Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary Material

Facile fabrication of BiOBr-Cu^{2+}/TiO_2 suspension for efficient equipment decontamination

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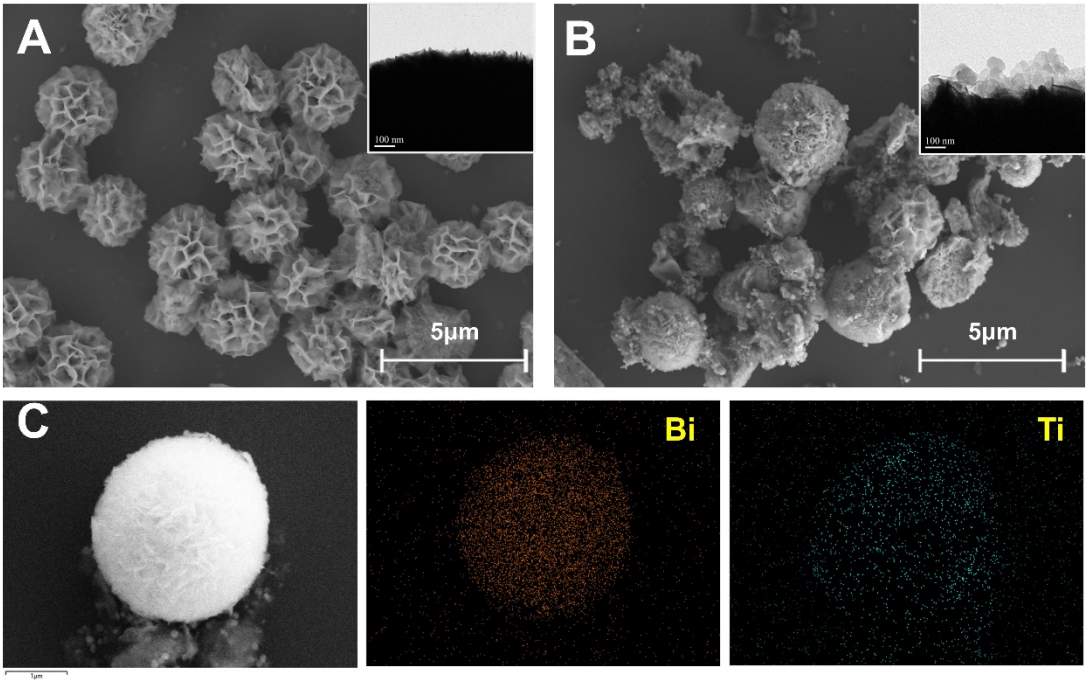

Figure S1 SEM of BiOBr-Cu^{2+} (A) and BiOBr-Cu^{2+}/TiO_2 (B) with the inset of corresponding TEM. Elemental mapping of BiOBr-Cu^{2+}/TiO_2 (C).

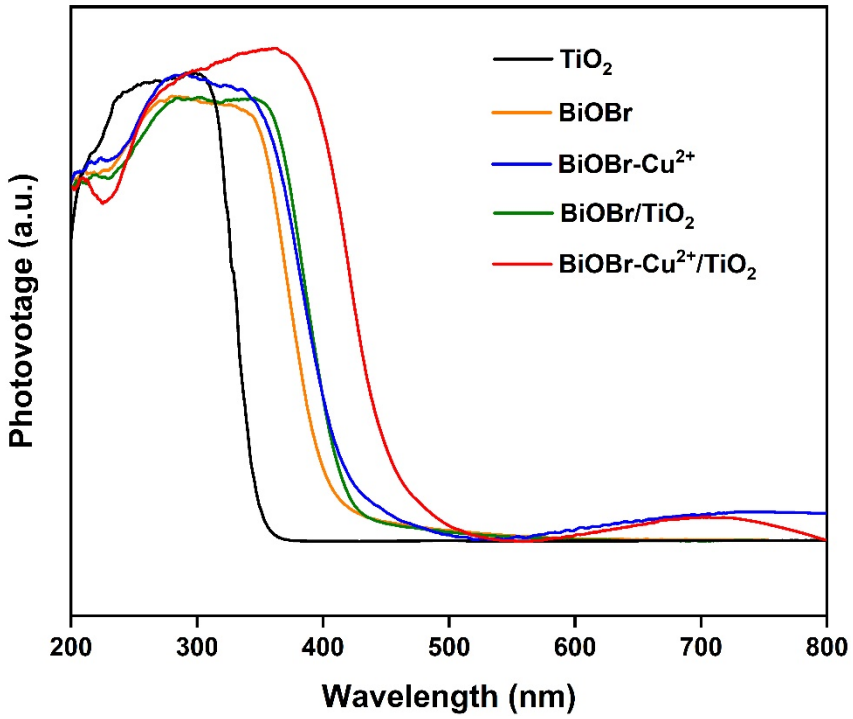

Figure S2 UV–vis DRS of TiO_2, BiOBr, BiOBr-Cu^{2+}, BiOBr/TiO_2, and BiOBr-Cu^{2+}/TiO_2.

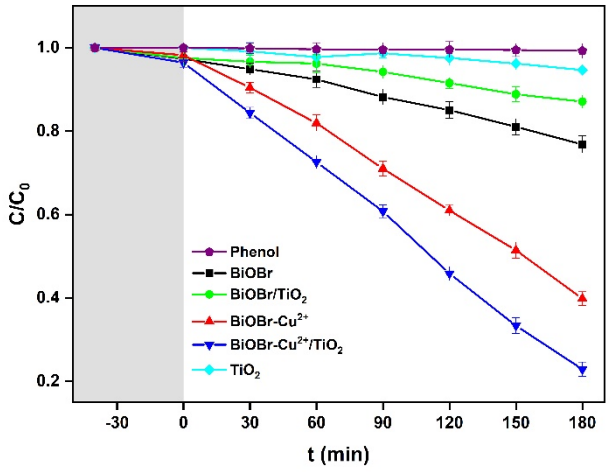

Figure S3 The photodegradation efficiency of phenol on different photocatalysts.

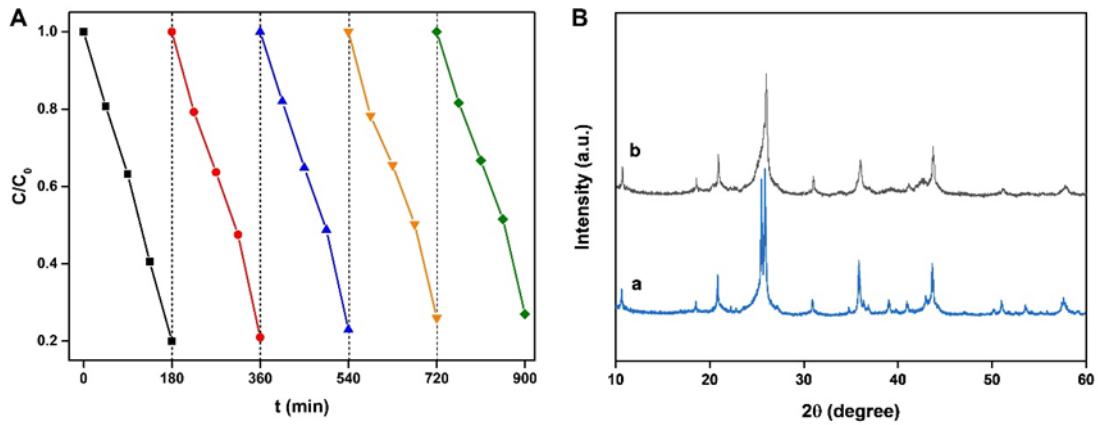

Figure S4. Reusability (A) of BiOBr-Cu^{2+}/TiO_2 on photodegradation of phenol. XRD pattern (B) for fresh (a) and five-times recycled (b) BiOBr-Cu^{2+}/TiO_2 sample.

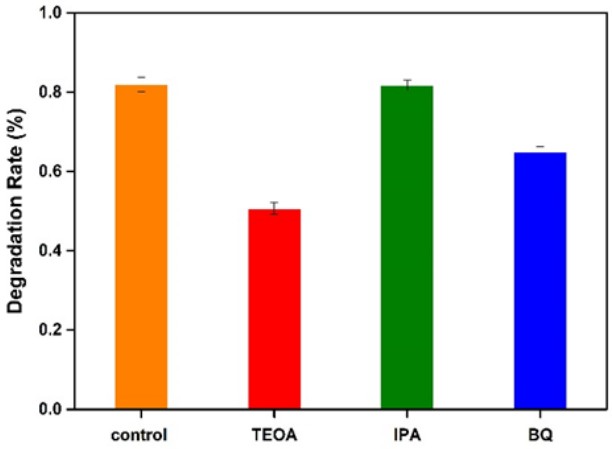

Figure S5. The photocatalytic rate of BiOBr-Cu^{2+}/TiO_2 in the presence of different scavengers.

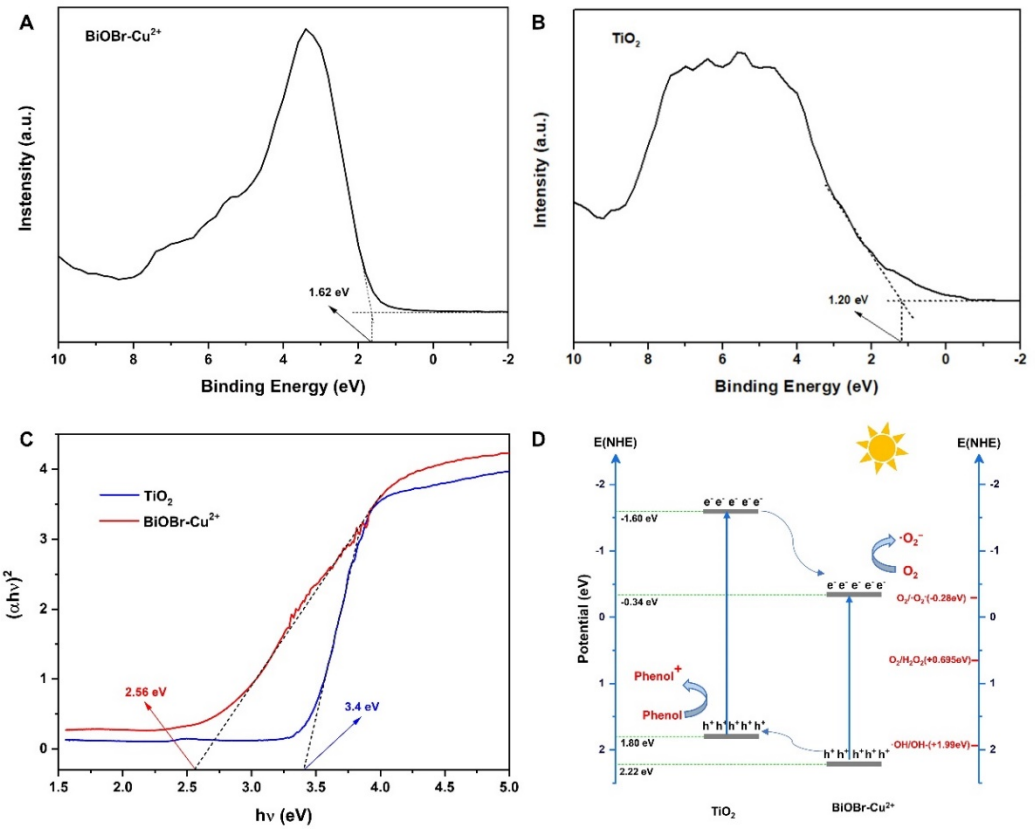

Figure S6. XPS valence-band spectra of BiOBr-Cu^{2+} (A) and TiO_2 (B); Tacu's plot (C) of BiOBr-Cu^{2+}, TiO_2; Possible photocatalytic reactions (D) of BiOBr-Cu^{2+}/TiO_2 heterojunctions

Table S1 The model parameters of pseudo-first order, pseudo-second order, and intraparticle diffusion kinetics.

Kinetic models	Parameters	BiOBr-Cu^{2+}/TiO_2
pseudo-first-order	$Q_{e,f}$[a] (mg g^{-1})	2.98
	k_1 (min^{-1})	0.0837
	R^2	0.993
pseudo-second-order	$Q_{e,s}$[a] (mg g^{-1})	3.58
	k_2 (g mg^{-1} min^{-1})	0.222
	v_0 (mg g^{-1} min^{-1})	0.352
	R^2	0.994
Intraparticle diffusion	k_i (mg L^{-1} $min^{1/2}$)	0.310
	C_i	0.886
	R^2	0.931

Table S2 Comparison of the phenol adsorption and photocatalytic degradation between BiOBr-Cu^{2+}/TiO_2 and other adsorbents reported in the literatures.

Adsorbent	Adsorption		Photodegradation				Ref.
	Adsorption capacity, mg g^{-1}	Equilibrium time, min	Initial concentration, mg L^{-1}	Degradation degree, %	Treatment time, min	Degradation rate, min^{-1}	
BiOBr-Cu^{2+}/TiO_2	2.91	40	10	85.0	180	9.6×10^{-3}	This work
TiO_2/ZnAl	0.15	120	10	55.7	120	6.0×10^{-3}	[R1]
γ-$Al_2O_3TiO_2$	–[a]	60	40	-	360	2.5×10^{-3}	[R2]
ZnAl LDH–SDS	×[b]	60	40	95.0	420	-	[R3]
01%Pd-0.5%Au/TiO_2	-	120	94.11	69	120	5.5×10^{-3}	[R4]

[a] means it is not mentioned or calculated.

[b] represents almost no adsorption

References

[R1] J.C. Contreras-Ruiz, S. Martínez-Gallegos, J.L. García-Rivas, J. Illescas, J.C. González-Juárez, G. Macedo Miranda, E. Ordoñez Regil, Influence of the textural parameters of LDH-TiO_2 composites on phenol adsorption and photodegradation capacities, Int. J. Photoenergy 2019 (2019) 1–11.

[R2] C. Martinez-Gómez, I. Rangel-Vazquez, R. Zarraga, G. Del Ángel, B. Ruíz-Camacho, F. Tzompantzi, E. Vidal-Robles, A. Perez-Larios, Photodegradation and mineralization of phenol using TiO_2 coated γ-Al_2O_3: effect of thermic treatment, Processes 10 (2022) 1186.

[R3] G. Romero Ortiz, L. Lartundo-Rojas, J.E. Samaniego-Benítez, Y. Jiménez-Flores, H.A. Calderón, A. Mantilla, Photocatalytic behavior for the phenol degradation of ZnAl layered double hydroxide functionalized with SDS, J. Environ. Manage. 277 (2021) 111399.

[R4] M.T. Yilleng, E.C. Gimba, G.I. Ndukwe, I.M. Bugaje, D.W. Rooney, H.G. Manyar, Batch to continuous photocatalytic degradation of phenol using TiO_2 and Au-Pd nanoparticles supported on TiO_2, J. Environ. Chem. Eng. 6 (2018) 6382–6389.