Supporting Information
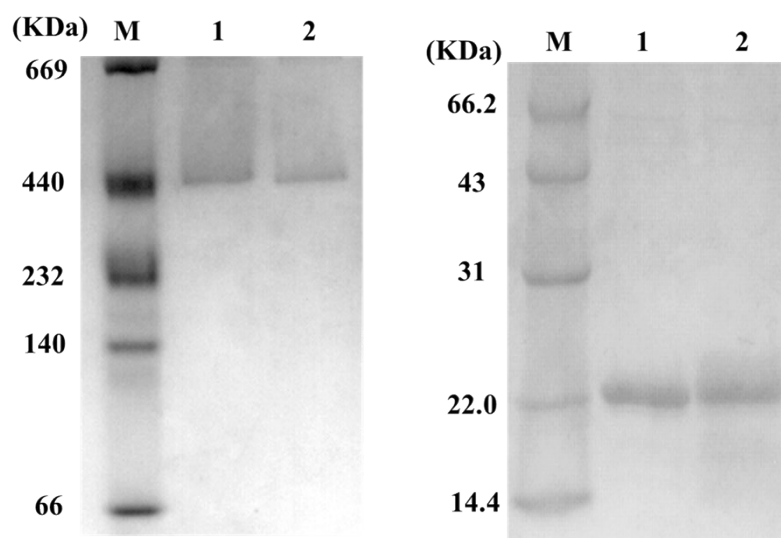
for

Ferritin-catalyzed synthesis of ferrihydrite nanoparticles with high mimetic peroxidase activity for biomolecules detection

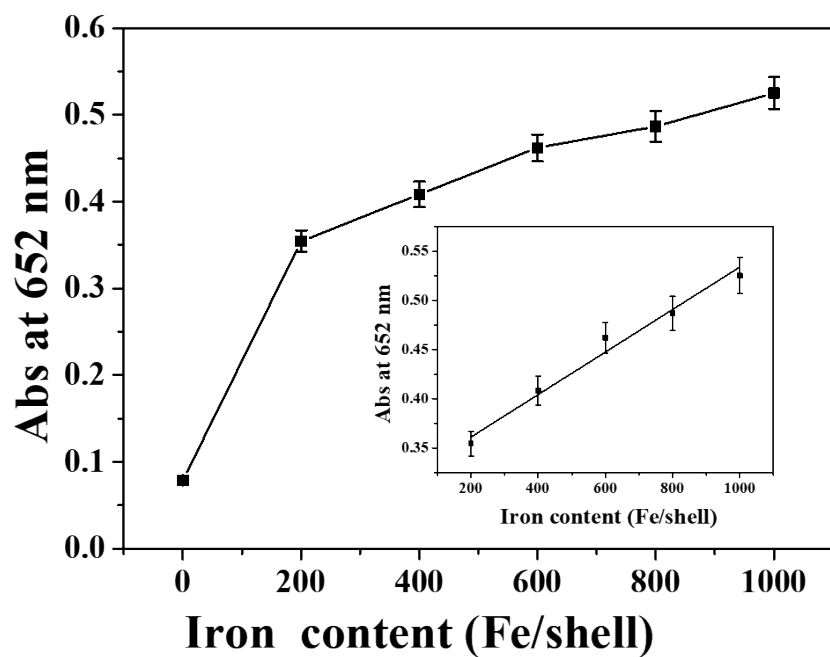Hai Chen,* Liang Ma and Yuhao Zhang*

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Supplementary Figures (Figs. S1-S5)

Figure S1. (a) SDS-PAGE and (b) Native-PAGE analyses. Land M, protein markers and their corresponding molecular masses; Land 1, purified rHuHF; Land 2, holo rHuHF with loading 800 iron/protein within the inner cavity.

Figure S2. Relationship between the absorbance at 652 nm and the iron content. Insert: A near linear relationship between the absorbance at 652 nm and the iron content. Conditions: 1.0 mM TMB, 10 mM H_2O_2, and [apo ferritin or $_{fs}FNs$] = 0.25 μM.
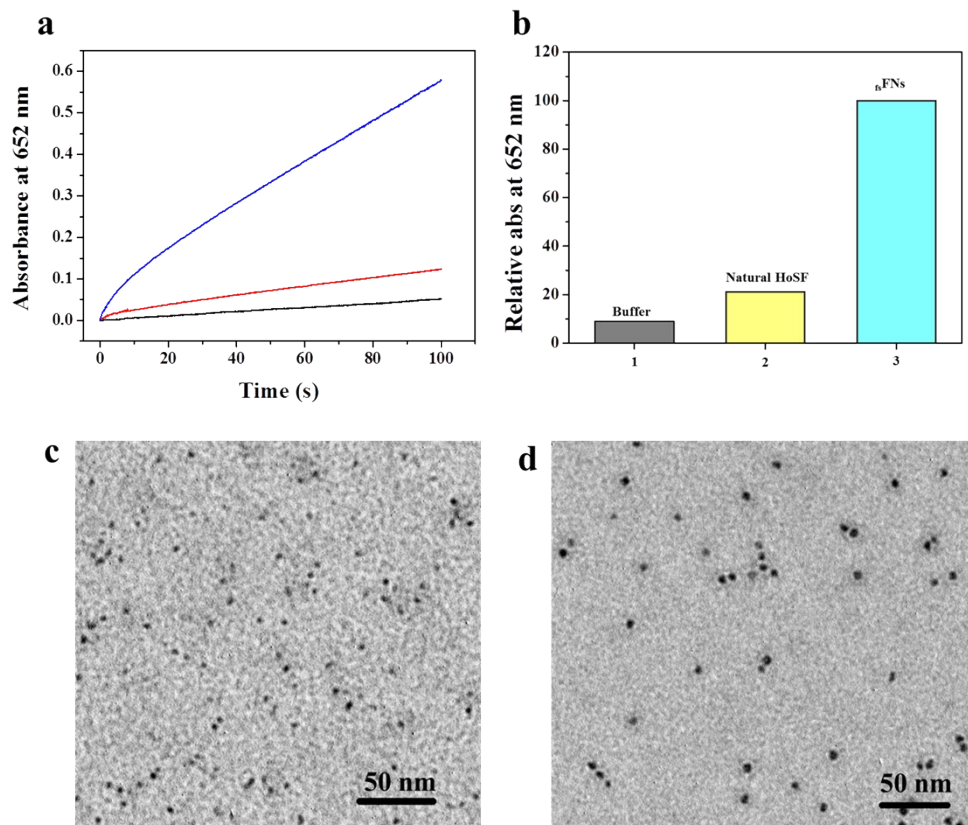
Figure S3. Comparison of the catalytic activity between natural holo horse spleen ferritin (HoSF) and fsFNs. (a) Time-dependence absorbance changes at 652 nm of buffer (black), fsFNs (blue) and natural holo HoSF (red). (b) Relative catalytic activity of buffer, fsFNs and natural holo HoSF with respect to 100% absorbance assumed for fsFNs at 652 nm. TEM images of fsFNs containing 800 iron/shell (c) and natural holo HoSF (d) without uranyl acetate staining.
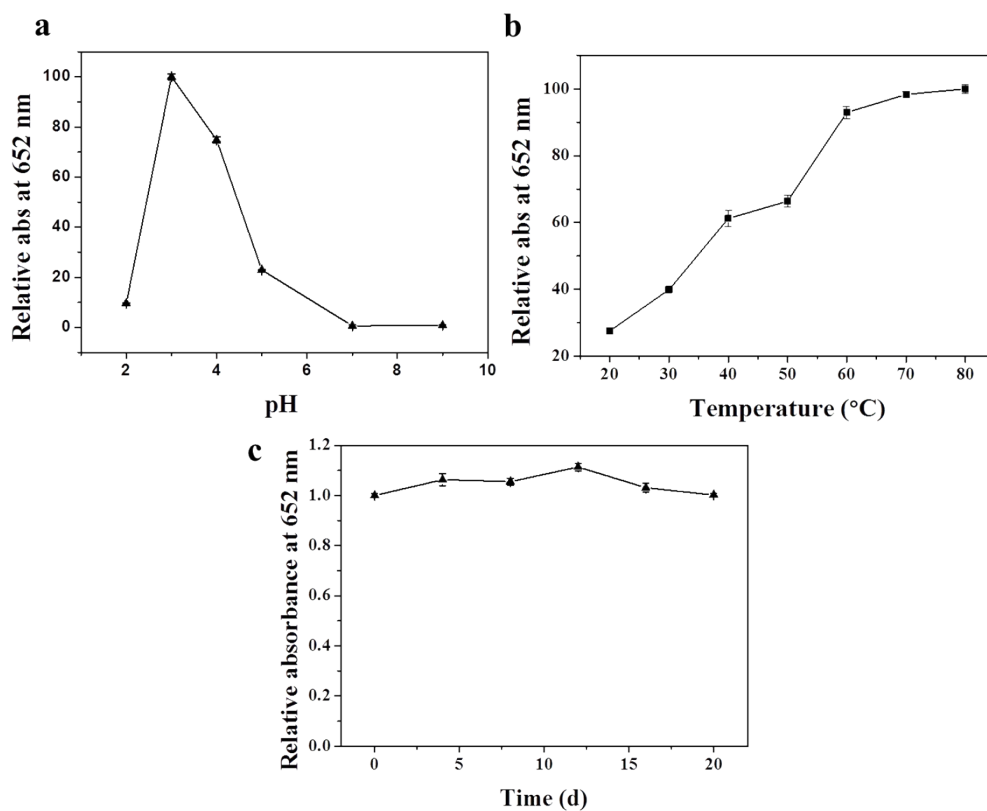
Figure S4. Effect of different experimental conditions on the peroxidase-like activity of $_{fs}$FNs, which include (a) pH value, (b) temperature, and (c) storage time. Conditions: 1.0 mM TMB, 10 mM H_2O_2, and [$_{fs}$FNs] = 0.25 μM.
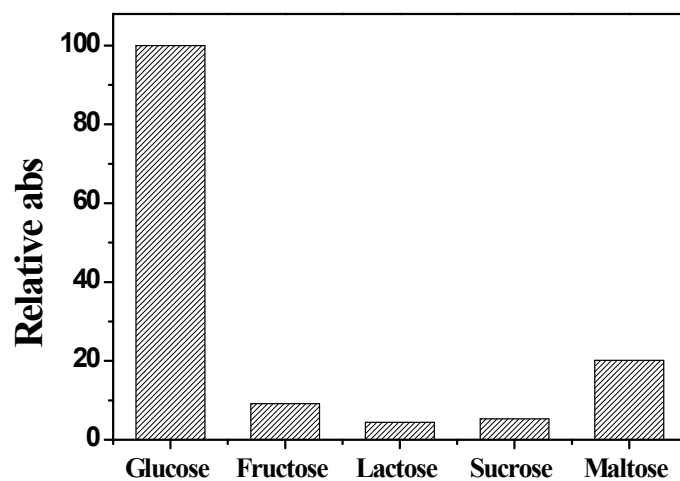
Figure S5. Determination of the selectivity for glucose detection. The concentration of glucose and fructose, lactose, sucrose, and maltose are 80 μM.

Supplementary table

Table 1. Comparison of kinetic parameters of TMB oxidation by $_{fs}$FNs and HRP.

Catalyst	Substrate	V_{max} (M s^{-1})	K_m (M)	Ref.
$_{fs}$FNs	TMB	4.4×10^{-7}	4.5×10^{-4}	This work
$_{fs}$FNs	H$_2$O$_2$	4.5×10^{-8}	3.1×10^{-5}	This work
HRP	TMB	3.3×10^{-8}	3.2×10^{-4}	[1]
HRP	H$_2$O$_2$	2.4×10^{-8}	5.5×10^{-5}	[1]
Au-Ft	TMB	7.5×10^{-8}	9.7×10^{-5}	[2]
Au-Ft	H$_2$O$_2$	9.3×10^{-8}	199.4×10^{-3}	[2]
Pt-Ft	TMB	5.6×10^{-7}	2.2×10^{-4}	[3]
Pt-Ft	H$_2$O$_2$	3.2×10^{-4}	187.3×10^{-3}	[3]
M-HFn-Co$_x$Fe$_{3-x}$O$_4$	TMB	1.3×10^{-8}	1.3×10^{-4}	[4]
M-HFn-Co$_x$Fe$_{3-x}$O$_4$	H$_2$O$_2$	0.7×10^{-8}	17.0×10^{-3}	[4]
Fe$_3$O$_4$ MNPs	TMB	3.4×10^{-8}	9.8×10^{-5}	[5]
Fe$_3$O$_4$ MNPs	H$_2$O$_2$	9.8×10^{-8}	154×10^{-3}	[5]

References

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