Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting information

Ultrafast colorimetric detection of Cr(VI) using Fe_3O_4@polydopamine/prussian blue composite as highly-efficient peroxidase mimic

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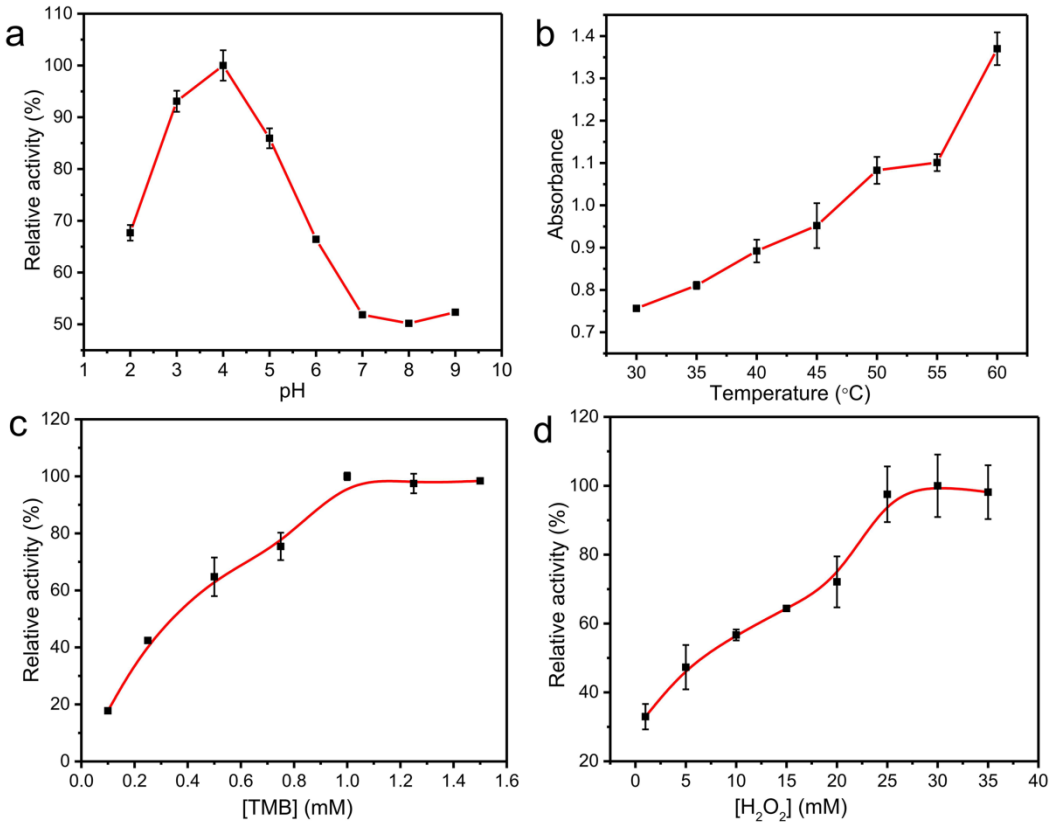

Fig. S1 The effects of experiment conditions on the peroxidase-like activity of Fe_3O_4@PDA/PB composites: (a) pH, (b) temperature, (c) the concentration of TMB and (d) the concentration of H_2O_2.

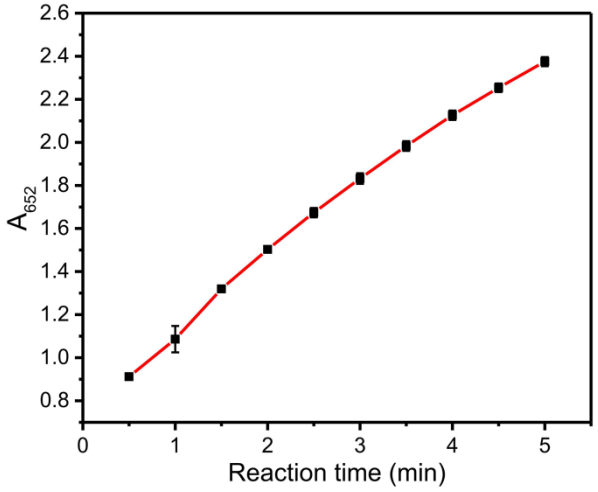

Fig. S2 A_{652} of the Fe_3O_4@PDA/PB+TMB+H_2O_2 reaction system as a function of reaction time.

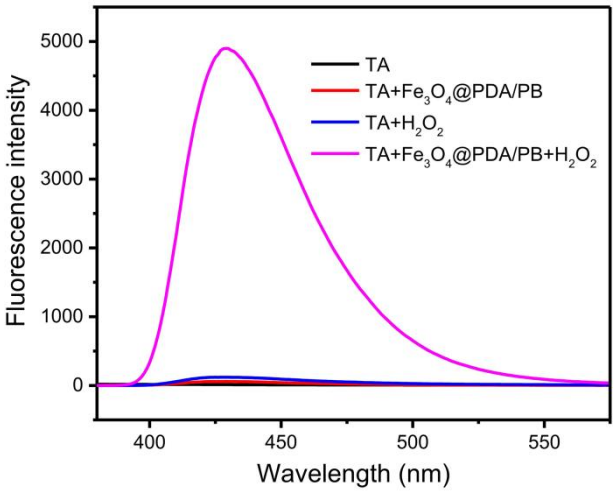

Fig. S3 Fluorescence emission spectra of TAOH from different reaction systems for inferring the catalytic mechanism of the Fe_3O_4@PDA/PB composites.

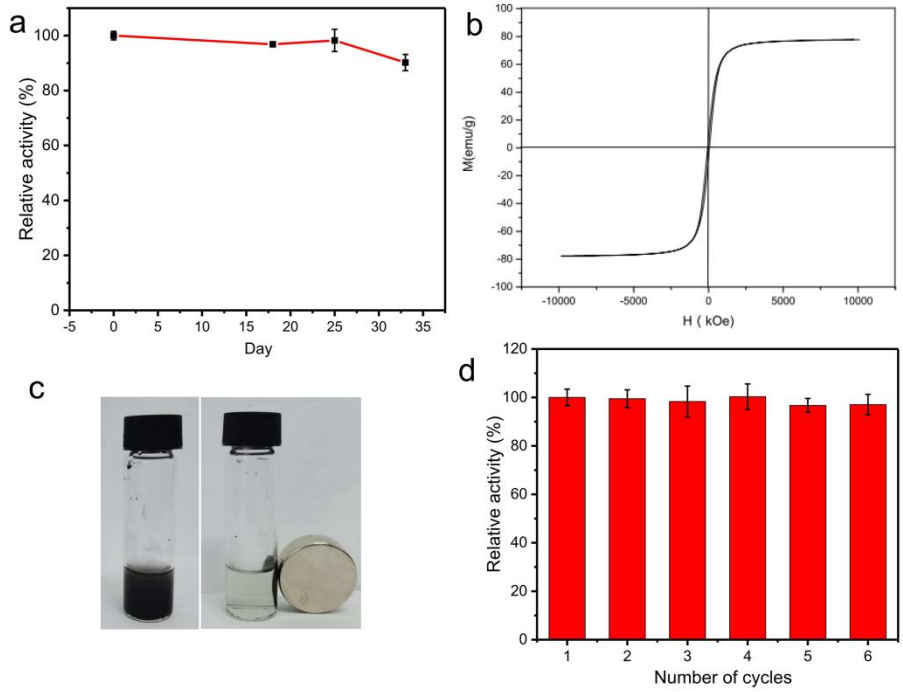

Fig. S4 (a) The relative activity of Fe_3O_4@PDA/PB composites during the storage for 33 days at 4 ℃. (b) Magnetic hysteresis curve of Fe_3O_4 NPs (provided by the supplier). (c) Photograph of Fe_3O_4@PDA/PB composites before and after magnetic treatment for 1 min. (d) The relative activity of Fe_3O_4@PDA/PB composites for six consecutive cycles.

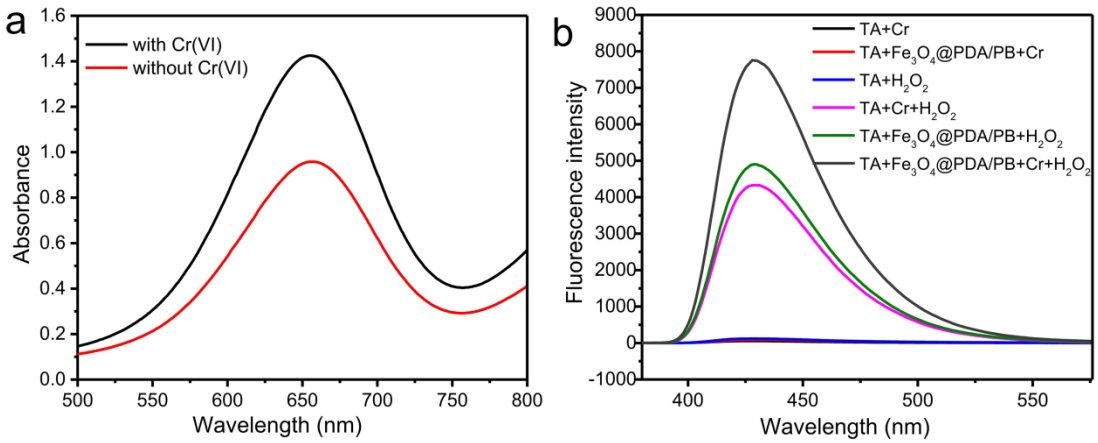

Fig. S5 (a) UV-vis absorption spectra of the Fe_3O_4@PDA/PB+TMB+H_2O_2 reaction system in the absence and presence of Cr(VI). (b) Fluorescence emission spectra of TAOH from different reaction systems to explain the detection principle of Cr(VI).

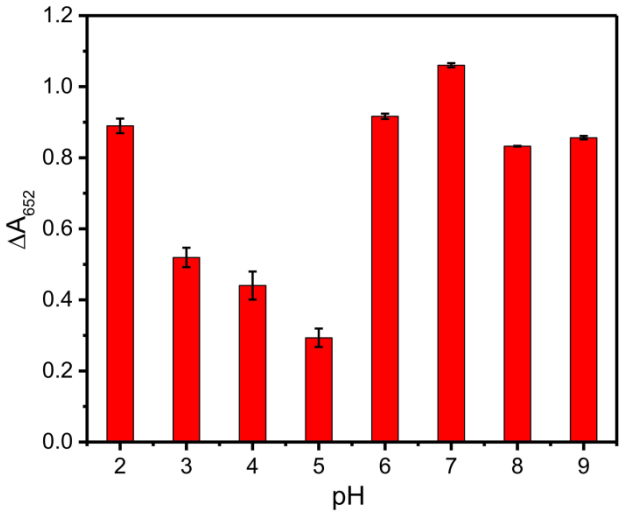

Fig. S6 ΔA_{652} response of the Fe_3O_4@PDA/PB+TMB+H_2O_2 reaction system in the presence of Cr(VI) at different pH.

2. Additional Table S1

Table S1 Comparison of the peroxidase-like activity (kinetic parameters and conditions) of Fe_3O_4@PDA/PB with others.

Catalysts	Substrate	K_m	V_{max} (M s^{-1})	pH	temperature	Ref
HRP	TMB	0.434	1×10^{-7}	4.0	40 ℃	[1]
	H_2O_2	3.70	8.71×10^{-8}			
CuS-BSA	TMB	0.2	2.2×10^{-8}	3.9	25 ℃	[2]
	H_2O_2	0.014	2×10^{-8}			
PNPG-PEG	TMB	0.2828	3.0276×10^{-9}	4.0	35 ℃	[3]
	H_2O_2	0.0799	2.467×10^{-9}			
$CoFe_2O_4/H_2PPOP$	TMB	0.075	6.54×10^{-5}	3.35	35 ℃	[4]
	H_2O_2	2.68	7.44×10^{-5}			
MoS_2	TMB	0.387	7.23×10^{-8}	4.0	25 ℃	[5]
	H_2O_2	0.116	2.42×10^{-8}			
CS-$MoSe_2$ NS	TMB	1.317	46.85×10^{-8}	4.0	25 ℃	[6]
	H_2O_2	12.89	23.26×10^{-8}			
PBMNPs	TMB	0.307	1.06×10^{-6}	4.6	25 ℃	[7]
	H_2O_2	323.6	1.17×10^{-6}			
Au-NPFe_2O_3NC	TMB	0.0429	5.882×10^{-8}	3.5	25 ℃	[8]
	H_2O_2	138.5	4.770×10^{-8}			
Mesoporous	TMB	0.0997	5.20×10^{-7}	3.5	25 ℃	[9]
γ-Fe_2O_3	H_2O_2	144.30	1.84×10^{-8}			
Mesoporous	TMB	0.5304	5.43×10^{-8}	3.5	25 ℃	[9]
α-Fe_2O_3	H_2O_2	127.92	3.77×10^{-8}			
IONF_250	TMB	0.24	3.07×10^{-8}	3.5	25 ℃	[10]
	H_2O_2	150.47	3.07×10^{-8}			
IO-MC	TMB	0.242	1.93×10^{-8}	4.0	25 ℃	[11]
	H_2O_2	14.9	1.64×10^{-8}			
Fe_3O_4@PDA/PB	TMB	0.1182	16.17×10^{-8}	4.0	30 ℃	This
	H_2O_2	10.70	16.19×10^{-8}			work

3. Additional References

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