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Metal-oxygen cluster as peroxidase mimetics for their multifarious applications in colorimetric sensor

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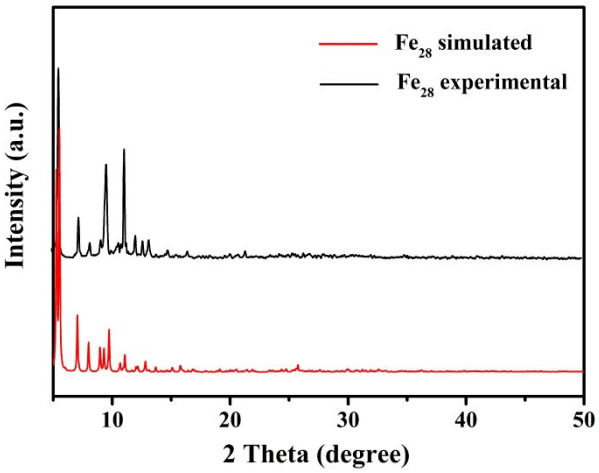

Fig. S1 XRD patterns of Fe_{28} powder samples.

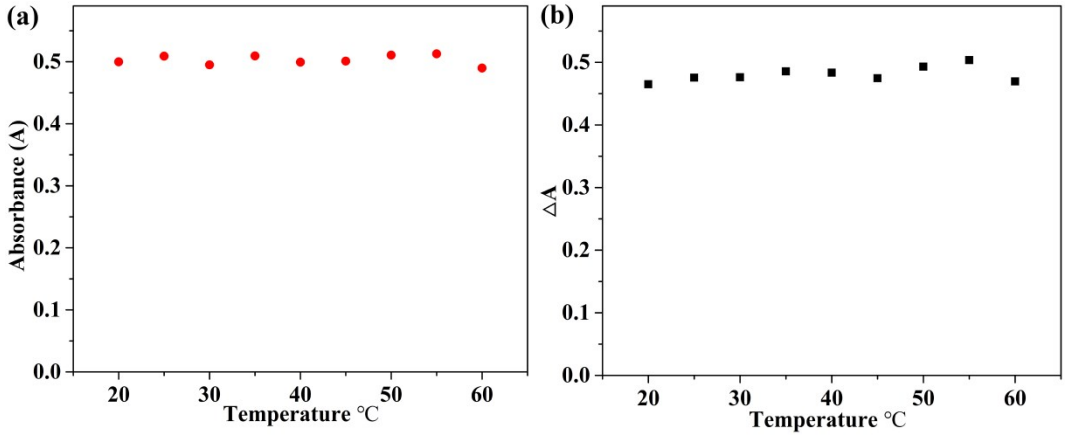

Fig. S2 (a) Temperature response curves for H_2O_2 detection; (b) Temperature–ΔA curve for H_2O_2 detection where ΔA = A (Fe_{28}, 652 nm)–A (blank, 652 nm).

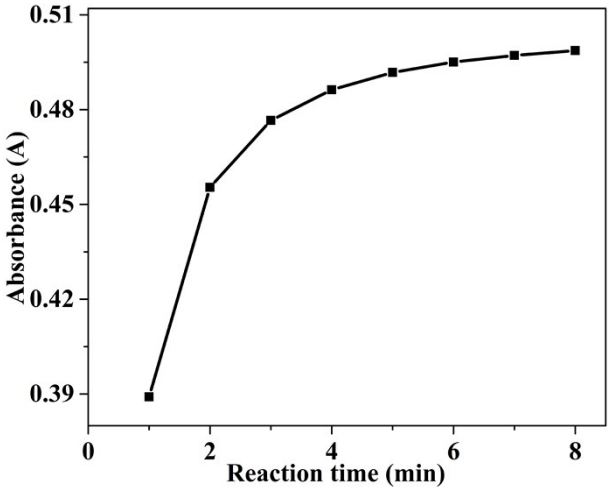

Fig. S3 Fe_{28} facilitate the oxidation of TMB at ultrapure water with different reaction time.

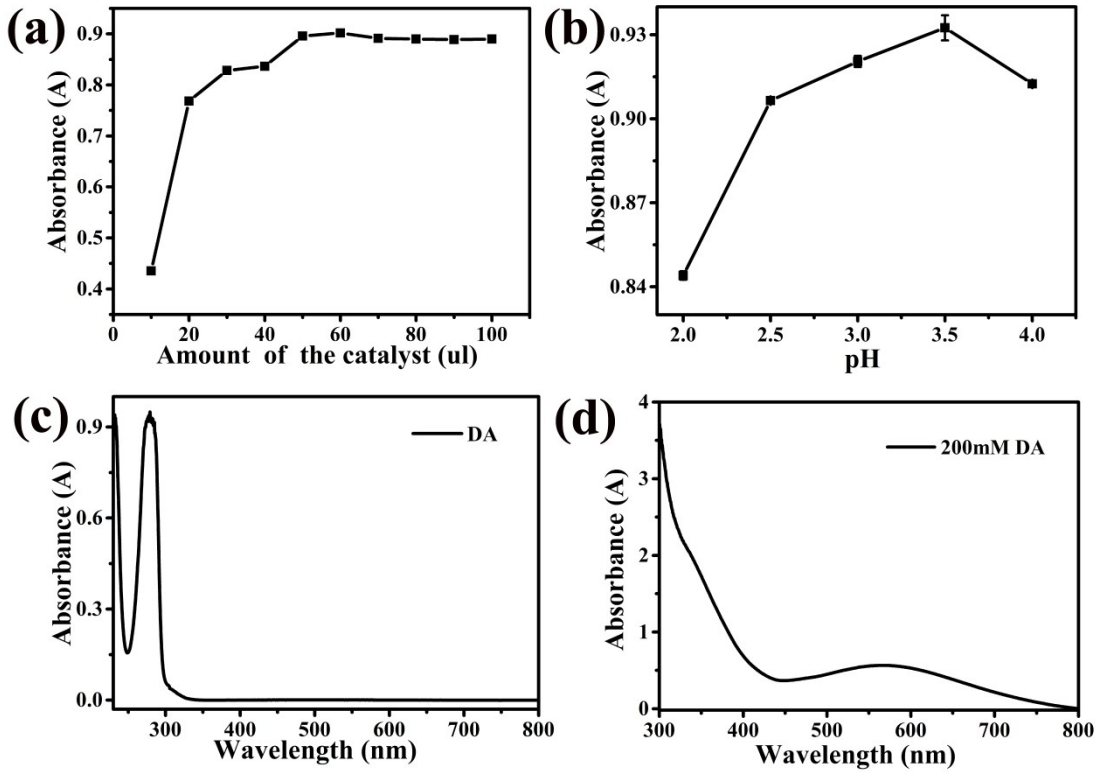

Fig. S4 (a) different amount of the catalyst facilitate the oxidation of DA at ultrapure water; (b) A pH dependent response curve for DA detection using Fe_{28} kept at 25 °C. The error bars represent the standard deviation of three measurements; (c) UV-vis absorption spectrum of the reaction solution of DA after 1 min; (d) UV-vis absorption spectrum of the reaction solution of DA with Fe_{28} after 1 min.

Table S1 The linear range for H_2O_2 detection between Fe_{28} and other catalysts.

Catalyst	Linear range (μM)	References
Fe_{28}	26.2–157	This work
$FeVO_4$	2–40	[1]
Fe_3O_4 MNPs	5–100	[2]
$Fe_3H_9(PO_4)_6 \cdot 6H_2O$	57.4–525.8	[3]
CoFe-LDHs	1–20	[4]
g-C_3N_4-Fe_3O_4	1–40	[5]
FA-Fe_2SiW_{10}	0.134–67	[6]

Table S2 Comparison of the kinetic parameters of Fe_{28}, Fe_3O_4 MNPs (magnetic nanoparticles) and HRP.

Catalyst	Substance	K_m (mM)	V_{max} ($M \cdot S^{-1}$)
Fe_{28}	TMB	0.0613	1.77×10^{-3}
Fe_{28}	H_2O_2	0.0544	2.24×10^{-3}
Fe_3O_4 MNPs	TMB	0.434	10.00×10^{-8}
Fe_3O_4 MNPs	H_2O_2	154	9.78×10^{-8}
HRP	TMB	0.275	1.24×10^{-8}
HRP	H_2O_2	0.214	2.46×10^{-8}

Table S3 Comparison of catalyst activity in the linear range for glucose detection between Fe_{28} and other catalysts.

Catalyst	Linear range (μM)	References
Fe_{28}	3.92–31.4	This work
H_2TCPP-CeO_2	50–100	[7]
Fe_3O_4 MNPs	50–100	[2]
$NiCo_2O_4$	100–4500	[8]

Reference

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