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Supplementary Information

Enhancing aqueous pollutants photodegradation via Fermi level matched Z-

scheme BiOI/Pt/g-C₃N₄ photocatalyst: unobstructed photogenerated charge

behavior and degradation pathway exploration

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Product	m/z	Formula	Proposed structure
ТСН	445	$\mathrm{C}_{22}\mathrm{H}_{24}\mathrm{N}_{2}\mathrm{O}_{8}$	H ₃ C OH
P1	461	C ₂₂ H ₂₄ N ₂ O ₉	$\begin{array}{c} OH \\ H_{3}C \\ H_{3}C \\ \end{array} OH \\ H_{3}C \\ CH_{3} \\ \end{array} OH \\ OH \\ H_{3}C \\ CH_{3} \\$
Р2	416	$\mathrm{C_{20}H_{20}N_{2}O_{8}}$	$\begin{array}{c} OH \\ H_{3}C \\ H_{4}C \\ $
Р3	374	C ₂₀ H ₂₄ NO ₆	$\begin{array}{c} OH \\ \hline \\ OH \\ \hline \\ OH \\ H_3C \\ CH_3 \end{array}$
Р4	357	C ₂₀ H ₂₃ NO ₅	
Р5	400	$C_{20}H_{20}N_2O_7$	OH O OH OH O O H OH

 Table S1 The possible intermediates products of TCH degradation.

P6	352	C ₁₆ H ₁₆ O ₉	ОН О ОН ОН СООН
P7	335	C ₁₆ H ₁₅ O ₈	
P8	259	C ₁₅ H ₁₅ O ₄	СНО
Р9	244	C ₁₄ H ₁₂ O ₄	OH O OH
P10	228	C ₁₄ H ₁₂ O ₃	
P11	274	C ₁₅ H ₁₄ O ₅	о он он соон
P12	212	C ₁₄ H ₁₂ O ₂	



Fig. S1 EDX analysis of BiOI/1% Pt/g-C $_3N_4$.



Fig. S2 colors of as-prepared photocatalysts.



Fig. S3 Survey XPS spectra of BiOI/1% Pt/g- $C_3N_{4.}$

The neglected loss of phenol by visible light irradiation could be observed, indicating that the visible light irradiation had no effect on the phenol degradation. The photocatalytic degradation efficiency could achieve 30.2% in the presence of BiOI/g-C₃N₄. Notably, the photocatalytic performance of BiOI/Pt/g-C₃N₄ with different mass ratio of Pt was remarkably enhanced than that of BiOI/g-C₃N₄. The phenol degradation efficiency first increased to 71.2% and then decreased to 42.6% with the increased Pt amount and optimum Pt amount was 1%. It is necessary to emphasize that Pt in all solid-state BiOI/Pt/g-C₃N₄ photocatalyst as a electronic transfer channel would facilitate more photogenerated charges separation and transfer, eventually enhancing the photocatalytic performance. However, excessive loading would block active sites and reduce the possibility of superior performance.

The degradation rate constants were calculated according to the pseudo-first order equation: $\ln (C_0/C) = k_{app} t$ (1). Where C_0 and C were initial phenol concentration and the concentration after t min of visible light illumination, respectively. In Fig. S4b, the degradation rate constant of BiOI/1% Pt/g-C₃N₄ (0.0077 min⁻¹) was 2.3 times higher than that of BiOI/g-C₃N₄ (0.0034 min⁻¹).



Fig. S4(a) Photocatalytic performance of BiOI/g-C₃N₄ and BiOI/Pt/g-C₃N₄ with different mass ratio of Pt for phenol degradation under visible light irradiation and (b) the pesudo-first order kenitics fitting.



Fig. S5 MS spectra of the degraded TCH at different reaction time (a) 0 min (b) 10 min (c) 20 min (d) 30 min.