Electronic Supplementary Information (ESI) for

Hierarchical {001}-faceted BiOBr microspheres as a novel biomimetic catalyst: Dark catalysis towards colorimetric biosensing and pollutant degradation

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Fig. S1 XRD patterns of the BiOBr microspheres before (a) and after (b) the catalytic reaction.



Fig. S2 SEM images (a,b) of the BiOBr microspheres after the catalytic reaction.



Fig. S3 Reaction images and schemes of oxidation of TMB, OPD, and Pyrogallol by H_2O_2 catalyzed by the BiOBr microspheres at pH 4.0 NaAc buffer solution.



Fig. S4 UV-vis diffuse reflectance spectrum of the BiOBr microspheres.



Fig. S5 UV-vis spectra of different reaction systems: TMB-BiOBr and TMB-BiOBr under visible light irradiation in 30 min at acetate buffer at 40 °C. ([TMB]: 0.19 mM; [H₂O₂]: 38 mM; [BiOBr]: 38 μg mL⁻¹).



Fig. S6 UV-vis spectra of the TMB oxidation system in the presence of the leaching solution (a) and the BiOBr micorspheres (b).



Fig. S7 Effect of pH (a), temperature (b) and H_2O_2 concentration (c) on the peroxidase-like activity of the BiOBr microspheres for the TMB oxidation.



Fig. S8 A dose-response curve for H_2O_2 detection using the BiOBr microspheres under the optimum conditions. Inset: linear calibration plot for H_2O_2



Fig. S9 Selectivity analysis for glucose detection by monitoring the relative absorbance. The analyte concentrations were as follows: 2 mM lactose, 2 mM fructose, 2 mM maltose and 300 μ M glucose. Inset: the color change of different solutions.

Table S1 Comparison of the apparent Michaelis-Menten constant (K_m) and maximum reaction rate (V_m) of the BiOBr microspheres and HRP

Catalyst	Substance	$K_{\rm m}$ [mM]	$V_{\rm max} \ [10^{-8} { m M s}^{-1}]$	
BiOBr	TMB	1.610	2.63	
BiOBr	H_2O_2	0.046	0.37	
HRP [S1]	TMB	0.275	1.24	
HRP [S1]	H_2O_2	0.214	2.46	

Table S2 Comparison of detection limit of H_2O_2 and glucose, and K_m value with H_2O_2 as the

Catalyst	$K_{\rm m}$ for H ₂ O ₂	Detection limit	Detection	Reference
	(mM)	of H_2O_2 (μM)	limit of	
			glucose (µM)	
BiOBr microspheres	0.046	0.3	0.8	This
				work
Fe ₃ O ₄ nanoparticles	Not reported	3	30	[S2]
Graphene oxide/Fe ₃ O ₄	0.71	0.32	0.74	[S 3]
Positively-charged gold	Not reported	0.5	4	[S4]
nanoparticles				
CeO ₂ nanoparticles	64.6	0.5	3	[S5]
Fe-MSN	520	10	10	[S6]

substrate of the BiOBr microspheres and other reported nanomaterials-based mimics

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