Dual-mode sensing platform for electron spin resonance and UV-vis detection of alkaline phosphatase based on Cu-based metal-organic frameworks

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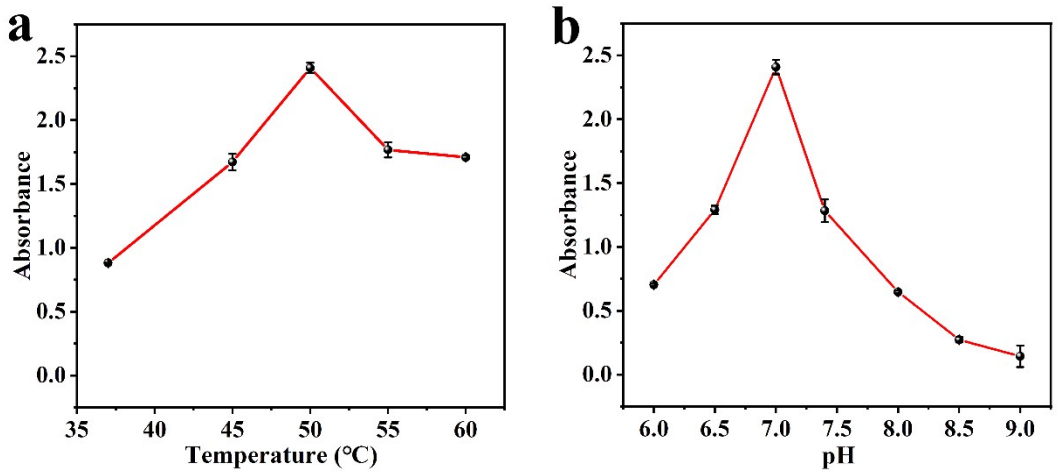

Figure S1. Variation of the catalytic activity of Cu-MOFs as peroxidase mimic with temperature (a) and the pH of the reaction solution (b).

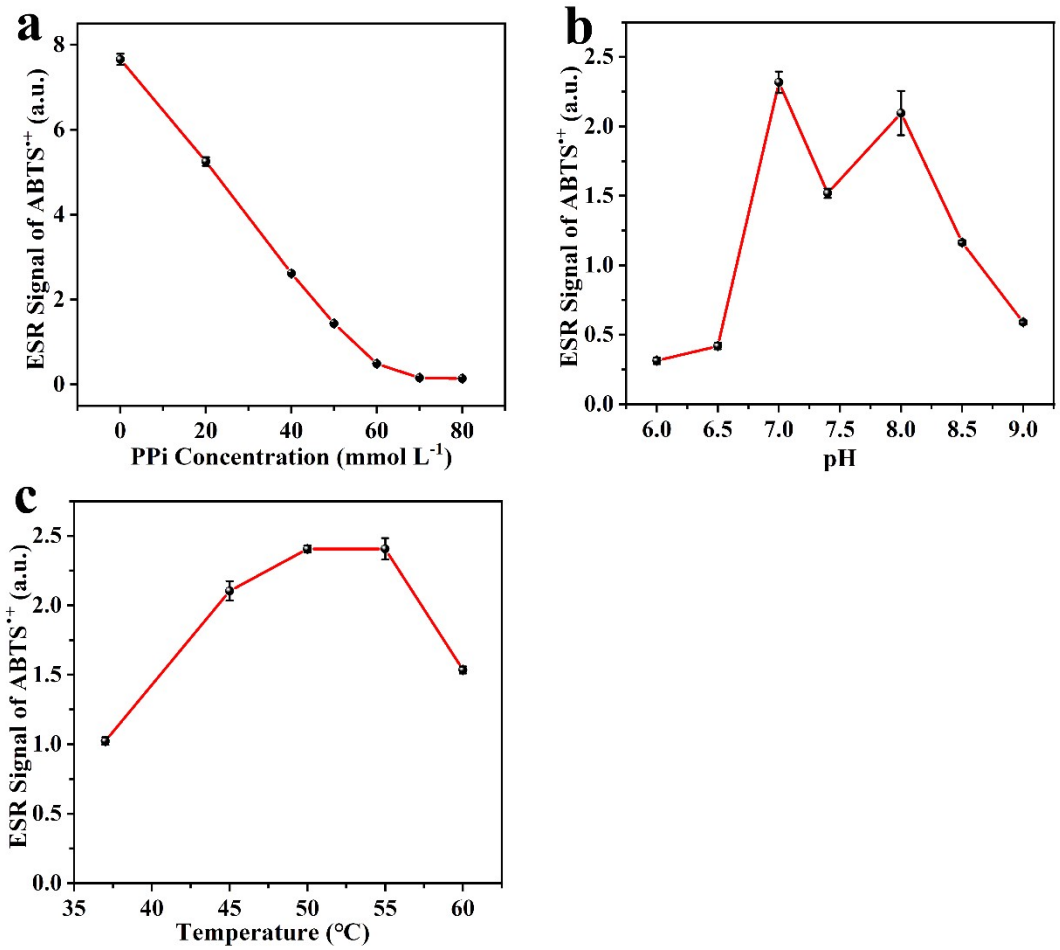

Figure S2. Variation of the ESR signal of $ABTS^{\bullet+}$ with the concentration of PPi (a), the pH of the reaction solution (b), and the incubation temperature for the catalytic reaction between Cu-MOFs and its substrates (c). In (b) and (c), ALP concentration was set at 18 U L^{-1}.

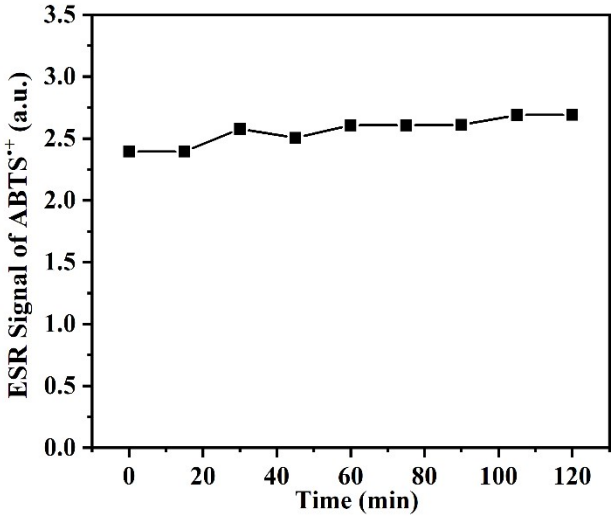

Figure S3. The stability of the ESR signal of $ABTS^{\bullet+}$. Cu-MOFs, 6 μg mL^{-1}; H_2O_2, 6 mmol L^{-1}; ABTS, 4 mmol L^{-1}. To prevent the further generation of new $ABTS^{\bullet+}$ by the catalysis of Cu-MOFs, the sample was kept in the ice bath before ESR measurement.

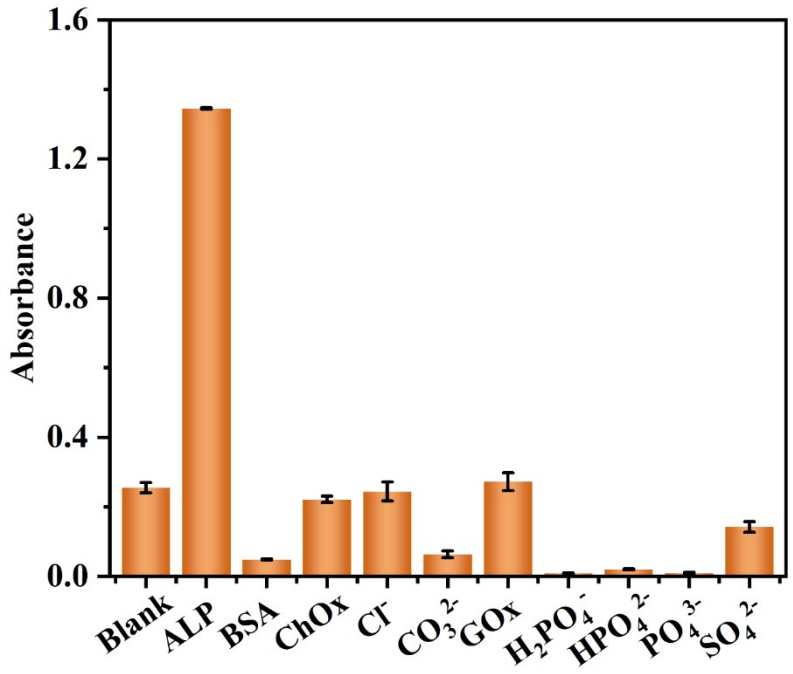

Figure S4. UV-vis signals at 740 nm in the presence of interfering substances (PO_4^{3-}, HPO_4^{2-} and $H_2PO_4^-$, 250 mmol L^{-1}; Cl^-, CO_3^{2-} and SO_4^{2-}, 100 mmol L^{-1}; BSA, 100 nmol L^{-1}; GOx and ChOx, 3000 U L^{-1}).

Table S1. Comparison of two kinetic parameters (K_m and V_{max}) of the synthesized Cu-MOFs with HRP and nanoenzymes reported in the literatures.

Catalyst	Substrate	K_m (mmol L^{-1})	V_{max} (10^{-7} mol L^{-1} s^{-1})	Ref.
$Au_1Ag_1Pd_1$	ABTS	71.53	36.5	1
	H_2O_2	0.011	0.123	
$MgFe_2O4$	ABTS	0.14	1.254	1
	H_2O_2	4.61	1.346	
Cys–MoS_2	ABTS	0.15	1.61	2
	H_2O_2	8.06	9.92	
raw MoS_2	ABTS	0.97	0.63	2
	H_2O_2	6.74	1.92	
HRP	ABTS	3.07	149	3
	H_2O_2	0.342	54.6	
Cu-MOFs	ABTS	4.38	0.713	This work
	H_2O_2	2.38	4.79	

References:

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