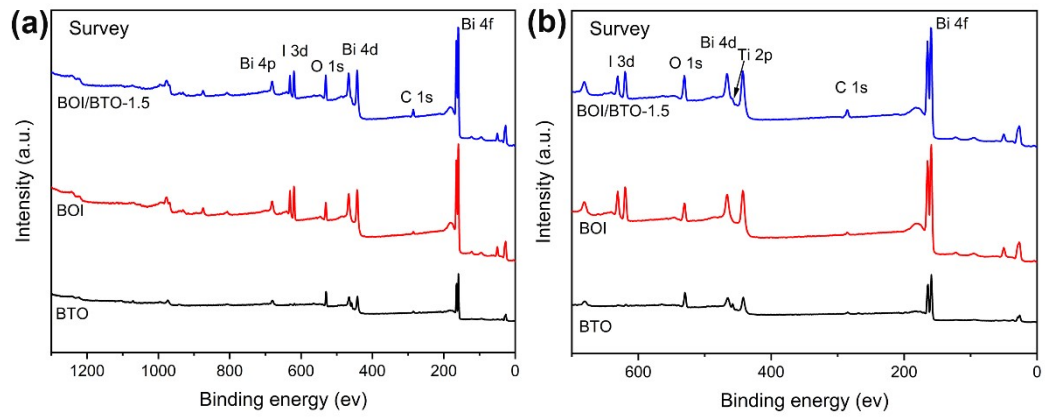


Fig. S2 (a) The survey XPS spectra of BOI, BTO and BOI/BTO-1.5; (b) the survey XPS spectra enlarged view of BOI, BTO and BOI/BTO-1.5.

Table S1 Physicochemical parameters of different samples

Sample	Surface area (m ² . g ⁻¹)	Pore volume (cm ³ .g ⁻¹)	Pore diameter (nm)
BOI	3.15	0.03	90.42
BTO	2.25	0.01	69.34
BOI/BTO-1	19.95	0.17	32.72
BOI/BTO-1.5	25.63	0.18	24.83
BOI/BTO-2	25.07	0.20	27.78
BOI/BTO-3	23.86	0.25	47.20

Table S2 Photocatalytic activity for the oxidation of 4-MBA over BOI/BTO-1.5 with different amount of catalyst^[a]

Entry	Catalyst amount (mg)	4-MBA/H ₂ O ₂ (molar ratio)	Time (h)	hν ^[b]	Conversion (%)	Selectivity (%)
1	5	1:2	8	+	14.6	72.3
2	20	1:2	8	+	20.1	88.3
3	50	1:2	8	+	22.8	90.6
4	80	1:2	8	+	23.0	80.0
5	100	1:2	8	+	37.5	29.4

^[a] Reaction conditions: catalyst (BOI/BTO-1.5), 4-MBA (0.2 mmol), DMF (5 mL), H₂O₂ (0.4 mmol), in the air^[b] Visible light (λ > 420 nm)**Table S3** Photocatalytic activity for the oxidation of 4-MBA over BOI/BTO-1.5 with different molar ratios of 4-MBA/H₂O₂^[a]

Entry	Catalyst	4-MBA/H ₂ O ₂ (molar ratio)	Time (h)	hν ^[b]	Conversion (%)	Selectivity (%)
1	BOT/BTO-1.5	1:1	8	+	20.2	92.4
2	BOT/BTO-1.5	1:1.5	8	+	21.4	91.6
3	BOT/BTO-1.5	1:2	8	+	22.8	90.6
4	BOT/BTO-1.5	1:2.5	8	+	23.7	65.0
5	BOT/BTO-1.5	1:3	8	+	26.3	48.7
6	BOT/BTO-1.5	1:4	8	+	29.4	43.6

^[a] Reaction conditions: catalyst (BOI/BTO-1.5, 50 mg), 4-MBA (0.2 mmol), DMF (5 mL), in the air^[b] Visible light (λ > 420 nm)

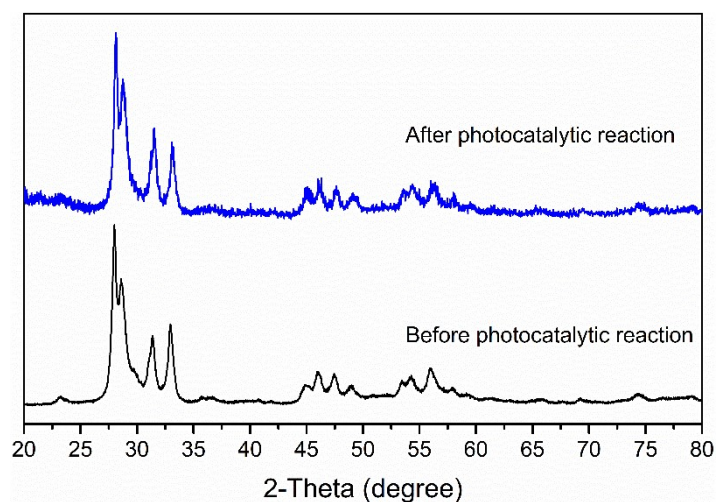


Fig. S3 XRD patterns of the fresh and four cycles used BOI/BTO-1.5.

Table S4 BiOI-based photocatalysts for photocatalytic oxidation of benzylic alcohols

Catalyst	Operating condition	Conversion (%)	Selectivity (%)	Reference
Bi ₂ MoO ₆ -Vo-poor	Visible-light irradiation	7.1	91.0	77
Bi ₂ MoO ₆ -Vo-rich	4 h, O ₂	38.2	>99	
BiOCl/Bi ₂ WO ₆	Visible-light irradiation 4 h, O ₂	22.5	-	62
BiOBr/Bi ₂ WO ₆		30.9	-	
BiOI/Bi ₂ WO ₆	Visible-light irradiation 1 h, O ₂	13.0	-	63
0.3 wt% Pt/Bi ₂ MoO ₆		36.0	>99	
Bi ₁₂ O ₁₇ Cl ₂	Visible-light irradiation 8 h, O ₂ , 50 °C	44.0	>99	64
BOI/BTO	Visible-light irradiation 8 h, H ₂ O ₂	20.2	92	Our work