

Supplementary Material

Construction of double S-scheme heterojunctions CeO₂/BHN/I-BiOIO₃ for enhanced photocatalytic degradation of norfloxacin

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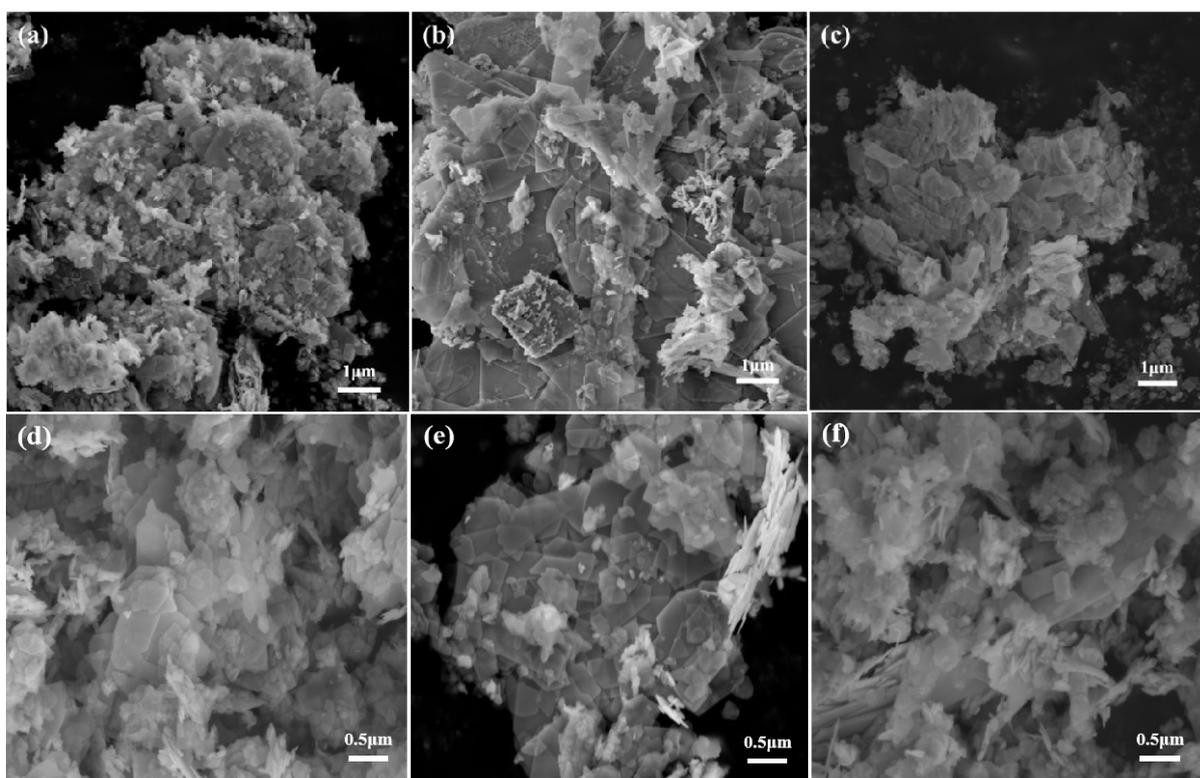


Figure S1. SEM images of (a) BHN/BiOIO₃, (b) CeO₂/BHN/BiOIO₃, (c) BHN/I-BiOIO₃, (d) CeO₂/BHN/I-BiOIO₃-1, (e) CeO₂/BHN/I-BiOIO₃-2, and (f) CeO₂/BHN/I-BiOIO₃-3.

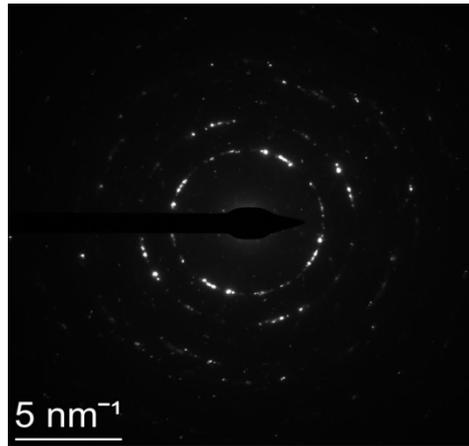


Figure S2. SAED image of CeO₂/BHN/I-BiOIO₃-2.

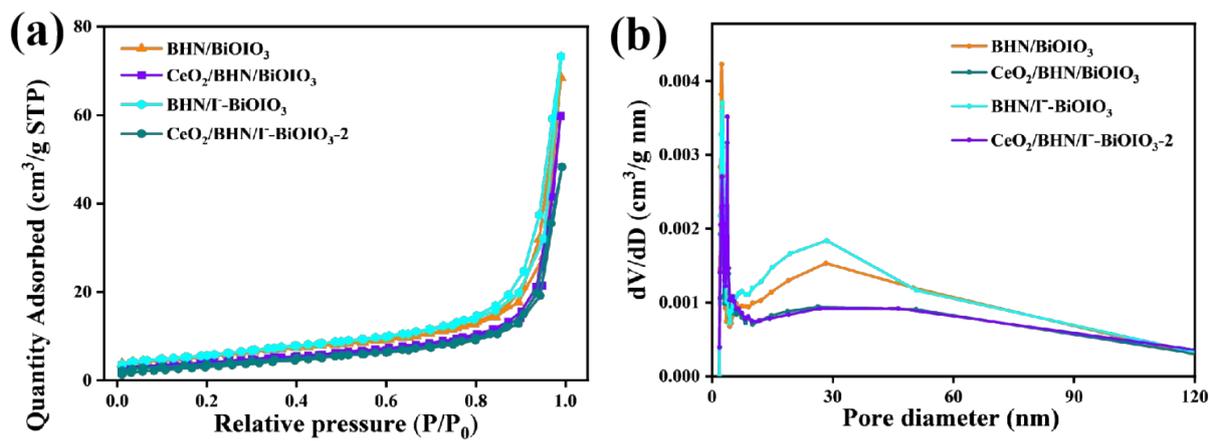


Figure S3. (a) Nitrogen adsorption-desorption isotherms and (b) pore size distributions of samples.

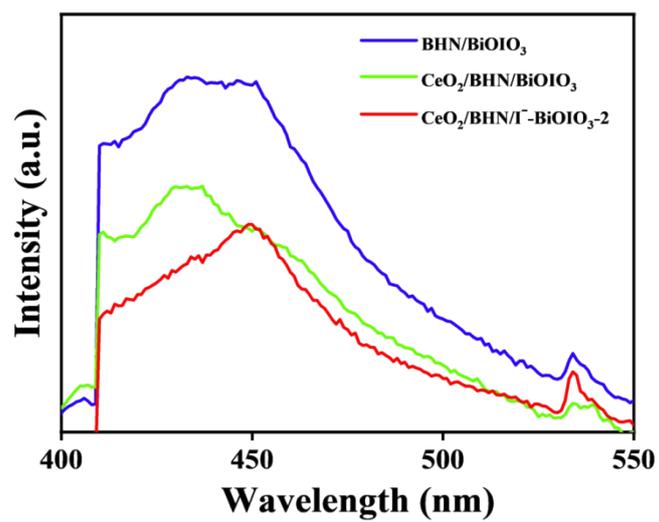


Figure S4. Steady-state photoluminescence (PL) spectra of samples.

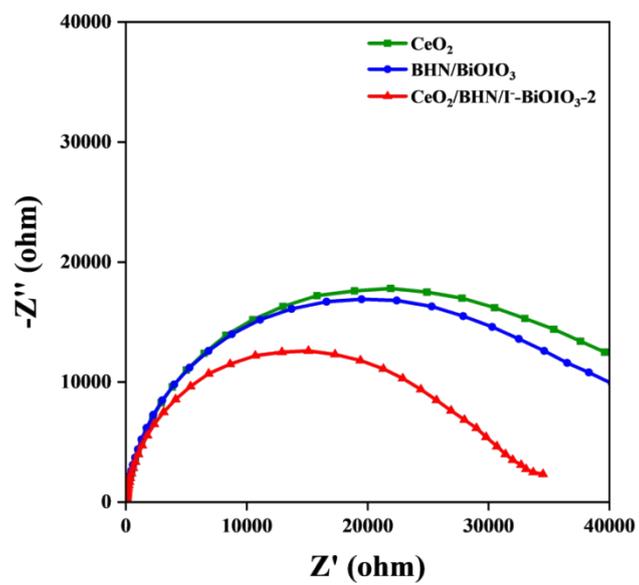


Figure S5. EIS plots of different samples.

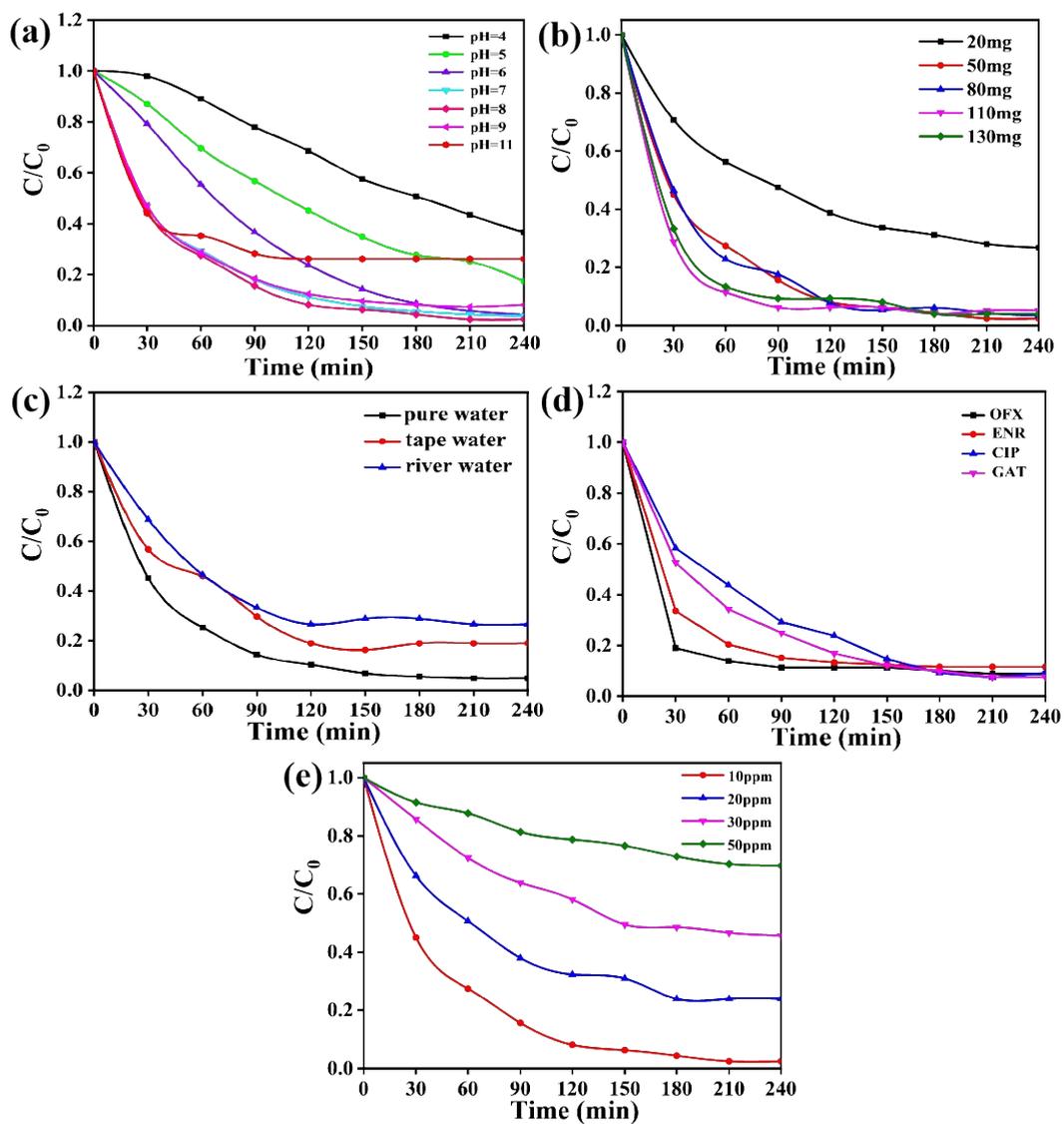


Figure S6. Photocatalytic degradation efficiencies at (a) different pH, (b) different catalyst doses, (c) different water bodies, (d) different antibiotics, and (e) different initial concentrations.

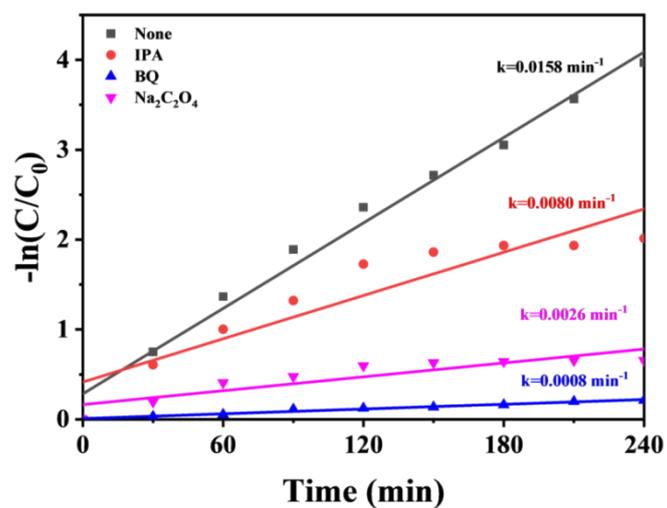


Figure S7. Corresponding quasi-first-order kinetic curves with various capture agents under light irradiation using $\text{CeO}_2/\text{BHN}/\text{I}-\text{BiOIO}_3\text{-2}$.

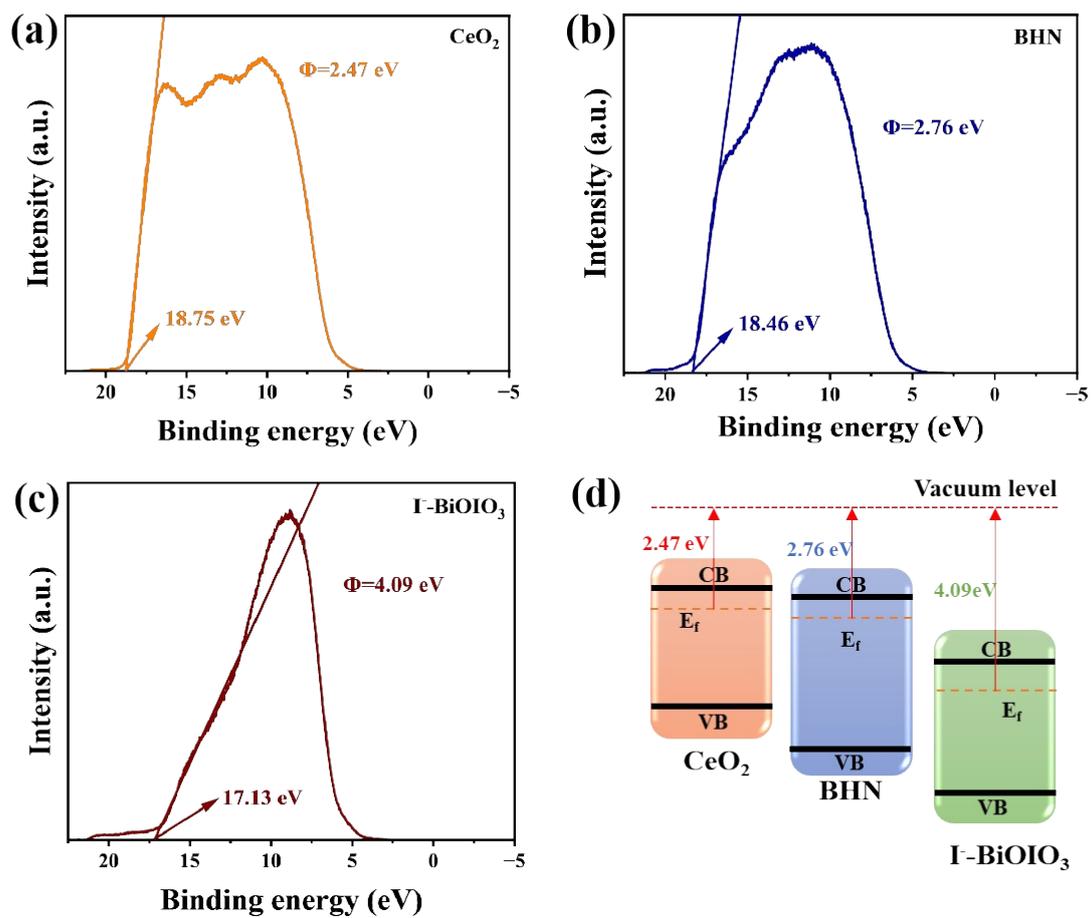


Figure S8. Ultraviolet photoelectron spectroscopy (UPS) of (a) CeO₂, (b) BHN, (c) I-BiOIO₃ and (d) schematic illustration for work functions of CeO₂, BHN and I-BiOIO₃.

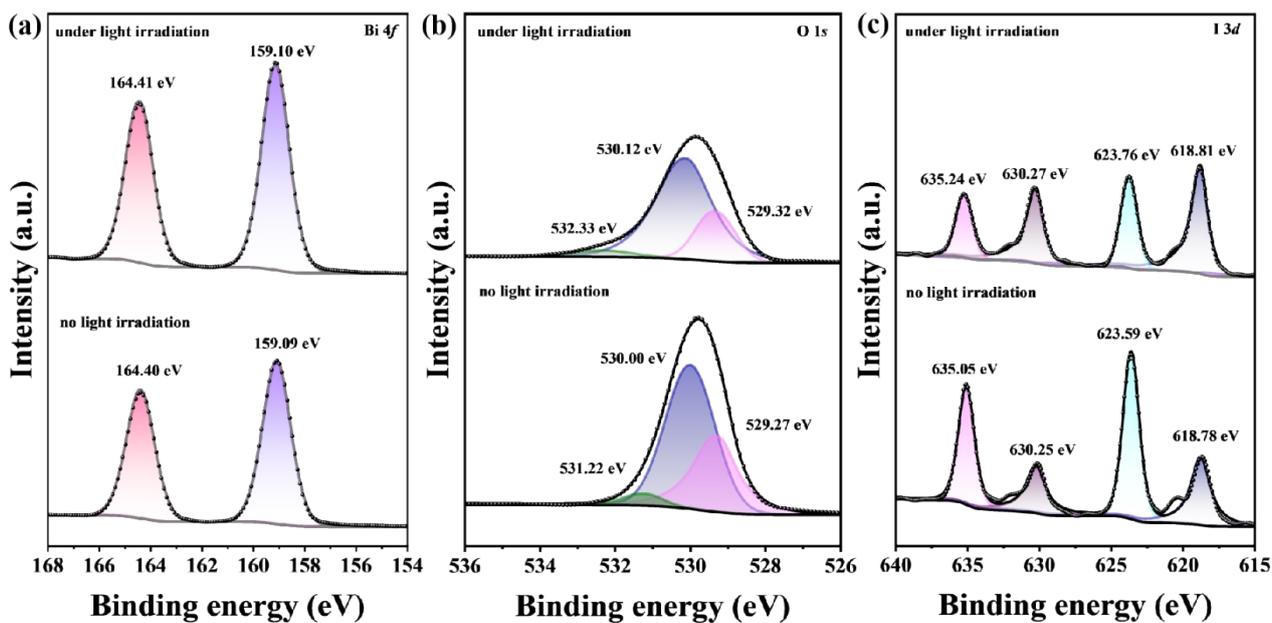


Figure S9. The high-resolution XPS spectra of (a) Bi 4*f*, (b) O 1*s*, and (c) I 3*d* of CeO₂/BHN/I-BiOIO₃-2 with no light irradiation and under light irradiation.

Table S1 The physical properties of the samples.

Samples	BET surface area (m²/g)	Pore volume (cm³/g)
BHN/BiOIO₃	20.2567	0.105994
CeO₂/BHN/BiOIO₃	14.8150	0.092489
BHN/I-BiOIO₃	20.9770	0.113353
CeO₂/BHN/I-BiOIO₃-2	13.4483	0.074682

Table S2 Photocatalytic degradation efficiencies of CeO₂/BHN/I-BiOIO₃-2 in comparison with most recently reported photocatalysts.

Photocatalysts	Degradation efficiencies	References
CeO ₂ /BHN/I-BiOIO ₃ -2	97.50 %	This work
ErBO ₃	89.60 %	[1]
V ₂ O ₅ /BiOCl-TiO ₂	90.20 %	[2]
SiP/TiO ₂	90.89 %	[3]
CoWO ₄ /ZnFe ₂ O ₄	88.15 %	[4]
InOOH/RCN/CoWO ₄	94.00 %	[5]
rGO/Bi ₂ WO ₆	87.49 %	[6]
CdS@ZnIn ₂ S ₄	90.80 %	[7]
L _{0.5} -ZCS@LDHs-V _{Zn} +O	89.00 %	[8]

Table S3 Intermediates in the photodegradation of NFX.

Products	m/z	Molecular formula	Structural formula
NFX	320	C ₁₆ H ₁₈ FN ₃ O ₃	
P1	350	C ₁₆ H ₁₆ FN ₃ O ₅	
P2	294	C ₁₄ H ₁₆ O ₃ FN ₃	
P3	251	C ₁₂ H ₁₁ O ₃ FN ₂	
P4	292	C ₁₅ H ₁₈ O ₂ FN ₃	
P5	278	C ₁₅ H ₂₀ OFN ₃	
P6	276	C ₁₅ H ₂₁ O ₂ N ₃	
P7	318	C ₁₆ H ₁₉ O ₄ N ₃	
P8	274	C ₁₅ H ₁₉ O ₂ N ₃	
P9	258	C ₁₅ H ₁₉ ON ₃	

References

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