

Supporting Information

Protein-mediated sponge-like copper sulfide as an ingenious and efficient peroxidase mimics for colorimetric glucose sensing

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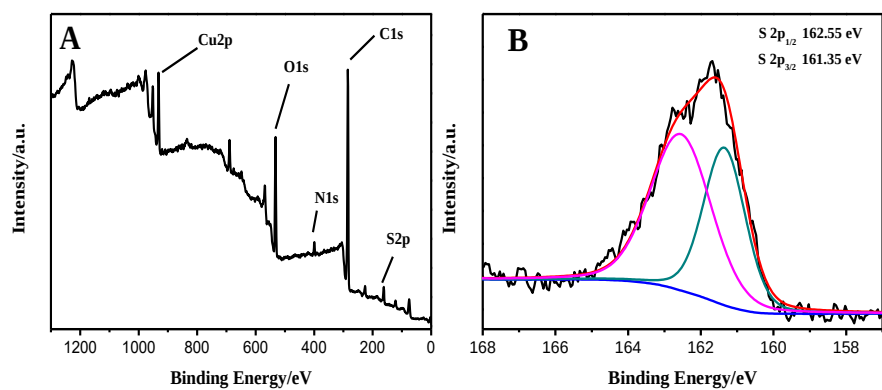


Fig. S1 (A) XPS spectra of survey scan of sponge-like casein-CuS hybrid. (B) High-resolution spectra of S 2p XPS spectra of the hybrid.

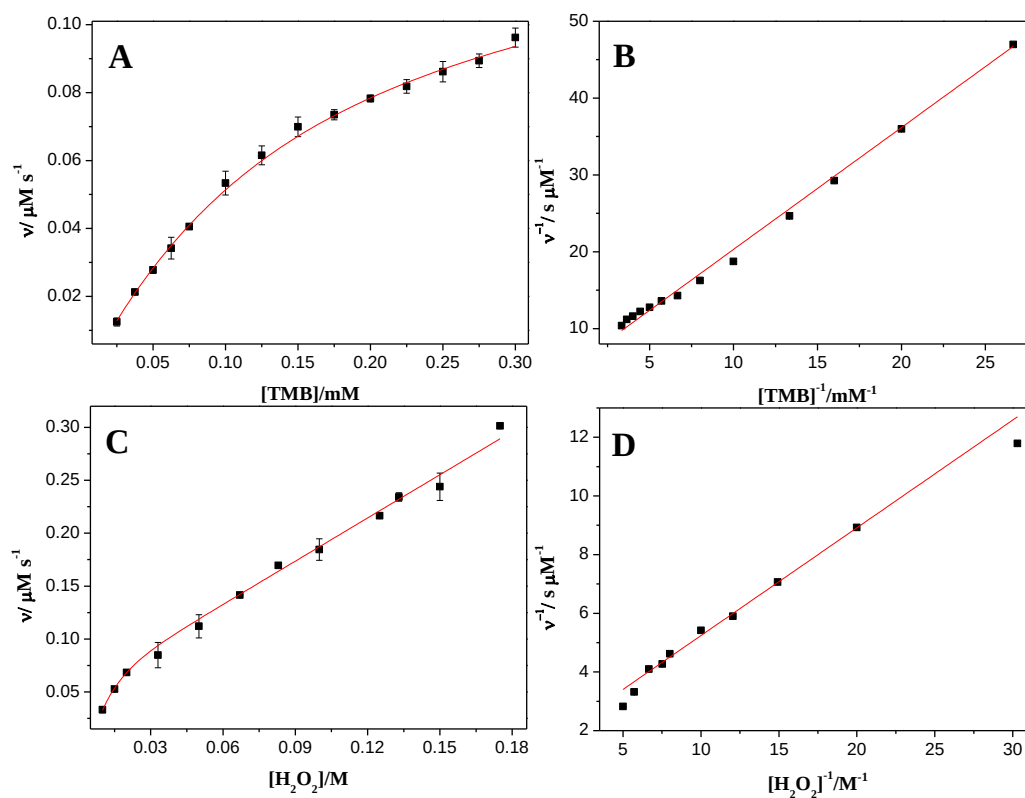


Fig. S2 (A, C) Correlation of initial reaction velocity with the concentration of one substrate (H_2O_2 or TMB) fixed and the other varied. (B, D) The double-reciprocal plots of (A) and (C).

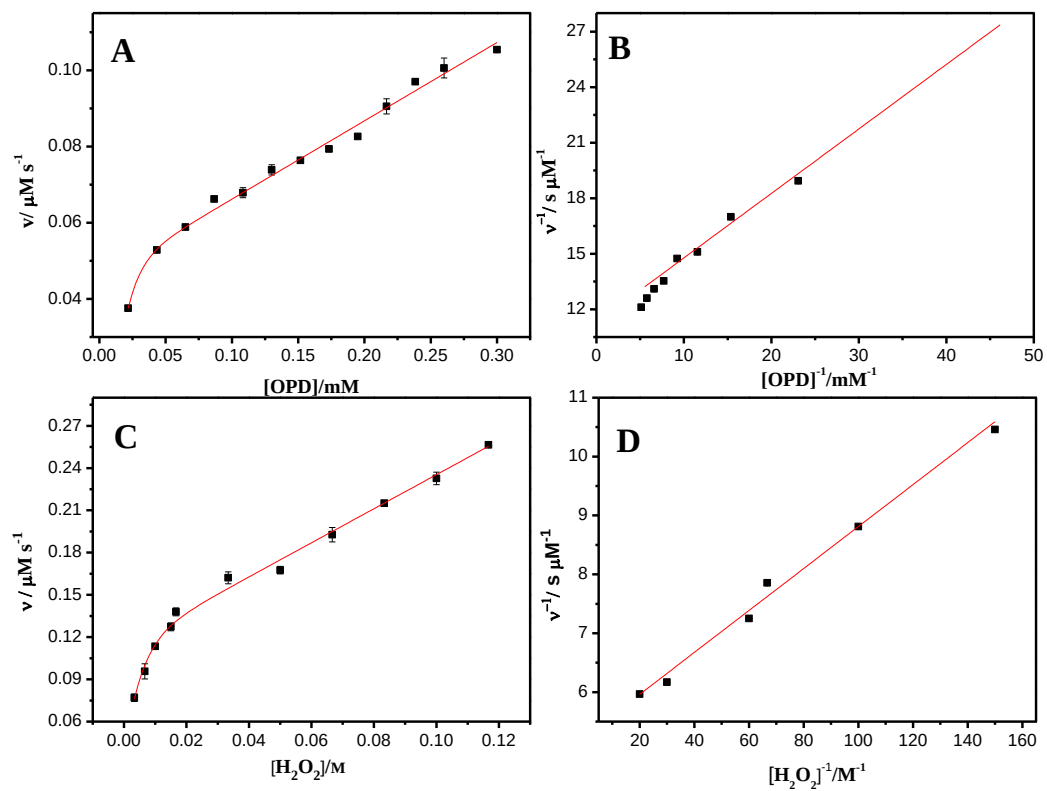


Fig. S3. (A, C) Correlation of initial reaction velocity with the concentration of one substrate (H_2O_2 or OPD) fixed and the other varied. (B, D) The double-reciprocal plots of (A) and (C).

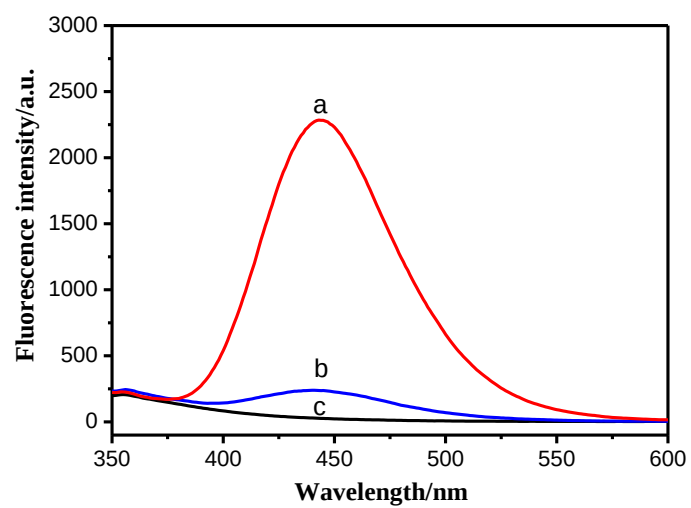


Fig. S4. The fluorescence spectra of TA in the presence of sponge-like casein-CuS hybrid + H_2O_2 (a), H_2O_2 (b) and sponge-like casein-CuS hybrid (c). ($[\text{TA}] = 2.5 \text{ mM}$, $[\text{H}_2\text{O}_2] = 125 \text{ mM}$)

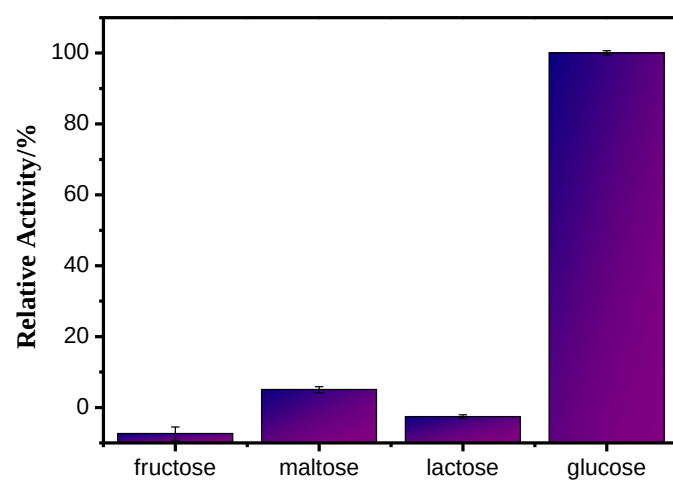


Fig. S5. Determination of the selectivity of glucose detection with 10 mM fructose, maltose, lactose, and 1 mM glucose.

Table S1 Comparison of the apparent Michaelis-Menton constant (K_m) and maximum reaction rate (V_{max}) of casein-CuS hybrid.

Enzyme	K_m (mM)		V_{max} (10^{-8} M s $^{-1}$)	
	TMB	H ₂ O ₂	TMB	H ₂ O ₂
HRP	0.434	3.7	10.0	8.71
Casein-CuS hybrid	0.355	234	22.5	63.8

Table S2 Comparison of the apparent Michaelis-Menton constant (K_m) and maximum reaction rate (V_{max}) of sponge-like casein-CuS with TMB and OPD as substrates.

Substrate	K_m (mM)	V_{max} (10^{-8} M s^{-1})
TMB	0.355	22.5
H ₂ O ₂ (TMB)	234	63.8
OPD	0.031	8.9
H ₂ O ₂ (OPD)	6.78	19.0

Table S3 Detection of glucose in human serum samples.

Sample	Glucose concentration determined by our method (mM)	Glucose concentration obtained by the hospital (mM)	RSD (n=3, %)
1	5.43	5.42	2.15
2	5.19	5.11	1.05
3	5.23	5.33	2.59