Electronic Supplementary information

Characterization of nanozyme kinetics for highly sensitive detection

Vasily G. Panferov,[a] Xiaoqin Wang,[a] and Juewen Liu[a]

[a]. Department of Chemistry, Waterloo Institute for Nanotechnology, University of Waterloo, Waterloo, Ontario, N2L 3G1, Canada.

Contents

S1. Materials and Methods

All alkalis, acids, salts for buffers, $HAuCl_4$, Na_2PtCl_6, trisodium citrate, ascorbic acid sodium salt, horseradish peroxidase (HRP), 3,3',5,5'-tetramethylbenzidine (TMB), and 30% H_2O_2 were purchased from Sigma Aldrich (Oakville, ON, Canada). Monoclonal antibodies against hepatitis B surface antigen (catalog number ABHBS-0404 and ABHBS-0406) and recombinant hepatitis B surface antigen (catalog number – AGHBS-0120) were purchased from Arista Biologicals (Allentown, PA, USA).

Synthesis, characterization and conjugation of nanoparticles

Au@Pt nanozyme was synthesized by overgrowth of the platinum layer over gold nanoparticle seeds. First, gold nanoparticles were synthesized by reducing of $HAuCl_4$ with trisodium citrate [1]. As synthesized gold nanoparticles were centrifuged (18 000 g, 20 min), and the pellets were dispersed in the same volume of Milli-Q water. Gold nanoparticles were mixed with Na_2PtCl_6 (final concentration equal to 1 mM) and incubated for 5 min at 80°C. Ascorbic acid sodium salt solution (stock solution 50 mM, final concentration equal to 5 mM) was added using a peristaltic pump (rate 200 µL/min). After adding ascorbic acid sodium salt solution, Au@Pt nanoparticles were incubated for 20 min at 80°C.

For the conjugation with monoclonal antibodies, Au@Pt nanoparticles were centrifuged (15 000g, 15 min), and the pellets were dispersed in the same volume of Milli-Q water. The pH value of Au@Pt nanoparticles was adjusted to 8.5 by 0.5 M Na_2CO_3. Au@Pt with adjusted pH were mixed with monoclonal antibodies (ABHBS-0404). The final concentration of monoclonal antibodies was 15 µg/mL. The mixture was incubated for two hours with continuous mixing. The remaining free surface on Au@Pt was blocked by bovine serum albumin (final concentration 2 mg/mL). Au@Pt were centrifuged (12 000g, 15 min), and the pellets were dispersed in 50 mM Tris buffer supplemented with 0.05% Triton X-100, pH 8.0. The synthesized conjugate was stored at 4°C and used within a week after the synthesis.

Characterization of Au@Pt nanoparticles was performed using a JEOL JEM F200 transmission electron microscope.

Measurement of kinetic parameters

For the kinetic measurements, a Tecan Spark microplate reader was used. All measurements were performed in three repeats, and the temperature was stabilized at 30°C. HRP (50 ng/mL) in 20 mM MES buffer, pH = 6.0, and Au@Pt-mAb (1:100 dilution) in 20 mM sodium acetate buffer, pH = 4.0 were used. For the kinetic measurements, the concentrations of TMB (0.1-2 mM) and H_2O_2 (0.02 -4000 mM) varied. The substrate solution was mixed with Au@Pt or HRP, and the optical density at 650 nm was recorded every 5 s over 5 min. The initial rate was calculated as the slope of the linear fit ($R^2 \geq 0.98$). The Michaelis-Menten kinetic model was used to calculate the Michaelis-Menten and inhibitory constants using Origin Pro 2021 software (OriginLab, Northampton, MA, USA).

Microplate immunoassays

Monoclonal antibodies (ABHBS-0406) were diluted with 50 mM sodium phosphate buffer saline (PBS), pH = 7.5. An aliquot (100 μL) of antibodies was added to the microplate wells (Corning Costar, polystyrene flat bottom, medium binding) and incubated for two hours at 37°C. The microplate was washed five times with PBS supplemented with 0.05% Triton X-100 (PBST). Then, hepatitis B surface antigen in PBST (100 μL) was added and incubated for one hour at 37°C. After washing the microplate with PBST, an aliquot of mAb-Au@Pt (1:150 dilution in PBST, 100 μL) was added and incubated for one hour at 37°C. The microplate was washed with PBST, and the aliquot (100 μL) of the substrate solution was added. Twelve various substrates solutions were tested – (1) 0.2 mM TMB and 5 mM H_2O_2, (2) 0.2 mM TMB and 500 mM H_2O_2, (3) 0.2 mM TMB and 1000 mM H_2O_2, (4) 0.5 mM TMB and 5 mM H_2O_2, (5) 0.5 mM TMB and 500 mM H_2O_2, (6) 0.5 mM TMB and 1000 mM H_2O_2, (7) 1 mM TMB and 5 mM H_2O_2, (8) 1 mM TMB and 500 mM H_2O_2, (9) 1 mM TMB and 1000 mM H_2O_2, (10) 1.5 mM TMB and 5 mM H_2O_2, (11) 1.5 mM TMB and 500 mM H_2O_2, (12) 1.5 mM TMB and 1000 mM H_2O_2. After 10 min of substrate incubation, 50 μL of 2 M H_2SO_4 was added, and optical density at 450 nm was recorded. As the negative control not-spiked PBST was used. The LOD values were determined as the hepatitis B surface antigen concentration higher than the mean value of the negative control plus its three standard deviations. All measurements were performed in three repeats.

S2. Michaelis–Menten constants for nanozymes

Table S1. The values of the Michaelis–Menten constants (K_m) for TMB and H_2O_2 for peroxidase-mimicking nanozymes.

Nanozyme Material	***K*m for TMB (mM)**	***K*m for H_2O_2 (mM)**	**Ref.**
Ag	0.19	7.61	[2]
Au-PEG	0.155	191	[3]
Au-citrate	0.134	213	
Au	0.094	272.78	[4]
Au	0.057	17.3	[5]
Au	3.59	16.71	[6]
Au	0.097	199.4	[7]
Au	0.00253	25.3	[8]
Au	0.0411	167	[9]
Au	0.00664	2.46	[10]
Au	0.0112	33	[11]
Au	0.2	572.98	[12]
β-casein-Au, 8.7 nm	0.035	191	[13]
β-casein-Au, 4.2 nm	0.023	130	
β-casein-Au, 2.8 nm	0.055	142	
Cu	0.648	29.16	[14]
Cu	0.543	32.87	[15]
Cu	1.047	31.265	[16]
Fe	0.35	0.65	[17]
Apoferritin-Fe	0.73	6.7	[18]
Ir	0.02	266	[19]
Ir	0.03	18.2	[20]
Glutathione -Pd 1.4 nm	0.045	254	[21]
Glutathione -Pd 2.6 nm	0.068	156	
Glutathione -Pd 3.5 nm	0.08	137	
Pd	0.1098	4.398	[22]
	0.195	23	[23]
Pt	0.1206	205.6	[24]
Pt	0.096	3.07	[25]
Pd	0.054	700	[26]
Pt	0.42	84.07	[27]
Pt 3.3. nm	0.03	88.7	[28]
Pt 3.6 nm	0.792	73.6	
Pt-apoferritin	0.22	187.2	[29]
Pt	0.119	41.8	[30]
Apoferritin-Pt	0.52	1.09	[18]
Pt	0.054	14.18	[31]

Pt	0.0186	155	[32]
DNA-Pt, 2.1 nm	0.0329	74.4	[33]
DNA-Pt, 2.9 nm	0.056	48	
DNA-Pt, 1.8 nm	0.0162	117.2	
Pt	0.052	63.86	[34]
Pt	0.1274	1.14	[35]
Rh	0.198	0.38	[36]
Ru	0.234	2.206	[37]
Ru	0.0603	318	[38]
Au-Ag	0.396	94.7	[39]
Au@Ag@Pt	0.130	0.0583	[40]
Au@Pt	0.3	10.67	[41]
Au@Pt	0.026	219	[42]
Au@Pt	0.041	6.85	[43]
Au@PtCu	0.036	23	[42]
$Fe_{0.5}Co_{0.5}$	1.79	0.06	[44]
Fe	0.38	0.32	[44]
Co	5.09	1.14	[44]
Apoferritin-Fe-Pt	0.16	0.95	[18]
FePt-Au	0.445	0.0185	[45]
NiPd	0.11	0.66	[46]
Pd-Ir	0.13	340	[26]
Pd@Pt	0.0865	2.231	[22]
PtPd	1.78	0.053	[47]
PtPd nanorods	1.62	0.05	[48]
PtPd nanoparticles	0.22	6.41	
CoAl	0.372	22.13	[49]
CoAl layered double hydroxides	1.775	10.24	[50]
$Cu(OH)_2$	1.335	0.379	[51]
$Cu(OH)_2$	2.448	0.199	[52]
$Ni(OH)_2$	0.023	1.76	[53]
NiO	0.018	1.77	
CeO_2	0.046	64.6	[54]
CeO_2	0.147	293	[55]
Fe- CeO_2	0.176	47.6	[56]
CeO_2	0.0106	0.366	[57]
H2TCPP- CeO_2	0.0854	0.254	[58]
CeO_2	0.274	0.278	
$CoFe_2O_4$, 4.1 nm	0.00645	0.035	[59]
$CoFe_2O_4$,13.8 nm	0.05537	0.228	
$CoFe_2O_4$,24.5 nm	0.01725	0.039	
$CoFe_2O_4$, 32.1 nm	0.02427	0.066	
$CoFe_2O_4$,45.2 nm	0.03476	0.111	
$Co_xFe_{3-x}O_4$, Co0	0.13	17.02	[60]

$Co_xFe_{3-x}O_4$, Co20	0.11	17.17	
$Co_xFe_{3-x}O_4$, Co40	0.12	18.38	
$Co_xFe_{3-x}O_4$, Co60	0.20	17.15	
Co_3O_4	0.037	140.07	[61]
Co_3O_4	0.0562	34.38	[62]
Co_3O_4	0.12	245	[63]
Co_3O_4	0.01513	0.826	[64]
Co_3O_4 nanoplates	0.09	284	[65]
Co_3O_4 nanorods	0.22	455	
Co_3O_4 nanocubes	0.26	480	
Porphyrin- Co_3O_4	0.0283	6.1	[66]
Co_3O_4	0.32446	29.205	
CuO	0.016	41	[67]
CuO	0.013	85.6	[68]
CuO	0.018	35.74	[69]
Fe^{3+}-polymer, calcination temp.400°C	0.153	86.425	[70]
Fe^{3+}-polymer, calcination temp.450°C	0.214	125.9	
Fe^{3+}-polymer, calcination temp.500°C	0.236	132.9	
Fe_2O_3	0.0887	157.19	[71]
Fe_3O_4	0.099	50	[72]
Fe_3O_4	0.45	18.71	[73]
Fe_3O_4	0.836	23.466	[74]
Fe_3O_4	0.098	154	[75]
Porphyrin- Fe_3O_4	0.439	0.919	[76]
Fe_3O_4	0.0603	3.927	
Fe_3O_4	0.255	237	[77]
Fe_3O_4	0.187	30	[78]
Fe_3O_4	0.185	39	
$LaCoO_3$	0.24	15	[79]
$LaNiO_3$	0.105	90.05	[80]
$MgFe_2O_4$	0.67	4.61	[81]
$NiFe_2O_4$	0.55	2.60	
$Mn_{0.5}Fe_{0.5}Fe_2O_4$	0.139	310	[82]
MoO_3	0.093	109.5	[83]
NiO	0.25	6.25	[84]
RuO_2	0.236	212	[85]
TiO_2	0.127	5.26	[86]
VO_2	0.146	1.69	[87]
CoS	0.41	7.15	[88]
Co_9S_8	1.64	7.39	[89]
CuS	0.064	1.753	[90]
$Cu_{1.8}S$	1.72	37.1	[91]

FeS	0.0082	9.36	[92]
FeSe	0.0089	8.09	
FeS	0.008	7.67	[93]
FeS	0.13	7.2	[94]
Fe_3S_4	0.16	1.158	[95]
Fe_7S_8	0.548	0.895	[96]
MoS_2	0.0116	0.525	[97]
MoS_2	4.55	0.019	[98]
MoS_2-SDS	2.04	0.013	
MoS_2-CTAB	6.92	0.022	
MoS_2	0.232	3.66	[99]
MoS_2	0.005	0.01	[100]
MoS_2	0.163	0.767	[101]
VS_2	0.28	3.49	[102]
WS_2	0.467	0.926	[103]
WS_2	1.83	0.24	[104]
ZnS	0.054	0.1724	[105]
$AgVO_3$	8.03	14	[106]
$AgVO_3$	0.333	1.3	[107]
BN	0.157	10.88	[108]
$CeVO_4$	0.136	3.52	[109]
Co_4N	0.243	2.95	[110]
$Fe_3H_9(PO_4)_6$	8.63	0.41	[111]
FeP-Prussian Blue	0.0653	2.907	[112]
FeSe	0.04	13.2	[113]
FeS	0.08	7.44	
Indium tin oxide	0.26	5.47	[114]
MnSe	0.0348	87	[115]
$MoSe_2$	0.2168	2.53	[116]
Prussian Blue	0.76	840	[117]
Prussian Blue	0.337	14.7	[118]
Prussian Blue	0.91	7.82	[119]
WC	0.274	119.6	[120]
WSe_2	0.0433	19.53	[121]
$Ag@Fe_3O_4$	3.46	75.2	[122]
Au@Ag-hemin-reduced graphene	0.048	2.75	[123]
Au@hollow carbon	0.0323	210	[124]
Au/CeO_2	0.29	44.69	[125]
$Au@Cu_XOS$	0.265	0.159	[126]
$Au\text{-}Fe_2O_3$	0.0429	138.5	[127]
Au-graphene	0.29	274.22	[128]
Au-graphene	0.14	140.52	[129]
Au-citrate-graphene	0.059	25.08	[130]
Au-graphene	0.38	26.42	

Au-cutrate	0.74	45.83	
Au-PVP-graphene	2.63	104	
Au-graphene oxide	0.16	142.39	[131]
Au-mesoporous silica	0.0411	15.81	[132]
Au@TiO_2	1.09	0.29	[133]
BN/CuS	0.175	25	[134]
Carbon dots/Fe_3O_4	0.06	56.97	[135]
CeO_2/NiO	0.0832	56.2	[136]
$CoFe_2O_4$	0.046	14.72	[137]
Co_3O_4-C_3N_4	0.056	30.04	[138]
Co_3O_4@CeO_2	0.140	7.09	[139]
Co_3O_4/graphene oxide	0.19	24.04	[140]
Co_3O_4	0.30	24.64	
Cu-Ag/ graphene oxide	0.634	8.6245	[141]
Ag/ graphene oxide	0.8503	20.928	
Cu/ graphene oxide	1.05	26.332	
Cu-hemin	1.42	2.18	[142]
Cu@C	1.65	1.89	[143]
Cu-C_3N_4	0.389	9.27	[144]
CuO-C_3N_4	0.9	1.05	[145]
CuO/Pt	0.413	2.887	[146]
Fe_3C-C_3N_4	0.25	38.42	[147]
Fe@C	0.1	114.4	[148]
SiO_2@Fe_2O_3	3.05	965.98	[149]
Au	0.0251	0.229	[150]
Fe_3O_4@C	0.072	0.38	[151]
Fe_3O_4/N-C	0.06	3.2	[152]
Fe_3O_4@CeO_2	0.15	1.13	[153]
Fe_3O_4@SiO_2	0.193	273	[154]
Fe_3O_4	0.173	185	
Fe_3O_4@SiO_2@Au	5.71	2.05	[155]
Fe-graphene oxide	0.76	0.36	[156]
Graphene oxide-Fe_2O_3	0.118	305	[157]
Graphene oxide-Fe_3O_4	0.43	0.71	[158]
Graphene oxide-Fe_3O_4-Pt	2.37	3.56	[159]
Pt	1.47	3.30	
Graphene oxide-Fe	1.71	3.09	[160]
Hemin-graphene	5.1	2.256	[161]
MoS_2/graphene oxide	0.1	0.2	[162]
MoS_2- polypyrrole	0.41	12.8	[163]
MoS_2–$Pt_{74}Ag_{26}$	25.71	0.386	[164]
MoS_2/PtCu	0.22	0.801	[165]
Prussian Blue	4.1	49.6	[166]
Fe_2O_3@Prussian Blue	0.307	323.6	[167]
Prussian Blue	5.23	19.22	[168]

Pd-$NiCl_2$	0.28	10.82	[169]
Pd/N-S	1.44	42.7	[170]
Pt/CeO_2	0.26	0.21	[171]
Pt-graphene oxide	0.0806	935	[172]
Pd-C	0.13	58.01	[173]
Pt-CN	1.056	7.362	[174]
Pt-GO	0.1864	221.4	
SiO_2@Co_3O_4	0.087	25.2	[175]
Fe_3O_4@Pt	0.14	702.6	[176]
Fe_3O_4	0.485	1175.3	
Pt/GO	0.1864	221.1	[177]
Pt	0.29	10.97	[178]
$Pt_{50}Ag_{50}$	0.25	0.35	[179]
Dealloyed $Pt_{50}Ag_{50}$	0.38	0.86	
Au@Pt	0.00243	0.004076	[180]
$ZnFe_2O_4$	0.85	1.66	[181]
Pt	0.127	61.5	[182]
Pd	0.12	1	[183]
Pd@Pt	0.43	14	
Hollow Pt	0.81	6.9	
Ag_3PO_4	0.327	0.216	[184]
Fe-N-C single atom nanozyme	0.3322	17.12	[185]
Graphene quantum dots	0.01	8	[186]
Prussian Blue	0.178	3.29	[187]
Pt	0.067	149	[188]
Au_2Pt_1	0.088	196	
Pt	0.0995	230.8	[189]
C60-carboxyfullerenes	0.2333	24.58	[190]
Pd-Pt	3.11	33.4	[191]
Au	0.23	0.16	[192]
Au	0.27	0.20	
Au	0.58	0.41	
Nanodiamonds	0.103	0.752	[193]
Au	0.18880	113	[194]
Gum Arabic-Au	0.0942	84	
PVP-Au	0.0551	96	
Citrate Au	0.0493	151	
Cysteamine-Au	0.0528	213	
Au@Pt	0.285	0.341	[195]
Fe-tannic acid	0.152	3.50	[196]
Cu-PDA	0.172	0.130	[197]
CuCo@PDA	0.8	17.3	[198]
Fe-N-C single atom nanozyme	0.052	0.191	[199]

Au@Pd	0.45	5.53	[200]
Au@Pd@Pt	0.065	4.59	[201]
Fe-N-C single atom	0.08	28.3	[202]
Pt-Ir	0.38	4.13	[203]
Fe-single atom nanozyme	0.24	16.28	[204]
FeOOH	0.41	4.08	[205]

S3. Michaelis–Menten constants for HRP

Table S2. The values of the Michaelis–Menten constants (K_m) for TMB and H_2O_2 for HRP.

K_M	**Ref**
K_M = 0.3322 mM for TMB K_M = 18.64 mM for H_2O_2	[185]
K_M = 0.01mM for TMB K_M = 0.37 mM for H_2O_2	[188]
K_M = 0.5 mM for TMB K_M = 0.645 mM for H_2O_2	[190]
K_M = 0.415 mM for TMB K_M = 5.2 mM for H_2O_2	[55]
K_M = 0.367 mM for TMB K_M = 3.4 mM for H_2O_2	[195]
K_M = 0.434 mM for TMB K_M = 3.70 mM for H_2O_2	[75]
K_M = 0.318 mM for TMB K_M = 0.217 mM for H_2O_2	[8]
K_M = 0.301 mM for TMB K_M = 0.935 mM for H_2O_2	[10]
K_M = 0.20 mM for TMB K_M = 0.16 mM for H_2O_2	[131]
K_M = 0.14 mM for TMB K_M = 0.81 mM for H_2O_2	[18]
K_M = 0.126 mM for TMB K_M = 0.322 mM for H_2O_2	[54]
K_M = 0.172 mM for TMB K_M = 10.9 mM for H_2O_2	[97]
K_M = 0.20 mM for TMB K_M = 0.16 mM for H_2O_2	[98]
K_M = 0.204 mM for TMB K_M = 0.171 mM for H_2O_2	[137]
K_M = 0.041 mM for TMB K_M = 6.36 mM for H_2O_2	[128]
K_M = 0.069 mM for TMB K_M = 3.42 mM for H_2O_2	[129]
K_M = 0.723 mM for TMB K_M = 3.20 mM for H_2O_2	[139]
K_M = 0.25 mM for TMB K_M = 0.224 mM for H_2O_2	[151]
K_M = 0.2343 mM for TMB K_M = 0.2832 mM for H_2O_2	[177]
K_M = 0.102 mM for TMB K_M = 0.25 mM for H_2O_2	This article

S4. Effect of the substrate concentration on the reaction rate

The rate of the reaction is determined by the Michaelis-Menten model (1).

V_{max} – max. reaction rate;

[S] – concentration of the substrate'

K_M – Michaelis-Menten constant

$$v_0 = \frac{V_{max} \times [S]}{(K_M + [S])} \quad (1)$$

When the concentration of the substrate is significantly higher then Michaelis-Menten constant (*[S]* >> K_M) (2)

$$v_o \rightarrow V_{max} \ (2)$$

The fraction of max rate (%) is determined by the substrate concentration (3)

$$\frac{v_o}{V_{max}} = \frac{[S]}{K_M + [S]} \times 100\% \ (3)$$

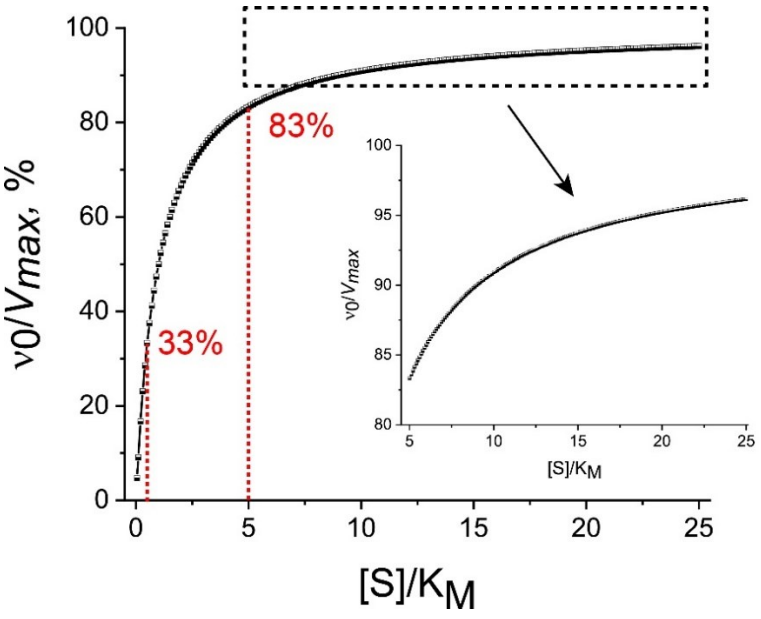

Fig S1. Effect of the substrate concentration (substrate to K_M ratio) on the rate of the reaction. The red dotted lines show substrate concentration equal to 0.5 × K_M (33% of max rate) and 5 × K_M (83% of max rate).

S5. Bioanalytical applications of nanozymes

Table S3. Kinetic parameters and bioanalytical applications of nanozymes.

Nanozyme	Kinetic parameters	Inhibition by the substrate	Conditions of nanozyme catalysis	Application of nanozyme catalysis	Ref.
Au@Pt	Not measured	Not measured	0.05% DAB and 0.015% H_2O_2 in PBS, pH 7.2	Signal amplification in lateral flow immunoassay (LFIA)	[206]
Au@Pt	K_M = 5.75 mM for H_2O_2 Not measured for TMB and DAB	Not measured	200 mM H_2O_2 0.05% DAB 0.05% $NiSO_4$ in 50 mM PBS, pH=7.3	Signal amplification in LFIA	[207]
Au@Ag-Pt	K_M = 0.06 mM for TMB K_M =320 mM for H_2O_2	Not measured	200 mM H_2O_2 0.05% DAB 0.05% $NiSO_4$ in 50 mM PBS, pH=7	Signal amplification in LFIA	[208]
Prussian Blue	Not measured	Not measured	Commercial DAB substrate	Signal amplification in LFIA	[209]
Prussian Blue	Not measured	Not measured	Commercial TMB substrate	Signal amplification in LFIA	[210]
Prussian Blue	Not measured	Not measured	10 mM DAB, H_2O_2 not reported	Signal amplification in LFIA	[211]
Prussian Blue	Not measured	Not measured	5 mg/mL TMB and 15% H_2O_2	Signal amplification in vertical flow immunoassay	[212]
Prussian Blue	Not measured	Not measured	TMB and H_2O_2 not reported	Signal amplification in LFIA	[213]
Prussian Blue	K_M = 0.178 mM for TMB K_M =3.29 mM for H_2O_2	No inhibition TMB ≤ 1.3 mM H_2O_2 ≤ 30 mM	1 mM TMB 60 mM H_2O_2	Colorimetric and electrochemical sensing	[187]

Fe_3O_4@Prussian Blue	Not measured	Not measured	10 mM TMB and 500 mM H_2O_2	Signal amplification in LFIA	[214]
Mesoporous silica particles loaded with Prussian Blue	Not measured	Not measured	TMB and H_2O_2 not reported	Signal amplification in paper-based assay	[215]
Fe_2O_3@Prussian Blue	K_M = 0.307 mM for TMB K_M =323.6 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM H_2O_2 ≤ 800 mM	TMB and H_2O_2 not reported	ELISA-like colorimetric assay	[167]
Fe_3O_4@Pt	Not measured	Not measured	Commercial DAB substrate supplemented with 7% H_2O_2	Signal amplification in LFIA	[216]
Pt	K_M = 0.1206 mM for TMB K_M =205.6 mM for H_2O_2	Not measured	0.8 mM TMB and 500 mM H_2O_2	Colorimetric assay	[24]
Pt nanoclusters	K_M = 0.096 mM for TMB K_M =3.07 mM for H_2O_2	Shown for the assay. No inhibition TMB ≤ 0.8 mM H_2O_2 ≤ 0.6 mM	0.5 mM TMB and H_2O_2 was varied	Colorimetric assay	[25]
Pt	K_M = 0.120 mM for TMB K_M =769 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM H_2O_2 ≤ 1600 mM	0.921 mM TMB and 7.63 M H_2O_2	ELISA-like colorimetric assay	[217]
Pt nanoclusters	Diameter 3.3 nm K_M = 0.03 mM for TMB K_M =88.7 mM for H_2O_2 Diameter 3.6 nm K_M = 0.079 mM for TMB	No inhibition TMB ≤ 0.14 mM H_2O_2 ≤ 200 mM	0.125 mM TMB, 125 mM H_2O_2	Colorimetric assay	[28]

	K_M =73.6 mM for H_2O_2				
Pt	K_M = 0.119 mM for TMB K_M =41.8 mM for H_2O_2	No inhibition TMB ≤ 0.4 mM H_2O_2 ≤ 250 mM	0.125 mM TMB, 125 mM H_2O_2	Colorimetric assay	[30]
Pt	K_M = 0.0995 mM for TMB K_M =230.8 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM H_2O_2 ≤ 2500 mM	0.8 mM TMB, 500 mM H_2O_2	Colorimetric assay	[189]
Pt	K_M = 0.052 mM for TMB K_M =63.86 mM for H_2O_2	Shown for the assay. No inhibition TMB ≤ 0.3 mM H_2O_2 ≤ 100 mM	0.08 mM TMB 80 mM H_2O_2	Colorimetric assay	[34]
PtPd	K_M = 1.78 mM for TMB K_M =0.053 mM for H_2O_2	No inhibition TMB ≤ 20 mM H_2O_2 ≤ 5 mM	Not reported	Signal amplification in LFIA	[47]
Au@Pt	K_M = 0.041 mM for TMB K_M =6.85 mM for H_2O_2	No inhibition TMB ≤ 0.3 mM H_2O_2 ≤ 25 mM	0.95 mM TMB 182 mM H_2O_2	Colorimetric assay	[43]
Graphene quantum dots	K_M = 0.01 mM for TMB K_M =8 mM for H_2O_2	No inhibition TMB ≤ 0.18 mM H_2O_2 ≤ 300 mM	0.4 mM TMB H_2O_2 generated in situ by choline oxidase	Colorimetric assay	[186]
Au@Pt	K_M = 0.0095 mM and 0.027 mM for TMB for various Au@Pt compositions		6.3 mM TMB 10 mM H_2O_2	ELISA-like colorimetric assay	[218]

	K_M for H_2O_2 was not reported				
Pt clusters on the Fe single-atom	K_M = 1.8 mM for TMB K_M =12.2 mM for H_2O_2	No inhibition TMB ≤ 1.6 mM H_2O_2 ≤ 80 mM	0.16 mM TMB H_2O_2 generated in situ by glucose oxidase	ELISA-like colorimetric assay	[219]
Graphene oxide-cationic multi-shaped GNP-hemin	K_M = 0.24-0.52 mM for TMB for various targets K_M =396-1100 mM for H_2O_2 for various targets	No inhibition TMB ≤ 3 mM H_2O_2 ≤ 1000 mM	0.77 mM TMB 200 mM H_2O_2	Colorimetric assay	[220]
Fe_3O_4@C	K_M = 0.2 mM for TMB K_M =0.23 mM for H_2O_2	No inhibition TMB ≤ 0.3 mM H_2O_2 ≤ 2 mM	0.5 mM TMB 200 mM H_2O_2	ELISA-like colorimetric assay	[221]
MoS_2	Not measured for N,N-diethyl-p-phenylenediamine and H_2O_2	Not measured	3 mM N,N-diethyl-p-phenylenediamine 10 mM H_2O_2	Colorimetric assay	[222]
Chitosan–coated Pd	K_M = 0.09 mM for TMB K_M =537.7 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM H_2O_2 ≤ 1500 mM	0.03 mM TMB 2.5 mM H_2O_2	Colorimetric assay	[223]
Pd	K_M = 0.165 mM for TMB K_M =1064 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM Inhibition if H_2O_2 ≥ 8000 mM	0.5 mM TMB 7.2 M H_2O_2	ELISA-like colorimetric assay	[224]
Co_3O_4	K_M = 0.037 mM for TMB K_M =140.07 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM H_2O_2 ≤ 2000 mM	0.4 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[61]

$ZnFe_2O_4$	K_M = 0.85 mM for TMB K_M =1.66 mM for H_2O_2	No inhibition TMB ≤ 1.6 mM Inhibition if H_2O_2 ≥ 600 mM	1.8 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[181]
CeO_2 of various shapes	Octahedron-shaped K_M = 3.743 mM for TMB K_M =415.2 mM for H_2O_2 Rod-shaped K_M = 0.230 mM for TMB K_M =302 mM for H_2O_2 Cube-shaped K_M = 0.1801 mM for TMB K_M =30.9 mM for H_2O_2	No inhibition TMB ≤ 2 mM H_2O_2 ≤ 2000 mM	2 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[225]
Ag of various shapes	Flower-shaped K_M = 1.1 mM for TMB K_M =369.6 mM for H_2O_2 Spherical-shaped K_M = 0.6 mM for TMB K_M =383.9 mM for H_2O_2	No inhibition TMB ≤ 1.6 mM H_2O_2 ≤ 600 mM	0.8 mM TMB 55 mM H_2O_2	Colorimetric assay	[226]
Pd@Pt	K_M = 0.0865 mM for TMB K_M =2.231 mM for H_2O_2	No inhibition TMB ≤ 0.75 mM H_2O_2 ≤ 10 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[22]
Pt	K_M = 0.174 mM for TMB	No inhibition	0.5 mM TMB 100 mM H_2O_2	Colorimetric assay	[227]

	K_M =82.7 mM for H_2O_2	TMB ≤ 1.5 mM H_2O_2 ≤ 140 mM			
Pd	K_M = 0.063 mM for TMB K_M =80.8 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM H_2O_2 ≤ 180 mM	0.125 mM TMB 125 mM H_2O_2	Colorimetric assay	[228]
Au/Cu_2O	K_M = 0.21 mM for TMB K_M =10.56 mM for H_2O_2	No inhibition TMB ≤ 1 mM H_2O_2 ≤ 50 mM	0.167 mM TMB H2O2 concentration was varied	Colorimetric assay	[229]
AuPd	K_M = 0.295 mM for TMB K_M =5.89 mM for H_2O_2	No inhibition TMB ≤ 1 mM H_2O_2 ≤ 25 mM	0.85 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[230]
IrO_2-graphene oxide	K_M = 0.56 mM for TMB K_M =5.19 mM for H_2O_2	No inhibition TMB ≤ 2 mM H_2O_2 ≤ 200 mM	0.5 mM TMB 5 mM H_2O_2	Colorimetric assay	[231]
Ir	K_M = 0.12 mM for TMB K_M =3.27 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM H_2O_2 ≤ 2.5 mM	0.25 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[232]
Pd-Ir	K_M = 0.13 mM for TMB K_M =340 mM for H_2O_2	Inhibition if TMB ≥ 1 mM Inhibition if H_2O_2 ≥ 7000 mM	0.8 mM TMB 2000 mM H_2O_2	ELISA-like colorimetric assay	[26]
BSA-MnO_2	K_M = 0.31 mM for o-phenylenediamine K_M =0.12 mM for H_2O_2	No inhibition o-phenylene	5 mM o-phenylenediamine	ELISA-like colorimetric assay	[233]

		diamine ≤ 8 mM $H_2O_2 \leq 4$ mM			
Fe_3O_4-Au	Not measured	Not measured	5 mM luminol 4 mM H_2O_2	Chemiluminescence immunoassay	[234]
Au	K_M = 0.024 mM for TMB K_M =57.84 mM for H_2O_2	No inhibition TMB ≤ 0.15 mM $H_2O_2 \leq$ 500 mM	0.08 mM TMB 0.4 mM H_2O_2	Colorimetric assay	[235]
Doped graphene	Not measured	Not measured	0.5 mM TMB 5-25 mM H_2O_2	Colorimetric assay	[236]
Pt nanoclusters of various diameters	2.1 nm diameter K_M = 0.4964 mM for TMB K_M =0.9504 mM for H_2O_2 3.2 nm diameter K_M = 0.4394 mM for TMB K_M =1.183 mM for H_2O_2 4.0 nm diameter K_M = 0.6488 mM for TMB K_M =2.900 mM for H_2O_2	Not measured	0.47 mM TMB 4.8 mM H_2O_2	Colorimetric assay	[237]
Au	Not measured	Not measured	Commercial TMB kit	Colorimetric assay	[238]
Fe_3O_4	Not measured	Not measured	DAB and H_2O_2 concentrations not specified	Signal amplification in LFIA	[239]
Au@Pt	Not measured	Not measured	TMB not specified 20 mM H_2O_2	SERS registration	[240]
Au-Ag@Pt	K_M = 0.13 mM for TMB K_M =0.3 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM $H_2O_2 \leq$ 0.3 mM	TMB and H_2O_2 concentrations not specified	Signal amplification in LFIA	[241]

Graphene Oxide/Fe-metal-organic framework	K_M = 0.3599 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 1.5 mM Not measured for H_2O_2	Commercial TMB kit	Colorimetric assay	[242]
NiCo@C	K_M = 0.34 mM for TMB K_M =8.71 mM for H_2O_2	No inhibition TMB ≤ 1.0 mM H_2O_2 ≤ 30 mM	0.5mM TMB 10 mM H_2O_2	Colorimetric assay	[243]
Fe_2MoO_4	K_M = 3.056 mM for TMB K_M =0.257 mM for H_2O_2	No inhibition TMB ≤ 2.0 mM H_2O_2 ≤ 2.5 mM	TMB and H_2O_2 concentrations not specified	Colorimetric assay	[244]
$Co_2V_2O_7$	K_M = 0.311 mM for TMB K_M =0.669 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM H_2O_2 ≤ 7 mM	H_2O_2 concentrations not specified	Fluorescent assay	[245]
Pt/Co_3O_4	K_M = 0.2116 mM for TMB K_M =0.1644 mM for H_2O_2	No inhibition TMB ≤ 0.15 mM H_2O_2 ≤ 0.18 mM	0.17 mM TMB H_2O_2 concentrations not specified	Colorimetric assay	[246]
Pd@Pt	K_M = 0.5 mM for TMB K_M =0.2 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM H_2O_2 ≤ 0.5 mM	Commercial TMB substrate	Colorimetric paper-based assay	[247]
PtCu	K_M = 0.24 mM for TMB K_M =7.77 mM for H_2O_2	No inhibition TMB ≤ 1.5 mM H_2O_2 ≤ 100 mM	1.3mM TMB 16 mM H_2O_2	Colorimetric assay	[248]
CuO	Not measured	Shown for the assay;	8.69 mM TMB 65 mM H_2O_2	Colorimetric assay	[249]

		No inhibition TMB ≤ 13 mM; H_2O_2 ≤ 108.7 mM;			
N, S-doped carbon dots@Ag	K_M = 0.307 mM for TMB K_M =1.137 mM for H_2O_2	No inhibition TMB ≤ 1.2 mM H_2O_2 ≤ 300 mM	2 mM TMB H_2O_2 generated in situ by cholesterol oxidase	SERS detection	[250]
Fe, N-Doped Carbon Dot	K_M = 0.23 mM for TMB K_M =1.10 mM for H_2O_2	No inhibition TMB ≤ 0.6 mM H_2O_2 ≤ 3 mM	0.5 mM TMB H_2O_2 generated in situ by cholesterol/glucose oxidase	Paper based colorimetric assay	[251]
MoS_2-MIL-101(Fe)	K_M = 0.12 mM for TMB K_M =0.015 mM for H_2O_2	No inhibition TMB ≤ 1.5 mM H_2O_2 ≤ 210 mM	0.25 mM TMB 0.4 mM H_2O_2	Colorimetric assay	[252]
Vancomycin-stabilized Pd	K_M = 1.007 mM for TMB K_M =0.623 mM for H_2O_2	No inhibition TMB ≤ 0.36 mM H_2O_2 ≤ 2 mM	0.44 mM TMB 2.2 mM H_2O_2	Colorimetric assay	[253]
Fe-coordinated L-lysine	K_M = 0.372 mM for TMB K_M =0.478 mM for H_2O_2	No inhibition TMB ≤ 2 mM H_2O_2 ≤ 2 mM	0.53 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[254]
N-doped carbon dots@Fe_3O_4	K_M = 0.607 mM for TMB K_M =0.719 mM for H_2O_2	No inhibition TMB ≤ 0.7 mM H_2O_2 ≤ 0.7 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[255]
$CoFe_2O_4$	Not measured	Not measured	Commercial DAB staining kit	Signal amplification in LFIA	[256]

Fe-doped CuO	K_M = 0.986 mM for TMB K_M =15.9 mM for H_2O_2	No inhibition TMB ≤ 0.67 mM H_2O_2 ≤ 100 mM	0.5 mM TMB 0.15 mM H_2O_2	Colorimetric assay	[257]
Fe/Zr-UIO-66 MOF	Not measured	Not measured	2.5 mM TMB 5 mM H_2O_2	Colorimetric assay	[258]
PVP-Pt	K_M = 0.022 mM for TMB K_M =3.92 mM for H_2O_2	Shown for the assay; No inhibition TMB ≤ 30 mM H_2O_2 ≤ 400 mM	2.5 mM TMB 166 mM H_2O_2	Colorimetric assay	[259]
Pt@Au	Not measured	Not measured	Not specified	Colorimetric assay	[260]
Fe_3O_4	Not measured	Not measured	Not specified	Signal amplification in LFIA	[261]
Prussian Blue	Not measured	Not measured	0.4 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[262]
Albumin-Prussian Blue	Not measured	Not measured	0.4 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[263]
MoS_2-Prussian Blue	K_M = 0.22 mM for TMB K_M =3.17 mM for H_2O_2	No inhibition TMB ≤ 0.1 mM H_2O_2 ≤ 20 mM	0.1 mM TMB 20 mM H_2O_2	Colorimetric assay	[264]
Tannic acid-caped Au	K_M = 0.2 mM for TMB K_M =190 mM for H_2O_2	No inhibition TMB ≤ 1 mM H_2O_2 ≤ 600 mM	0.5 mM TMB 530 mM H_2O_2	Colorimetric assay	[265]
Fe@BC	Not measured	Not measured	Commercial TMB kit	ELISA-like colorimetric assay	[266]
Fe-coordination polymer	K_M = 0.166 mM for TMB K_M =0.189 mM for H_2O_2	No inhibition TMB ≤ 1 mM	0.4 mM TMB 3 mM H_2O_2	ELISA-like colorimetric assay	[267]

		$H_2O_2 \leq$ 0.5 mM			
Au@Pt@SiO_2	K_M = 0.124 mM for TMB K_M =121.8 mM for H_2O_2	No inhibition TMB ≤ 1 mM $H_2O_2 \leq$ 3.3 M	1 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[268]
Fe_3O_4	Not measured	Not measured	DAB- H_2O_2 commercial staining kit	Signal amplification in LFIA	[269]
Au	Not measured	Not measured	Not specified	ELISA-like colorimetric assay	[270]
Au	Not measured	Not measured	0.78 mM TMB 300 mM H_2O_2	ELISA-like colorimetric assay	[271]
PdRu	K_M = 0.745 mM for TMB K_M =1.628 mM for H_2O_2	No inhibition TMB ≤ 1 mM $H_2O_2 \leq$ 5 mM	0.4 mM TMB 3 mM H_2O_2	ELISA-like colorimetric assay	[272]
Au-graphene-chitosan	K_M = 0.048 mM for TMB K_M not reported for H_2O_2	Shown for the assay; No inhibition TMB ≤ 25 mM $H_2O_2 \leq$ 16 mM	15 mM TMB 5 mM H_2O_2	ELISA-like colorimetric assay	[273]
Au@Ag	K_M = 0.25 mM for TMB K_M =0.17 mM for H_2O_2	No inhibition TMB ≤ 1 mM $H_2O_2 \leq$ 1 mM	10 mM TMB 2500 mM H_2O_2	ELISA-like colorimetric assay	[274]
Pt-Au	Not measured	Not measured	Commercial TMB solution	Signal amplification in LFIA	[275]
Fe-N-C single atom nanozyme	Not measured	Not measured	1.4 mM TMB 1.4 mM H_2O_2	ELISA-like colorimetric assay	[276]
Au@Pt@Au	Not measured	Not measured	Not specified	ELISA-like colorimetric assay	[277]

Au@Pt	Not measured	Not measured	Not specified	Optical sensor	[278]
Ru-Te_2	K_M = 0.419 mM for TMB K_M =18.4 mM for H_2O_2	No inhibition TMB ≤ 5 mM H_2O_2 ≤ 40 mM	1 mM TMB 100 mM H_2O	ELISA-like colorimetric assay	[279]
Pt@Co_3O_4-MOF	Not measured	Not measured	4 mM TMB 150 mM H_2O	ELISA-like colorimetric assay	[280]
Network of Fe_3O_4	K_M = 0.87 mM for TMB K_M =0.11 mM for H_2O_2	No inhibition TMB ≤ 2.5 mM H_2O_2 ≤ 200 mM	2.5 mM TMB 250 mM H_2O_2	Colorimetric assay	[281]
Au	Not measured	Not measured	5 mg/mL DAB 9000 mM H_2O_2	Signal amplification in LFIA	[282]
Fe single-atom nanozyme	K_M = 0.185 mM for TMB K_M =0.187 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM H_2O_2 ≤ 1 mM	Commercial luminol substrate kit	Signal amplification in LFIA	[283]
Au@Pd	K_M = 0.63 mM for TMB K_M =284 mM for H_2O_2	No inhibition TMB ≤ 3 mM H_2O_2 ≤ 2000 mM	Not specified	Colorimetric assay	[284]
Au	Not measured	No inhibition TMB ≤2 mM H_2O_2 ≤ 1000 mM	1 mM TMB 600 mM H_2O_2	Paper-based colorimetric assay	[285]
Rh	K_M = not measured for TMB K_M =15 mM for H_2O_2	Not measured for TMB; No inhibition H_2O_2 ≤ 40 mM	Not specified	Signal amplification in LFIA	[286]

Au@Pt	K_M = 0.3 mM for TMB K_M =10.67 mM for H_2O_2	No inhibition TMB ≤1 mM H_2O_2 ≤ 50 mM	0.5 mM TMB 20 mM H_2O_2	ELISA-like colorimetric assay	[41]
Pd@Pt	K_M = 0.516 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤2 mM Not measured for H_2O_2	Not specified	Colorimetric assay	[287]
Fe-MIL-88	K_M =1.5 mM for TMB K_M =1.7 mM for H_2O_2	No inhibition TMB ≤1 mM H_2O_2 ≤ 10 mM	1 mM TMB 10 mM H_2O_2	ELISA-like colorimetric assay	[288]
Albumin-Hemin	Not measured	Not measured	0.4 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[289]
Au-Pt	Not measured	Not measured	Commercial TMB kit	Colorimetric assay	[290]
Au-Ru	Not measured	Not measured	Commercial TMB kit	Colorimetric assay	
Au@Ag	Not measured for TMB K_M =20.595 mM for H_2O_2	Not measured for TMB, No inhibition H_2O_2 ≤ 1200 mM	Commercial TMB kit	ELISA-like colorimetric assay	[291]
Au@SiO_2	Not measured	Not measured	Not specified	ELISA-like colorimetric assay	[292]
Au@Pt	Not measured	Not measured	Not specified	ELISA-like colorimetric assay	[293]
Black phosphorous/ Au	K_M =0.417 mM for TMB K_M =20.69 mM for H_2O_2	No inhibition TMB ≤2.5 mM H_2O_2 ≤ 3000 mM	1.4 mM TMB 1800 mM H_2O_2	ELISA-like colorimetric assay and registration f photothermal effect	[294]

Prussian Blue	Not measured	Shown for the assay; No inhibition TMB ≤0.5 mM H_2O_2 ≤ 125 mM	0.5 mM TMB 125 mM H_2O_2	ELISA-like colorimetric assay	[295]
Citric-acid capped PtRu	K_M =0.046 mM for TMB K_M =14.9 mM for H_2O_2	No inhibition TMB ≤0.25 mM H_2O_2 ≤ 25 mM	0.5mm TMB 10 mM H_2O_2	Colorimetric assay	[296]
Au@Pt@SiO_2	Not measured	Shown for the assay; No inhibition TMB ≤0.4 mM H_2O_2 ≤ 100 mM	0.4 mm TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[297]
Pd-Ir of different sizes	3.3 nm K_M =0.27 mM for TMB K_M not measured for H_2O_2 5.9 nm K_M =0.64 mM for TMB K_M not measured for H_2O_2 9.8 nm K_M =0.4 mM for TMB K_M not measured for H_2O_2 13 nm K_M =0.34 mM for TMB	No inhibition TMB ≤0.6 mM Not measured for H_2O_2	0.8 mM TMB 2000 mM H_2O_2	ELISA-like colorimetric assay	[298]

	K_M not measured for H_2O_2				
AuPt@Fe_xO_y	K_M =0.0518-0.0754 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤0.6 mM Not measured for H_2O_2	Commercial TMB substrate supplemented with 2000 mM H_2O_2	Signal amplification in LFIA	[299]
Au@Pt	Not measured	Shown for the assay; No inhibition H_2O_2 ≤ 3000 mM	TMB not specified 2000 mM H_2O_2	Signal amplification in LFIA	[300]
Prussian Blue	Not measured	Not measured	0.5 mM TMB 125 mM H_2O_2	ELISA-like colorimetric assay	[301]
Fe_3O_4@MOF @Pt	K_M =0.49 mM for TMB K_M =125 mM for H_2O_2	Not measured	3-amino-9-ethylcarbazole not specified 1000 mM H_2O_2	Signal amplification in LFIA	[302]
Pt-BSA	Not measured	Not measured	Commercial TMB substrate	ELISA-like colorimetric assay	[303]
graphitic C_3N_4 - Cu_2O	Not measured	Not measured	12 mM TMB 3000 mM H_2O_2	Colorimetric assay	[304]
Cu^{2+}-graphene oxide	Not measured	No inhibition TMB ≤40 mM ≤50 for H_2O_2	40 mM TMB 50 mM H_2O_2	Colorimetric assay	[305]
DNA-modified MoS_2	K_M =0.6518 mM for TMB K_M =0.0348 mM for H_2O_2	No inhibition TMB ≤3.0 mM H_2O_2 ≤ 0.40 mM	0.4 mM TMB 0.2 mM H_2O_2	Colorimetric assay	[306]
DNA-modified graphitic C_3N_4	K_M =0.11 mM for TMB K_M =4.61 mM for H_2O_2	No inhibition TMB ≤0.8 mM;	0.5 mM TMB 5 mM H_2O_2	Colorimetric assay	[307]

		Inhibited if $H_2O_2 > 5$ mM			
DNA-modified-WS_2	K_M =4.437 mM for TMB K_M =0.702 mM for H_2O_2	No inhibition TMB ≤6.0 mM; $H_2O_2 \leq 2$ mM	5 mM TMB 2.5 mM H_2O_2	Colorimetric assay	[308]
Fe_3O_4	Not measured	No inhibition TMB ≤0.07 mM; $H_2O_2 \leq 40$ mM	0.04 mM TMB 35 mM H_2O_2	Colorimetric assay	[309]
Au@Pd	Not measured	Shown for the assay; No inhibition TMB ≤0.5 mM; $H_2O_2 \leq$ 1000 mM	0.5 mM TMB 1 mM H_2O_2	Colorimetric assay	[310]
Cu-MOF	Not measured	Not measured	Not specified	Colorimetric assay	[311]
Au	Not measured	Not measured for TMB; Inhibited if $H_2O_2 \geq$ 1000 mM	TMB not specified 50 mM H_2O_2	Colorimetric assay	[312]
Ag	K_M =0.053 mM for TMB K_M =6.3 mM for H_2O_2	No inhibition TMB ≤0.25 mM; $H_2O_2 \leq 10$ mM	0.25 mM TMB 1 mM H_2O_2	Colorimetric assay	[313]
Fe_3O_4	Not measured	Not measured	Not specified for o-phenylenediamine and H_2O_2	Colorimetric assay	[314]

Au	Not measured	Inhibited if ABTS ≥0.5 mM; And H_2O_2 ≥100 mM	0.5 mM ABTS 80 mM H_2O_2	Colorimetric assay	[315]
Au	Not measured	Inhibited if ABTS ≥0.5 mM; And H_2O_2 ≥40 mM	0.5 mM ABTS 40 mM H_2O_2	Colorimetric assay	[316]
Au	Not measured	Not measured	Commercial TMB substrate	Colorimetric assay	[317]
Pt/Pd	Not measured	Not measured	Commercial TMB substrate	Colorimetric assay	[318]
Au	Not measured	Shown for the assay; Signal reduced if TMB ≥0.75 mM; And H_2O_2 ≥750 mM	0.75 mM TMB 750 mM H_2O_2	Colorimetric assay	[319]
Fe_3O_4	Not measured	Shown for the assay, No inhibition TMB ≤4 mM; H_2O_2 ≤ 40 mM	3 mM TMB 20 mM H_2O_2	Colorimetric assay	[320]
Hemin-reduced graphene oxide	Not measured	Shown for the assay; No inhibition TMB ≤ 1 mM; H_2O_2 ≤ 20 mM	0.58 mM TMB 9.7 mM H_2O_2	Colorimetric assay	[321]

Au	Not measured	Shown for the assay; No inhibition TMB ≤ 4 mM; $H_2O_2 \leq$ 6000 mM	2 mM TMB 5000 mM H_2O_2	Colorimetric assay	[322]
$ZnFe_2O_4$/reduced graphene oxide	Not measured	Not measured	Commercial TMB substrate	ELISA-like colorimetric assay	[323]
Fe_3O_4	Not measured	Not measured	Commercial TMB substrate	ELISA-like colorimetric assay	[324]
Cu-MOF	Not measured	Shown for the assay; No inhibition TMB $\leq$ 0.25 mM; $H_2O_2 \leq 20$ mM	0.08 mM TMB 10 mM H_2O_2	Colorimetric assay	[325]
Au@ Fe_3O_4	K_M not measured for TMB K_M =4.27 mM for H_2O_2	Not measured for TMB; No inhibition $H_2O_2 \leq 20$ mM	2 mM TMB 0.1 mM H_2O_2	Colorimetric assay	[326]
Au-MoS_2	Not measured	Not measured	1.25 mM TMB 2.21 mM H_2O_2	ELISA-like colorimetric assay	[327]
Graphene/Fe_3O_4/Au	Not measured	Not measured	1.25 mM TMB 2.21 mM H_2O_2	ELISA-like colorimetric assay	[328]
Pt	Not measured	Not measured	Not specified	Colorimetric assay	[329]
Fe_3O_4@Au	K_M = 0.8502 mM for TMB K_M =147.2629 mM for H_2O_2	No inhibition TMB ≤ 7 mM; $H_2O_2 \leq$ 800 mM	0.84 mM TMB 196 mM H_2O_2	Colorimetric assay	[330]
CoO assembled onto ordered	K_M not measured for TMB	No inhibition	0.7 mM TMB	Colorimetric assay	[331]

mesoporous carbon	K_M =3.29 mM for H_2O_2	TMB ≤ 1.0 mM; H_2O_2 ≤ 5 mM	H_2O_2 generated in situ by glucose oxidase		
$CoFe_2O_4$	Not measured	Not measured	DAB commercial kit	Signal amplification in LFIA	[332]
Prussian Blue	Not measured	Not measured	TMB commercial kit	Signal amplification in LFIA	[333]
Ir	K_M = 0.03 mM for TMB K_M =18.02 mM for H_2O_2	No inhibition TMB ≤ 0.3 mM; H_2O_2 ≤ 30 mM	0.25 mM TMB H_2O_2 generated in situ by xanthine oxidase	Colorimetric assay	[20]
CeO_2	K_M = 0.147 mM for TMB K_M =293 mM for H_2O_2	No inhibition TMB ≤ 1.6 mM; H_2O_2 ≤ 100 mM	Not specified	ELISA-like colorimetric assay	[55]
V_2O_5	K_M = 0.738 mM for TMB K_M =0.232 mM for H_2O_2	No inhibition TMB ≤ 0.7 mM; H_2O_2 ≤ 7 mM	0.2 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[334]
Cu	Not measured	Not measured	0.5 mM TMB 5 mM H_2O_2	Colorimetric assay	[335]
Cu	K_M = 0.648 mM for TMB K_M =29.16 mM for H_2O_2	No inhibition TMB ≤ 1.0 mM; H_2O_2 ≤ 200 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[14]
FeP	Not measured	Not measured	0.5 mM TMB 5 mM H_2O_2	Colorimetric assay	[336]
MoS_2	K_M = 0.005 mM for TMB K_M =0.01 mM for H_2O_2	No inhibition TMB ≤ 0.30 mM; H_2O_2 ≤ 400 mM	0.5 mM TMB H_2O_2 generated in situ by choline oxidase	Colorimetric assay	[100]
Fe-MOF	K_M = 0.3698 mM for TMB	Not measured	Commercial TMB kit	Colorimetric assay	[337]

	K_M not measured for H_2O_2				
Pt	K_M = 0.29 mM for TMB K_M = 10.97 mM for H_2O_2	No inhibition TMB ≤ 0.80 mM; H_2O_2 ≤ 80 mM	Not specified	Signal amplification in LFIA	[178]
Pt-Pd	Not measured	Not measured	Not specified	Signal amplification in LFIA	[338]
Pd	Not measured	Not measured	Commercial TMB solution Or 5 mM N,N diethyl-p-phenylenediamine sulfate, 4 mM 4-Hydroxy-1-naphthalenesulfonic acid sodium salt with 256 mM H_2O_2	Signal amplification in LFIA	[339]
Au@Pt	K_M = 0.00243 mM for TMB K_M = 0.004076 mM for H_2O_2	Not measured	AEC substrate, not specified	Signal amplification in LFIA	[180]
Fe_3O_4@SiO_2@ Pt	Not measured	Not measured	1.2 mM TMB 245 mM H_2O_2	Colorimetric assay	[340]
Pt	K_M = 0.127 mM for TMB K_M = 61.5 mM for H_2O_2	No inhibition TMB ≤ 0.20 mM; H_2O_2 ≤ 200 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[182]
Pt	K_M = 0.42 mM for TMB K_M = 84.07 mM for H_2O_2	No inhibition TMB ≤ 3.50 mM; H_2O_2 ≤ 700 mM	Luminol solution	Signal amplification in LFIA	[27]

Fe-N single atom nanozyme	K_M = 0.3322 mM for TMB K_M = 17.12 mM for H_2O_2	No inhibition TMB ≤ 1.5 mM; H_2O_2 ≤ 100 mM	TMB not specified	ELISA-like colorimetric assay	[185]
Au-Pt	K_M = 0.088 mM for TMB K_M = 196 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM; H_2O_2 ≤ 500 mM	0.125 mM TMB 125 mM H_2O_2	Colorimetric assay	[188]
Pt	K_M = 0.1274 mM for TMB K_M = 1.14 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM; H_2O_2 ≤ 10 mM	0.25 mM TMB 1 mM H_2O_2	Colorimetric assay	[35]
C60-carboxyfullerene	K_M = 0.2333 mM for TMB K_M = 24.58 mM for H_2O_2	No inhibition TMB ≤ 0.2 mM; H_2O_2 ≤ 300 mM	1 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[190]
Pd-Pt	K_M = 3.11 mM for TMB K_M = 33.40 mM for H_2O_2	No inhibition TMB ≤ 20 mM;	Not specified	Signal amplification in LFIA	[191]
Au	Synthesized using hydroquinone K_M = 0.23 mM for TMB K_M = 0.16 mM for H_2O_2 Synthesized using ascorbic acid K_M = 0.27 mM for TMB K_M = 0.20 mM for H_2O_2 Synthesized using hydroxylamine	No inhibition TMB ≤ 2 mM; H_2O_2 ≤ 2000 mM	Commercial AEC solution supplemented with 1000 mM H_2O_2	Signal amplification in LFIA	[192]

	K_M = 0.58 mM for TMB K_M = 0.41 mM for H_2O_2				
Au@Pt	K_M = 0.026 mM for TMB K_M = 219 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM; H_2O_2 ≤ 1000 mM	0.4 mM TMB 2 mM H_2O_2	ELISA-like colorimetric assay	[42]
Au@PtCu	K_M = 0.036 mM for TMB K_M = 23 mM for H_2O_2	No inhibition TMB ≤ 0.12 mM; H_2O_2 ≤ 200 mM	0.4 mM TMB 2 mM H_2O_2	ELISA-like colorimetric assay	
CuO	K_M = 0.016 mM for TMB K_M = 41 mM for H_2O_2	No inhibition TMB ≤ 0.7 mM; H_2O_2 ≤ 400 mM	catalytic oxidation of phenol coupled with 4-amino-atipyrine	Colorimetric assay	[67]
Nanodiamonds	K_M = 0.103 mM for TMB K_M = 0.752 mM for H_2O_2	No inhibition TMB ≤ 1.4 mM; H_2O_2 ≤200 mM	1 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[193]
Au@Ag@Pt	K_M = 0.130 mM for TMB K_M = 0.0583 mM for H_2O_2	No inhibition TMB ≤ 0.9 mM; H_2O_2 ≤ 1 mM	0.75 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[40]
$LaNiO_3$	K_M = 0.105 mM for TMB K_M = 90.05 mM for H_2O_2	Shown for the assay No inhibition H_2O_2 ≤ 1.0 mM;	0.8 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[80]

Au-Ag	K_M = 0.396 mM for TMB K_M = 94.7 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM; H_2O_2 ≤ 200 mM	0.75 mM TMB 0.5 mM H_2O_2	SERS registration	[39]
Au@Pt	Not measured	Not measured	Indiamine blue dye	Signal amplification in LFIA	[341]
Au@Pt	Not measured	Not measured	5 mM TMB 5 mM H_2O_2	Signal amplification in LFIA	[342]
Au nanoflowers @Pt	K_M = 0.285 mM for TMB K_M = 0.341 mM for H_2O_2	No inhibition TMB ≤ 20 mM; H_2O_2 ≤ 10 mM	Commercial TMB solution	Signal amplification in LFIA	[195]
Pd@Ir	K_M = 0.246 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 0.5 mM; not measured for H_2O_2	Not specified	Signal amplification in LFIA	[343]
Fe-tannic acid	K_M = 0.152 mM for TMB K_M = 3.50 mM for H_2O_2	No inhibition TMB ≤ 1 mM; H_2O_2 ≤ 25 mM	24 mM TMB 2600 mM H_2O_2	Signal amplification in LFIA	[196]
Cu-polydopamine (PDA)	K_M = 0.172 mM for TMB K_M = 0.130 mM for H_2O_2	Not measured	2 mM TMB 20 mM H_2O_2	Signal amplification in LFIA	[197]
Au@Pt	Not measured	Not measured	Not specified for TMB 0.1 % H_2O_2	Signal amplification in LFIA	[344]

CuCo@PDA	K_M = 0.8 mM for TMB K_M = 17.3 mM for H_2O_2	No inhibition TMB ≤ 1.5 mM; H_2O_2 ≤ 50 mM	25 mM TMB 5000 mM H_2O_2	Signal amplification in LFIA	[198]
C-Fe@hemin	Not measured	Not measured	Commercial luminol substrate supplemented with H_2O_2	Signal amplification in LFIA	[345]
Au@Pt	Not measured	Not measured	0.05% DAB, 0.03% H2O2	Signal amplification in LFIA	[346]
Fe-N-C single atom nanozyme	K_M = 0.052 mM for TMB K_M = 0.191 mM for H_2O_2	No inhibition TMB ≤ 1.5 mM; H_2O_2 ≤ 1 mM	0.08 mM TMB 0.16 mM H_2O_2	Signal amplification in LFIA	[199]
Pt-MXene	Not measured	Not measured	13.3 mM AEC 30 mM H_2O_2	Signal amplification in LFIA	[347]
Au@Pd	K_M = 0.45 mM for TMB K_M = 5.53 mM for H_2O_2	No inhibition TMB ≤ 2.0 mM; H_2O_2 ≤ 100 mM	4 mM TMB 490 mM H_2O_2	Signal amplification in LFIA	[200]
Au@Pt	Not measured	Not measured	AEC substrate, not specified	Signal amplification in LFIA	[348]
Au@Pt	Not measured	Not measured	1 mM TMB 160 mM H_2O_2	Signal amplification in LFIA	[349]

Au@Pt	Not measured	Not measured	Not specified	Signal amplification in LFIA	[350]
Fe_3O_4	Not measured	Not measured	5 mg/mL DAB 15% H_2O_2	Signal amplification in LFIA	[351]
Fe_3O_4	Not measured	Not measured	0.19 mg/mL DAB 0.57% H_2O_2	Signal amplification in LFIA	[352]
Pt	K_M not measured for TMB K_M = 7.04 mM for H_2O_2	Shown for the assay; Inhibited if DAB ≥2.5 mM and $H_2O_2 \geq 25$ mM	2 mM DAB 20 mM H_2O_2	Signal amplification in LFIA	[353]
Au@Ag-Pt	K_M = 0.0502 for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 0.6 mM; Not measured for H_2O_2	Commercial TMB substrate solution supplemented with 2000 mM H_2O_2	Signal amplification in LFIA	[354]
Fe_3O_4@PDA @Pt	K_M = 0.178 mM for TMB K_M = 0.459 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM; $H_2O_2 \leq 3$ mM	TMB substrate solution not specified	Signal amplification in LFIA	[355]
Au@Pd@Pt	K_M = 0.065 mM for TMB K_M = 4.59 mM for H_2O_2	No inhibition TMB ≤ 0.20 mM; $H_2O_2 \leq 8$ mM	Commercial TMB substrate solution supplemented	Signal amplification in LFIA	[201]

Pd@Pt	Not measured	Not measured	TMB substrate not specified	Signal amplification in LFIA	[356]
Prussian Blue	Not measured	Not measured	0.4 mM TMB Not specified for H_2O_2	ELISA-like colorimetric assay	[357]
Au@Pt	Not measured	Not measured	Commercial TMB substrate	Signal amplification in LFIA	[358]
$NiCo_2O_4$	Not measured	Shown for the assay; No inhibition TMB ≤ 40 mM and H_2O_2 ≤ 25 %	20 mM TMB 25 % H_2O_2	Signal amplification in LFIA	[359]
Au@Pt	Not measured	Not measured	15 mM TMB 2000 mM H_2O_2	Signal amplification in LFIA	[360]
Fe_3O_4@Pt	K_M = 0.055 mM for TMB K_M not measured for H_2O_2	Not measured	3.8 mM AEC 0.3 % H_2O_2	Signal amplification in LFIA	[361]
Pt	Not measured	Not measured	14.6 mM TMB 80 mM H_2O_2	Signal amplification in LFIA	[362]
Au-Pt	Not measured	Not measured	AEC commercial substrate 3267 mM H_2O_2	Signal amplification in LFIA	[363]

Fe-N-C single atom	K_M = 0.08 mM for TMB K_M = 28.30 mM for H_2O_2	No inhibition TMB ≤ 10 mM; H_2O_2 ≤ 100 mM	Not specified TMB solution	ELISA-like colorimetric assay	[202]
Au@Pt	Not measured	Not measured	DAB commercial kit supplemented with 4000 mM H_2O_2	Signal amplification in LFIA	[364]
Pt	Not measured	No inhibition TMB ≤ 0.8 mM; H_2O_2 ≤ 800 mM	0.5 mM TMB 100 mM H_2O_2	ELISA-like colorimetric assay	[365]
Au@Pt	Not measured	Shown for the assay; Inhibited if TMB ≥ 0.8 mM Inhibited if H_2O_2 ≥ 600 mM	730 mM TMB 620 mM H_2O_2	Colorimetric assay	[366]
Au@Pt	Not measured	Not measured	TMB commercial kit supplemented with 2000 mM H_2O_2	Signal amplification in LFIA	[367]
Au@Ir	K_M = 0.906 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 0.8 mM; Not measured for H_2O_2	TMB commercial kit supplemented with 200 mM H_2O_2	Signal amplification in LFIA	[368]
Pt-Ir	K_M = 0.38 mM for TMB K_M = 4.13 mM for H_2O_2	No inhibition TMB ≤ 1.6 mM; H_2O_2 ≤ 25 mM	AEC not specified 250 mM H_2O_2	Signal amplification in LFIA	[203]

Au/Fe_3O_4	K_M = 0.702 mM for DAB K_M = 1.172 mM for H_2O_2	No inhibition DAB ≤ 1.0 mM; H_2O_2 ≤ 1 mM	0.5 mM DAB 0.5 mM H_2O_2	Signal amplification in LFIA	[369]
$Pd_xHg_y(PdO)_z$	K_M = 0.03 mM for TMB K_M = 0.04 mM for H_2O_2	No inhibition TMB ≤ 0.2 mM; H_2O_2 ≤ 0.012 mM	0.2 mM TMB 200 mM H_2O_2	Signal amplification in LFIA	[370]
Au@Pt	Not measured	Not measured	0.921 mM TMB 7630 mM H_2O_2	Colorimetric assay	[371]
Fe_3O_4@PDA @Pd/Pt	K_M = 0.036 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 1 mM; Not measured for H_2O_2	DAB substrate, not specified	Signal amplification in LFIA	[372]
VS_2	K_M = 0.4 mM for TMB K_M = 0.772 mM for H_2O_2	No inhibition TMB ≤ 1 mM; 5 mM H_2O_2	15% H_2O_2	Signal amplification in LFIA	[373]
Pd-Ir	K_M = 0.2 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 0.6 mM mM; Not measured for H_2O_2	0.72 mM TMB 1818 mM H_2O_2	ELISA-like colorimetric assay	[374]
Au@Pt	Not measured	Not measured	Commercial DAB substrate	Signal amplification in LFIA	[375]

Fe-single atom nanozyme	K_M = 0.24 mM for TMB K_M = 16.28 mM for H_2O_2	No inhibition TMB ≤ 2 mM; 100 mM H_2O_2	Not specified	Signal amplification in LFIA	[204]
Pt on polymer nanospheres	K_M = 0.3742 mM for TMB K_M not measured for H_2O_2	No inhibition TMB ≤ 0.5 mM mM; Not measured for H_2O_2	Not specified	ELISA-like colorimetric assay	[376]
Au@Pd	Not measured	Shown for the assay; No inhibition TMB ≤ 2.4 mM Inhibited if $H_2O_2 \geq 40$ mM	1 mM TMB 40 mM H_2O_2	Colorimetric assay	[377]
Au	K_M = 0.0251 mM for TMB K_M = 0.229 mM for H_2O_2	No inhibition TMB ≤ 5 mM; $H_2O_2 \leq$ 5000 mM	Commercial TMB substrate supplemented with H2O2	Colorimetric assay	[150]
Au@Pt	Not measured	Not measured	Not specified	Colorimetric assay	[378]
Au@Pt	Not measured	Not measured	Commercial TMB substrate	Colorimetric assay	[379]
Ti_3C_2 MXene	K_M = 0.196 mM for TMB K_M = 0.007 mM for H_2O_2	No inhibition TMB ≤ 1 mM;	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[380]

		$H_2O_2 \leq$ 100 mM			
Ag/Pt	Not measured	Shown for the assay; No inhibition $H_2O_2 \leq$ 100 mM; Not measured for TMB	0.8 mM TMB 50 mM H_2O_2	ELISA-like colorimetric assay	[381]
Au@Pt	Not measured	Not measured	Commercial DAB substrate	Signal amplification in LFIA	[382]
Au	Not measured	Not measured	3.59 mM TMB 115 mM H_2O_2	Colorimetric assay	[383]
FeOOH	K_M = 0.41 mM for TMB K_M = 4.08 mM for H_2O_2 K_M = 0.47 mM for TMB K_M = 3.97 mM for H_2O_2	No inhibition TMB and ABTS $\leq$ 1.8 mM; $H_2O_2 \leq 2$ mM	2 mM TMB 1.8 mM H_2O_2	Signal amplification in LFIA	[205]
Au	K_M = 3.59 mM for TMB K_M = 16.71 mM for H_2O_2	No inhibition TMB $\leq$ 1 mM; $H_2O_2 \leq$ 300 mM;	0.18 mM TMB 90 mM H_2O_2	Colorimetric assay	[6]

Au	K_M = 0.0411 mM for TMB K_M = 167 mM for H_2O_2	No inhibition TMB ≤ 0.25 mM; H_2O_2 ≤ 180 mM;	0.2 mM TMB 100 mM H_2O_2	Colorimetric assay	[9]
Au	K_M = 0.20 mM for TMB K_M = 572.98 mM for H_2O_2	Shown for the assay; No inhibition H_2O_2 ≤ 1200 mM; Not measured for TMB	0.00207 TMB 1.32 mM H_2O_2	ELISA-like colorimetric assay	[12]
Glutathione-Pd	K_M = 0.068 mM for TMB K_M = 156 mM for H_2O_2	No inhibition TMB ≤ 0.15 mM; H_2O_2 ≤ 180 mM;	0.12 mM TMB 125 mM H_2O_2	Colorimetric assay	[21]
Prussian Blue	K_M = 0.76 mM for TMB K_M = 840 mM for H_2O_2	No inhibition TMB ≤ 0.5 mM; H_2O_2 ≤ 1000 mM;	0.5 mM TMB 125 mM H_2O_2	ELISA-like colorimetric assay	[117]
WSe_2	K_M = 0.0433 mM for TMB K_M = 19.53 mM for H_2O_2	No inhibition TMB ≤ 1 mM; H_2O_2 ≤ 100 mM;	1 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[121]
Au@Cu_XOS	K_M = 0.265 mM for TMB K_M = 0.159 mM for H_2O_2	No inhibition TMB ≤ 0.9 mM; H_2O_2 ≤ 25 mM;	0.4 mM TMB H_2O_2 concentration was varied	Colorimetric assay	[126]

$Au@TiO_2$	K_M = 1.09 mM for TMB K_M = 0.29 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM; H_2O_2 ≤ 10 mM;	2 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[133]
$C_3O_4@CeO_2$	K_M = 0.140 mM for TMB K_M = 7.09 mM for H_2O_2	No inhibition TMB ≤ 1 mM; H_2O_2 ≤ 150 mM	0.18 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[139]
Co_3O_4/graphene oxide	K_M = 0.19 mM for TMB K_M = 24.04 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM; H_2O_2 ≤ 500 mM	0.05 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[140]
Cu-hemin	K_M = 1.42 mM for TMB K_M = 2.18 mM for H_2O_2	No inhibition TMB ≤ 0.8 mM; H_2O_2 ≤ 10 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[142]
Cu-C_3N_4	K_M = 0.389 mM for TMB K_M = 9.27 mM for H_2O_2	No inhibition TMB ≤ 8 mM; H_2O_2 ≤ 5 mM	0.8 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[144]
Fe_2O_3/SiO_2	K_M = 3.05 mM for TMB K_M = 965.98 mM for H_2O_2	No inhibition TMB ≤ 1 mM; H_2O_2 ≤ 2200 mM	0.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[149]
$Fe_3O_4@SiO_2$@Au	K_M = 5.71 mM for TMB K_M = 2.05 mM for H_2O_2		6.5 mM TMB H_2O_2 generated in situ by glucose oxidase	Colorimetric assay	[155]

Au@Pt	K_M = 0.21 mM for TMB K_M = 540 mM for H_2O_2	Inhibited if TMB ≥ 0.5 mM; No inhibition H_2O_2 ≤ 4000 mM	0.5 mM TMB 500 mM H_2O_2	ELISA-like colorimetric assay	This article

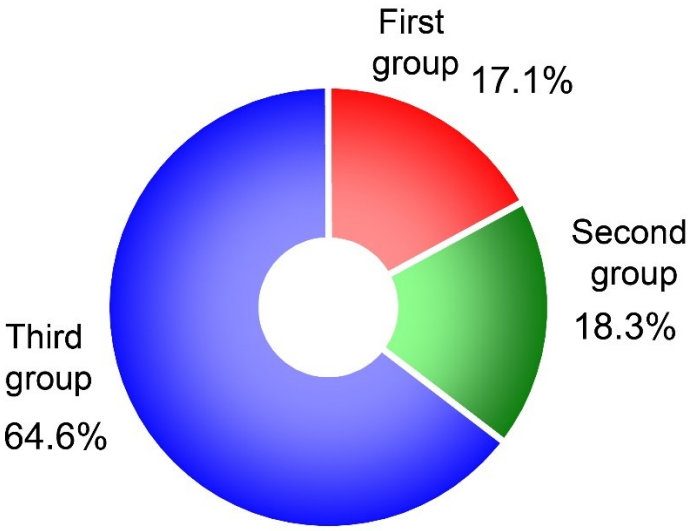

Fig.S2. Distribution of analyzed papers (Table S3) into three groups. The articles that used substrates concentrations within recommended range (0.5× Km ≤ substrates concentrations ≤ 5×Km) were assigned to the first group. The articles that used substrates in higher concentrations (substrates concentrations >> 5×Km) without substrate inhibition were assigned to the second group. The articles that used substrates in low (substrate concentration < 0.5× Km) or high (substrate concentration > 5×Km, without the confirmation of the absence of inhibition) concentrations, did not measure kinetic parameters, utilized commercial substrates or used different substrates for kinetic measurements and assay performance were assigned to third group.

S6. Nanozyme titration

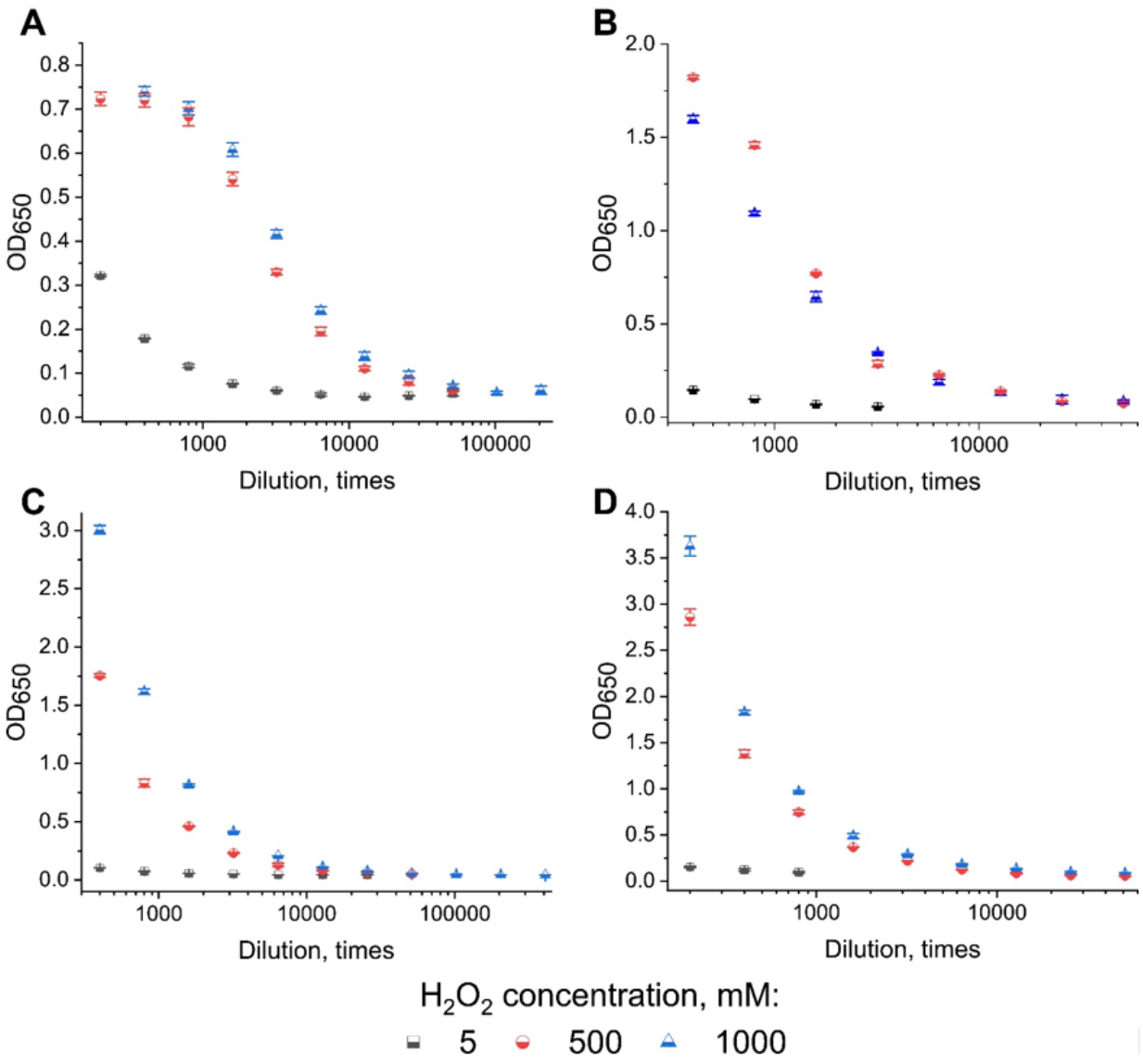

Fig. S3. Optical density at 650 nm (TMB_{ox}) versus nanozyme dilution after 5 min incubation. TMB concentration was varied: (A) 0.2 mM, (B) 0.5 mM, (C) 1.0 mM, (D) 1.5 mM. All measurements were performed in three repeats. Mean values of OD_{650} and the standard deviations after 5 min were calculated and plotted. Catalytic reaction and measurements were performed at 30°C. Measurements were performed in 20 mM sodium acetate buffer.

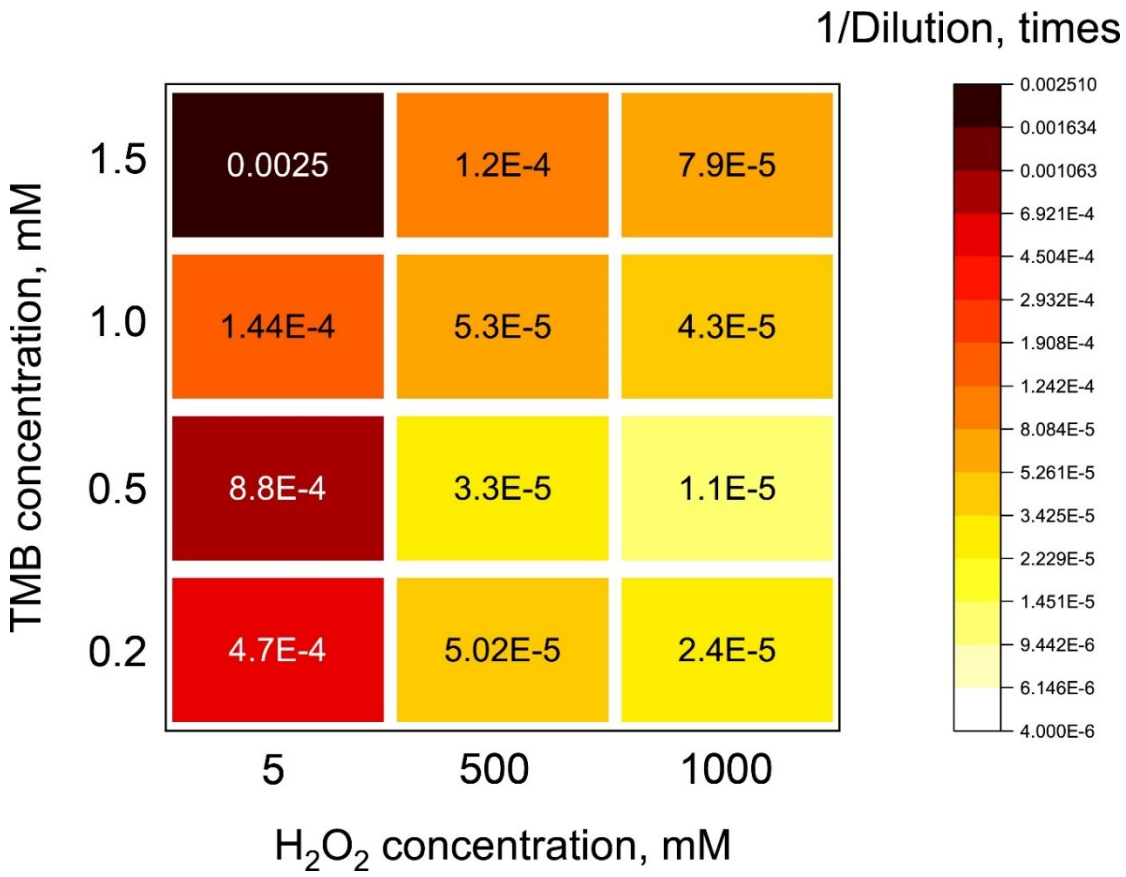

Fig. S4. Effect of TMB and H_2O_2 concentrations on the lowest detectable dilution of Au@Pt nanozyme. All measurements were performed in three repeats. Catalytic reaction and measurements were performed at 30°C. Measurements were performed in 20 mM sodium acetate buffer. The lowest detectable dilution was determined as the dilution of Au@Pt nanozyme facilitating OD_{650} higher than the mean value of the negative control (substrate solution without Au@Pt nanozyme) plus three standard deviations of a blank.

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