Supplementary Information

Novel Au-anchored Fe-NC nanozyme enabled rapid and sensitive colorimetric detection of Cr(VI)

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CONTENTS

Stability of AuNPs/Fe-NC during the catalytic process

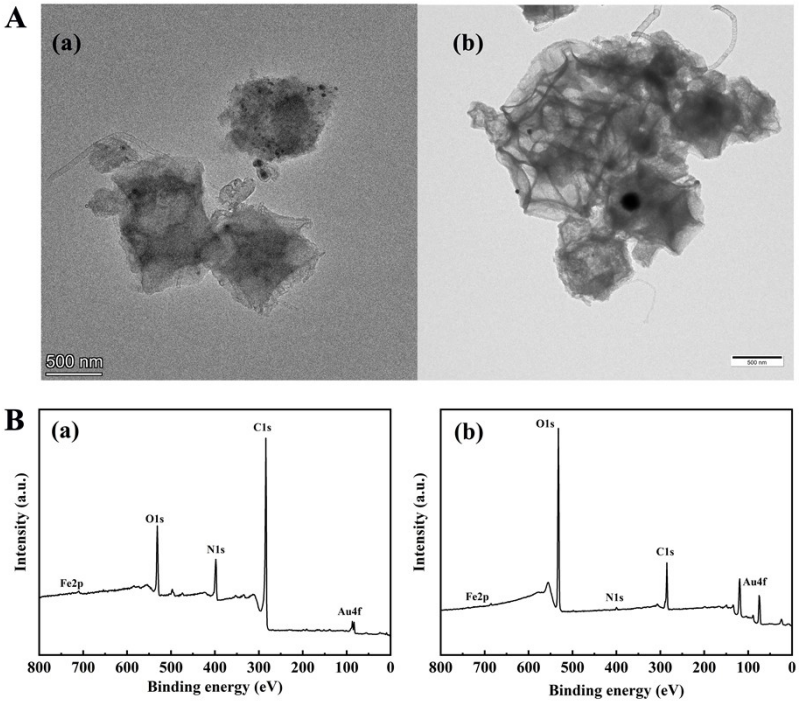

Figure S1 (A) TEM and (B) XPS characterizations of AuNPs/Fe-NC (a) before and (b) after the catalytic reaction.

It is a very valuable research to explore the stability of AuNPs/Fe-NC nanozyme during the detection process. In this work, a comparison of the morphology and composition of the prepared AuNPs/Fe-NC before and after the catalytic reaction was conducted by TEM and XPS analysis. As shown in Figure S1A, no significant change in the morphology of the material before and after the catalytic reaction. Meanwhile, XPS comparative analysis also confirmed that the material has good stability (seen in Figure S1B). From the above results, we could conclude the stability of prepared nanozyme, which also could be attributed to the relatively mild catalytic reaction environment.

Circulation and storage stability of AuNPs/Fe-NC nanozyme

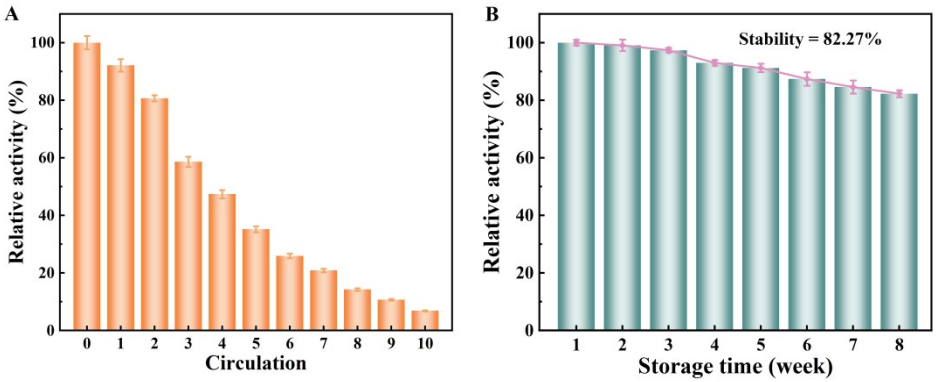

Figure S2 Stability analysis of AuNPs/Fe-NC nanozyme.

Table S1 Comparison of steady-state kinetic parameters of AuNPs/Fe-NC nanozyme with another report peroxidase mimics.

Catalyst	K_m / (mM)		V_{max} / (10^{-7} M/s)		Reference
	TMB	H_2O_2	TMB	H_2O_2	
Au seeds	0.088	47.56	0.17	0.178	[1]
Fe_3O_4	0.233	479.91	17.66	27.5	[2]
Fe_3O_4@MQDs	0.36	6.81	2.89	24	[3]
Fe_3O_4@MoS_2	0.25	1.39	11.1	16.3	[4]
PtPd NPs	1.78	0.053	3.64	0.926	[5]
Pd@Pt	0.067	490	1.2	1.2	[6]
Fe_3O_4@C_7	0.057	0.863	0.62	0.856	[7]
AuNPs/Fe-NC	0.433	1.299	11.976	2.305	This work

Verification the generation of·OH during the H_2O_2 catalysis by AuNPs/Fe-NC

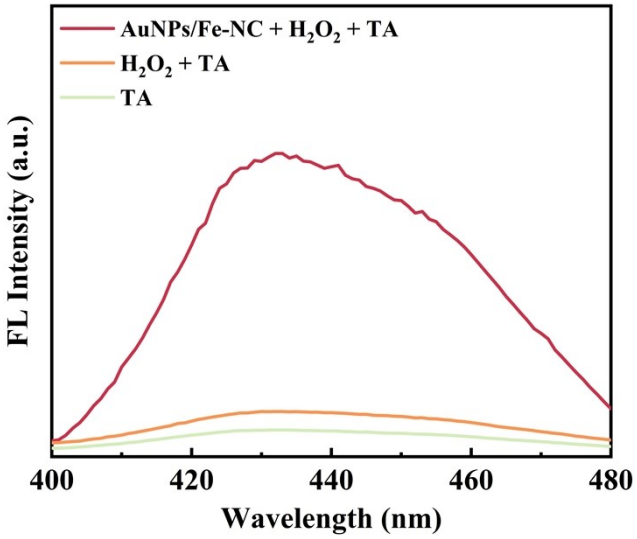

Figure S3 Fluorescent curves of TA, H_2O_2 + TA, and AuNPs/Fe-NC + H_2O_2 + TA.

Fluorescence analysis method was further applied to demonstrate the generation of •OH. Terephthalic acid (TA) as a typically fluorescent probe can capture hydroxyl radical (•OH) to produce a fluorescent product with an emission at 440 nm. As expected, only if the AuNPs/Fe-NC, H_2O_2, and TA are all existed, an obvious fluorescent signal was observed, demonstrating the generation of •OH during the catalytic reaction.

Optimization of the Cr(VI) detection conditions

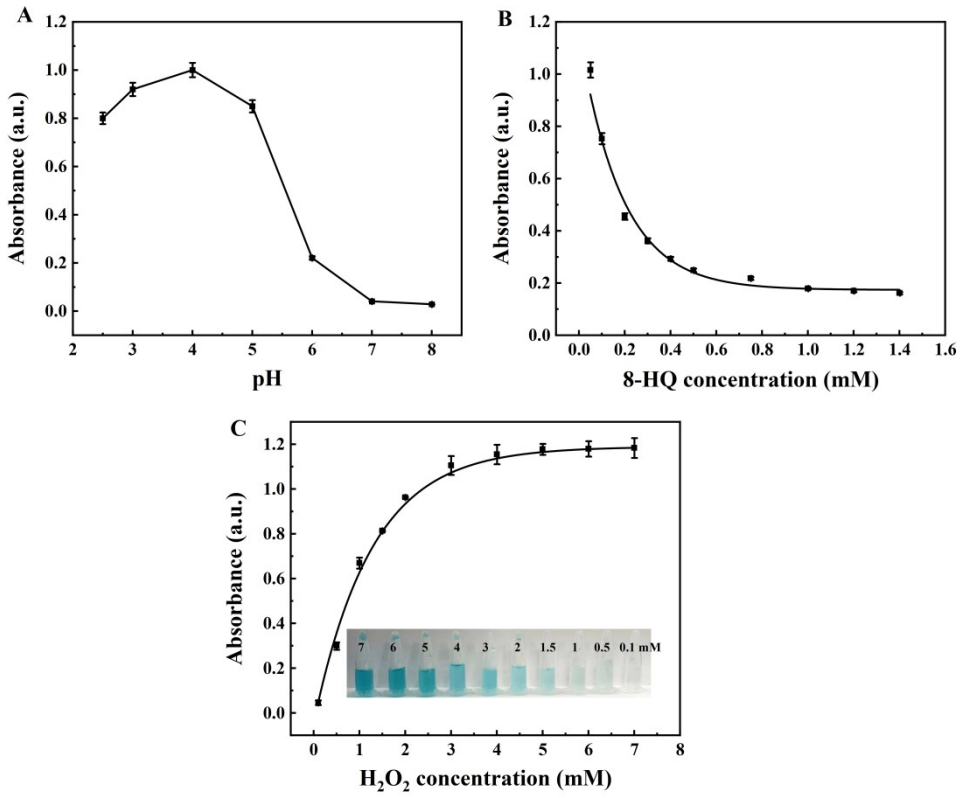

Figure S4 Optimization of the Cr(VI) detection conditions (A) pH; (B) 8-HQ concentration, and (C) H_2O_2 concentration

Anti-interference analysis for colorimetric detection of Cr(VI)

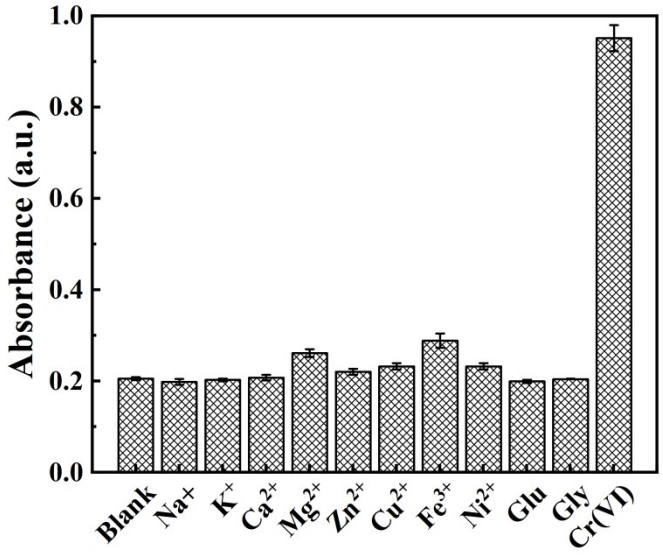

Figure S5 Anti-interference analysis for colorimetric detection of Cr(VI)

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