SUPPORTING INFORMATION

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In-Situ Synthesis of CQDs/BiOBr Material via Mechanical Ball Milling with Enhanced Photocatalytic Performances

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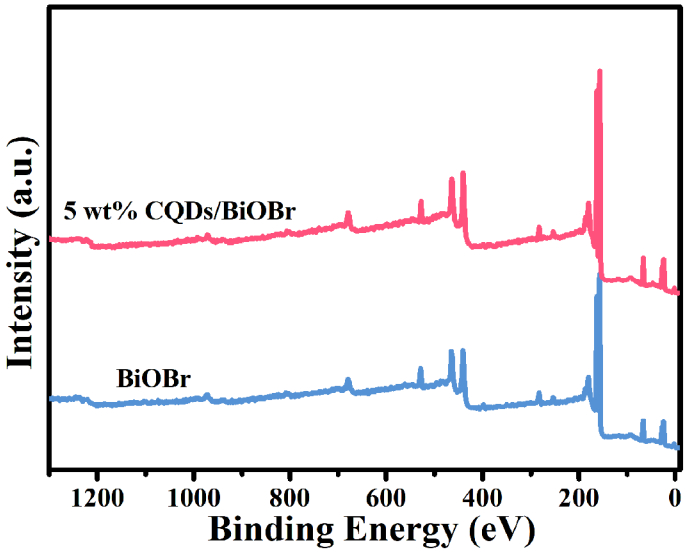

Figure S1. Survey of the BiOBr and 5.0 wt% CQDs/BiOBr composite.

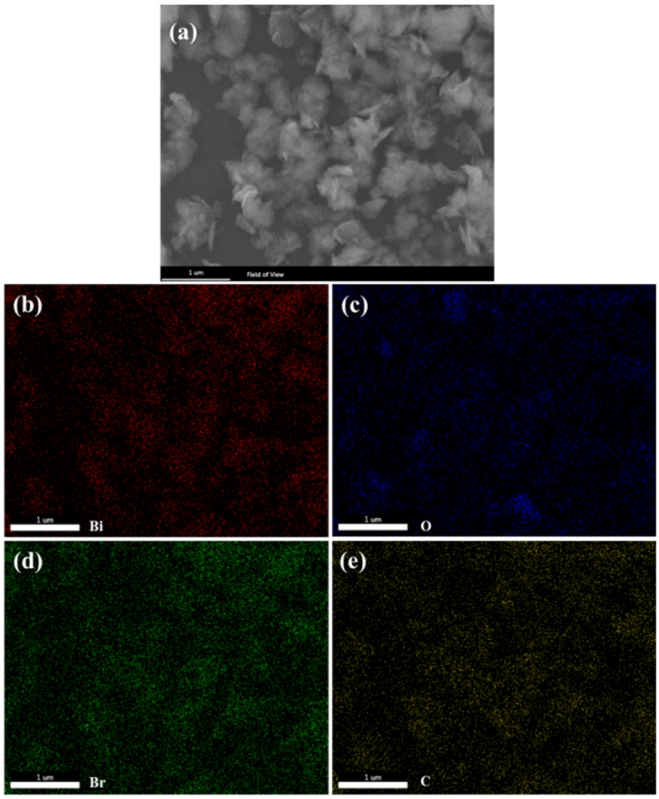

Figure S2. SEM image (a) of 5.0 wt% CQDs/BiOBr and corresponding elemental mapping images of (b) Bi, (c) O, (d) Br and (e) C.

Different Synthetic Methods. Solvothermal method: 1 mmol $Bi(NO_3)_3 \cdot 5H_2O$ and 1 mmol $[C_{16}mim]Br$ were added into a beaker, and 20 mL distilled water was added into the beaker. They were dispersed evenly by ultrasound. Then the above solution was stirred for 30 min. The solution was transferred into a 25 mL Teflon-lined autoclave and heated to 140 ℃ for 24 h. The product was washed three times with distilled water and ethanol, and dried at 60 ℃ for 6 h. Finally, the white powder sample was BiOBr and named as BiOBr-H. The synthesis steps of 5 wt% CQDs/BiOBr composites were as the same as that of BiOBr-H. During the synthesis process, 16 mg CQDs need to be added. The final samples were named as 5 wt% CQDs/BiOBr-H.

Physical mixing method: 1 mmol BiOBr prepared via mechanical ball milling and 16 mg CQDs were weighed accurately. They were mixed evenly by grinding. The obtained samples were named as 5 wt% CQDs/BiOBr-PM.

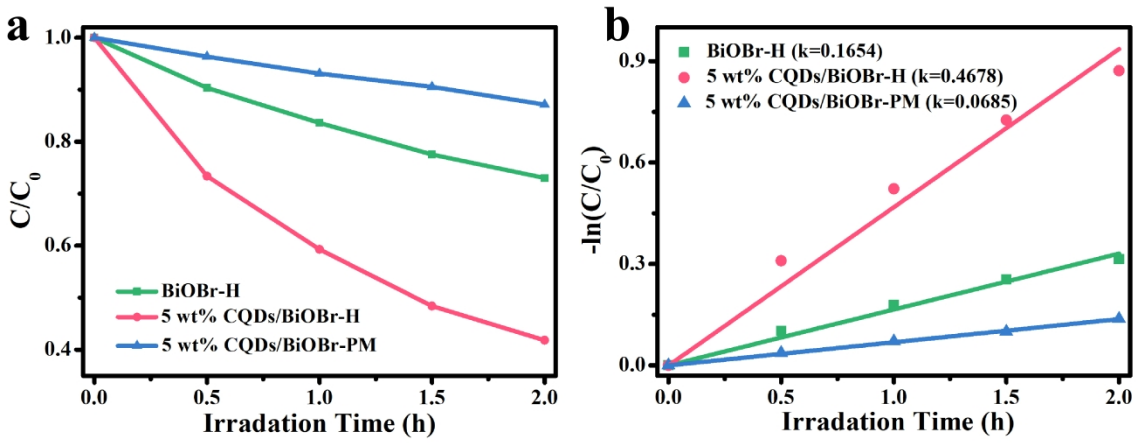

Figure S3. Photocatalytic performance of BiOBr-H, 5 wt% CQDs/BiOBr-H and 5 wt% CQDs/BiOBr-PM for degradation of TC under visible light irradiation, (b) Reaction kinetics for degradation of TC.

Different Br Sources. KBr was selected as Br source for the preparation of BiOBr: 1 mmol $Bi(NO_3)_3·5H_2O$ and 1 mmol KBr were mixed into an agate ball milling tank with a volume of 50 mL. The ball mill ran at 1200 rpm for 60 min under normal temperature and pressure. The samples were directly washed with distilled water and ethanol for three times and dried at 60 ℃ for 6 h. The obtained samples were named as BiOBr-K.

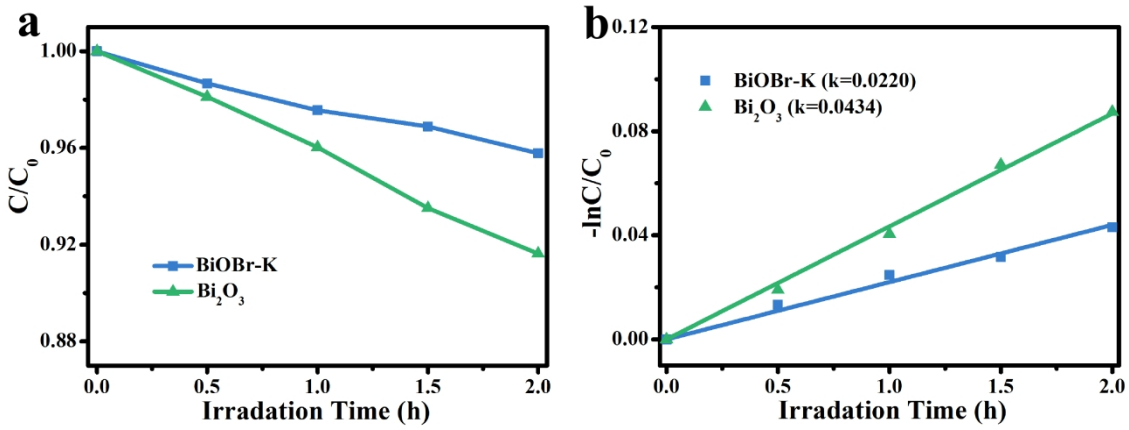

Figure S4. Photocatalytic performance of BiOBr-K and the commercial Bi_2O_3 for degradation of TC under visible light irradiation, (b) Reaction kinetics for degradation of TC.

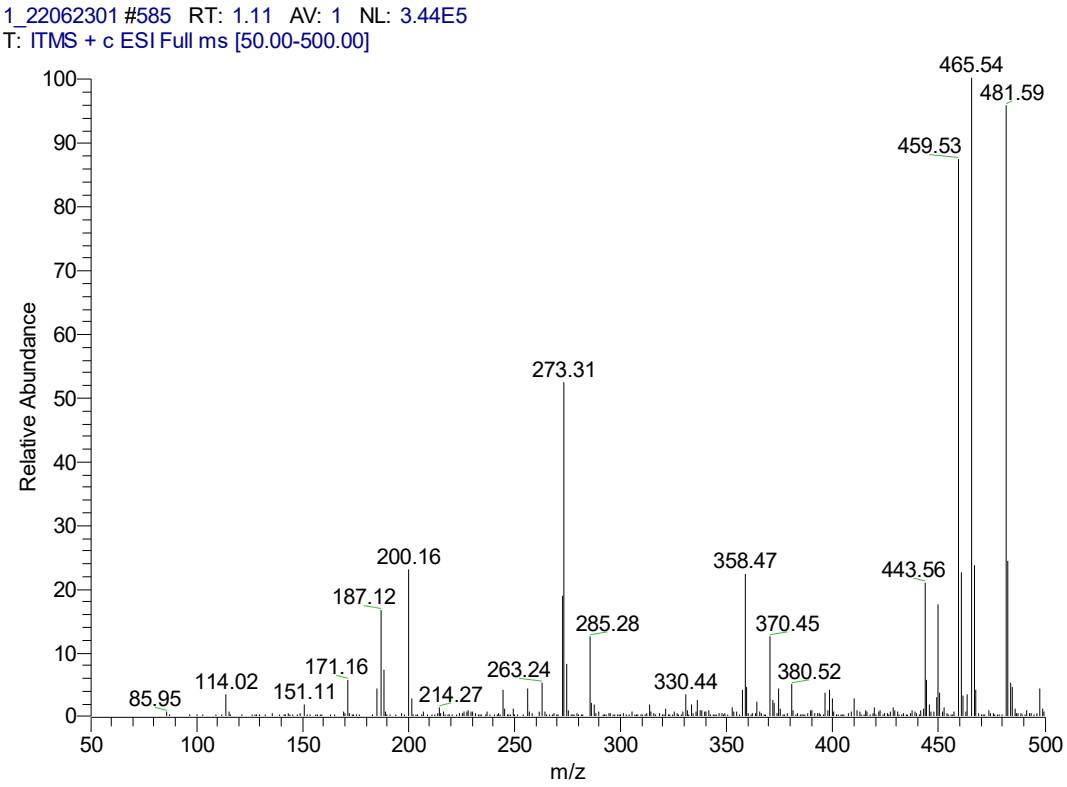

Figure S5. The mass spectra of TC and its intermediates that appeared during the photodegradation process.

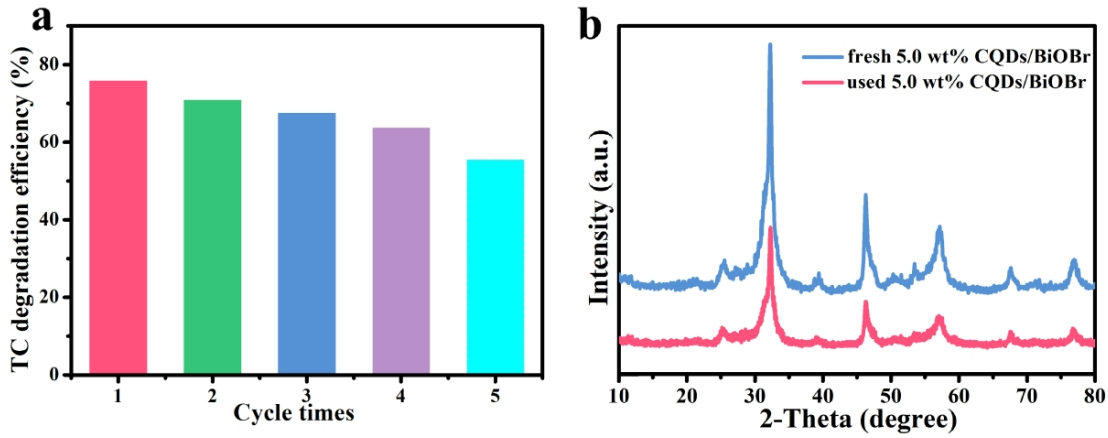

Figure S6. (a) Circulating experiments for photocatalytic degradation of TC in the presence of 5.0 wt% CQDs/BiOBr, (b) XRD patterns of the 5.0 wt% CQDs/BiOBr before and after the photocatalytic cycle experiments.

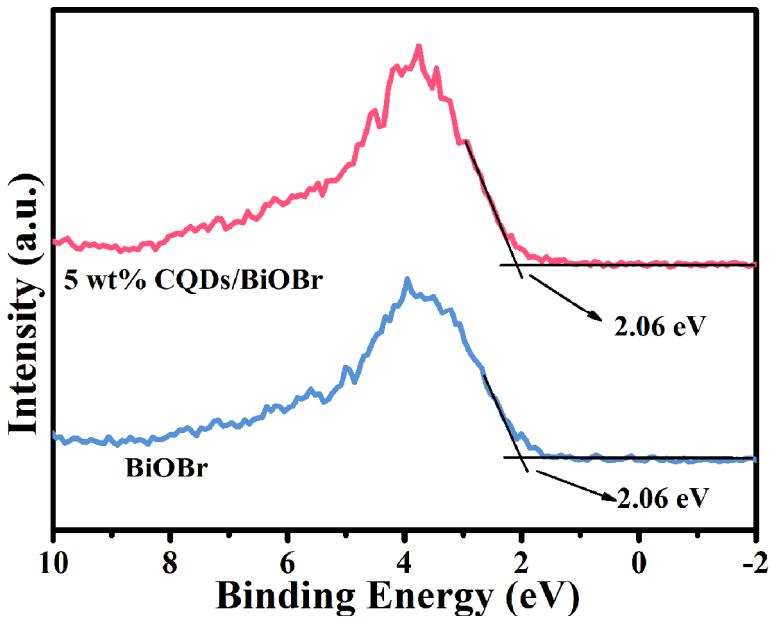

Figure S7. XPS valence-band spectra of pure BiOBr and 5.0 wt% CQDs/BiOBr.

Table S1. Comparison of Synthesis Method, Conditions and Photocatalytic Degradation Activity with BiOBr and CQDs/BiOBr in Other Reported Literature

	Synthesis method	Synthesis conditions	Weight of photocatalyst	Model pollutant	Reaction time	Removal efficiency (BiOBr)	Removal efficiency (CQDs/BiOBr)	Reference
1	mechanical ball milling	room temperature, 60 min	50 mg	TC (100 mL, 20 mg/L)	120 min	40%	76%	This work
2	hydrothermal method	160 ℃, 16 h	100 mg	BPA (100 mL, 15 mg/L)	50 min	11.5%	67.9%	[1]
3	hydrothermal method	160 ℃, 24 h	10 mg	TCH (50 mL, 20 mg/L) Cr(VI) (50 mL, 10 mg/L)	60 min 60 min	45% 9%	66% 44%	[2]
4	hydrothermal method	160 ℃, 12 h	100 mg	RhB (100 mL) CIP (100 mL)	30 min 180 min	83.7% 43.6%	94.3% 65.8%	[3]
5	hydrothermal method	140 ℃, 24 h	30 mg 50 mg 20 mg	TC (100 mL, 20 mg/L) BPA (100 mL, 10 mg/L) RhB (100 mL, 10 mg/L)	120 min 150 min 20 min	30% / 22.7%	60% 73% 91.8%	[4]
6	hydrolysis method	room temperature, 30min	30 mg 30 mg	RhB (100 mL, 10 mg/L) BPA (50 mL, 10 mg/L)	20 min 240 min	67% 10%	92% 96.8%	[5]
7	hydrothermal method	140 ℃, 24 h	20 mg 30 mg 50 mg	RhB (100 mL, 10 mg/L) CIP (100 mL, 10 mg/L) BPA (100 mL, 10 mg/L)	50 min 240 min 180 min	65% 35% 37%	99.8% 68% 55%	[6]
8	solvothermal method	180 ℃, 8 h	100 mg 100 mg	RhB (100 mL, 20 mg/L) PNP (100 mL, 20 mg/L)	145 min 320 min	57% 0%	100% 26%	[7]

n REFERENCES

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