SUPPORTING INFORMATION

Porous Co_3O_4 nanoplates with pH-switchable peroxidase- and catalase-like activity

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FIGURES.

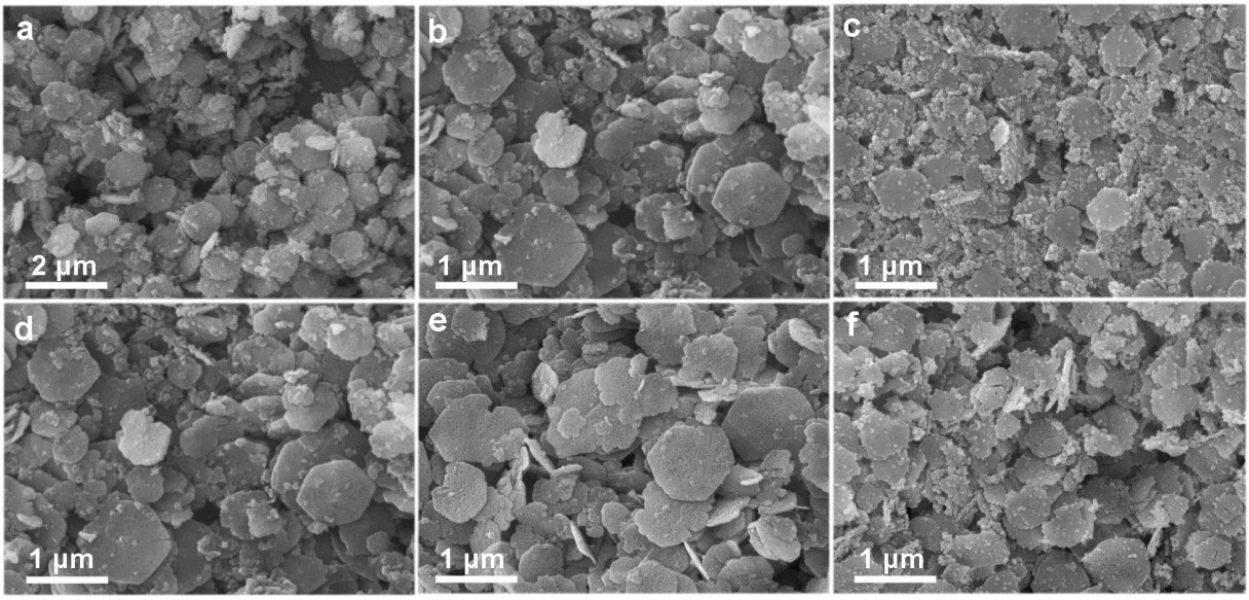

Fig. S1. SEM images of $Co(OH)_2$-F (a), $Co(OH)_2$-P (b), $Co(OH)_2$ (c), Co_3O_4-F (d), Co_3O_4-P (e) and Co_3O_4 (f).

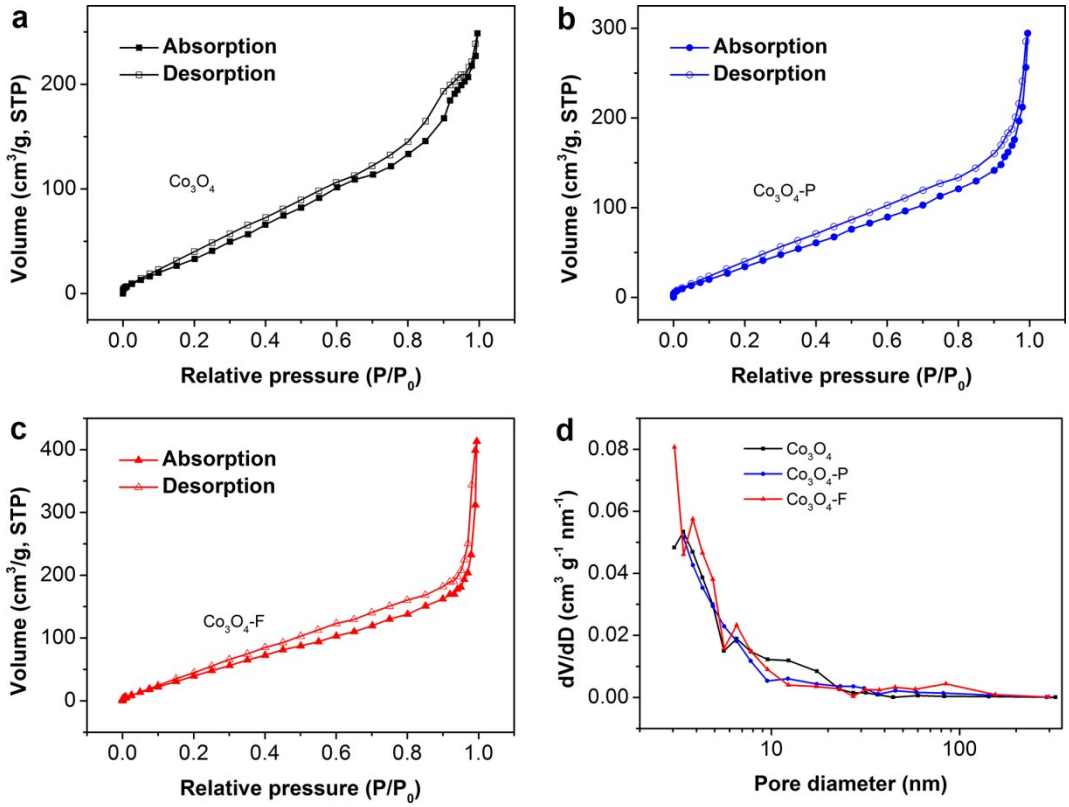

Fig. S2. Typical nitrogen adsorption/desorption isotherm of (a) Co_3O_4, (b) Co_3O_4-P and (c) Co_3O_4-F. (d) BJH pore diameter distribution of Co_3O_4, Co_3O_4-P and Co_3O_4-F.

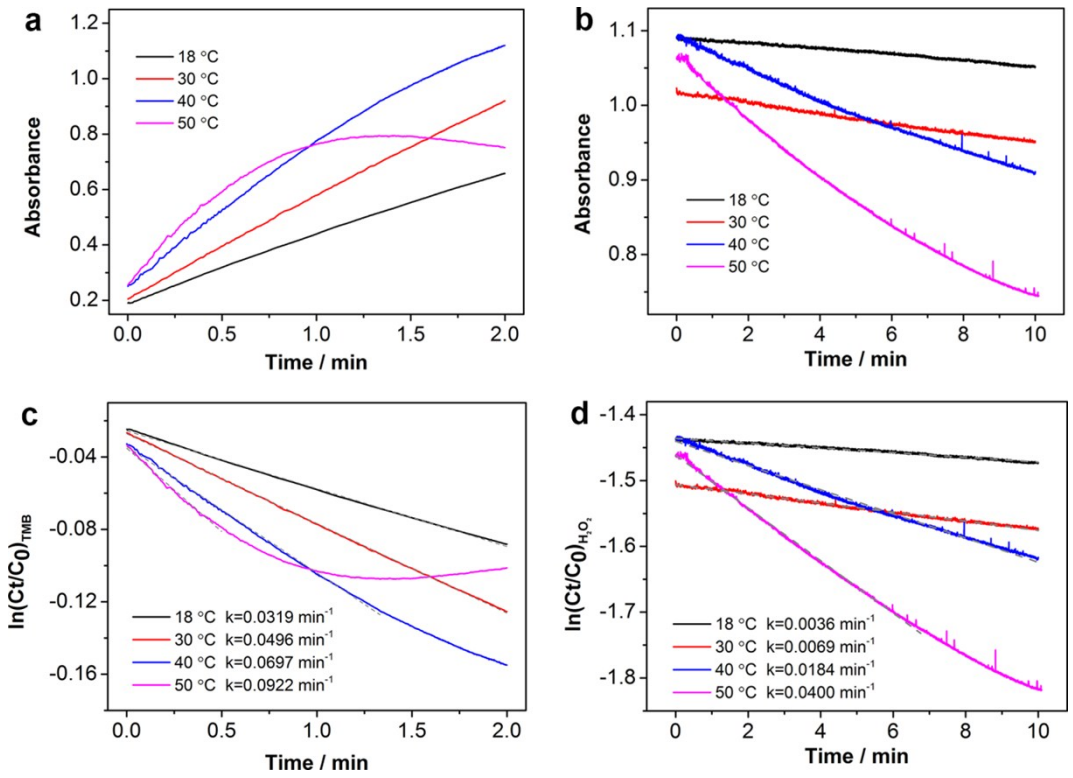

Fig. S3. The thermodynamics of the reactions catalyzed by Co_3O_4-F. (a) The time-dependent absorbance changes at 652 nm. Reaction conditions: 0.2 mM TMB, 20 mM H_2O_2 and 10 μg mL^{-1} Co_3O_4-F were incubated in 5 mM pH 5.0 Tris-HCl buffer. (b) The time-dependent absorbance changes at 240 nm. Reaction conditions: 20 mM H_2O_2 and 10 μg mL^{-1} Co_3O_4-F were incubated in 5 mM pH 9.0 Tris-HCl buffer. The reaction rate constant (k) was determined from the initial reaction rate at each temperature. The value $\varepsilon_{652\ nm}$= 39 000 $M^{-1}cm^{-1}$ for the oxidized product of TMB (c) and $\varepsilon_{240\ nm}$ = 22 940 $M^{-1}cm^{-1}$ for H_2O_2 (d) were used here to obtain the corresponding concentration term from the absorbance data.

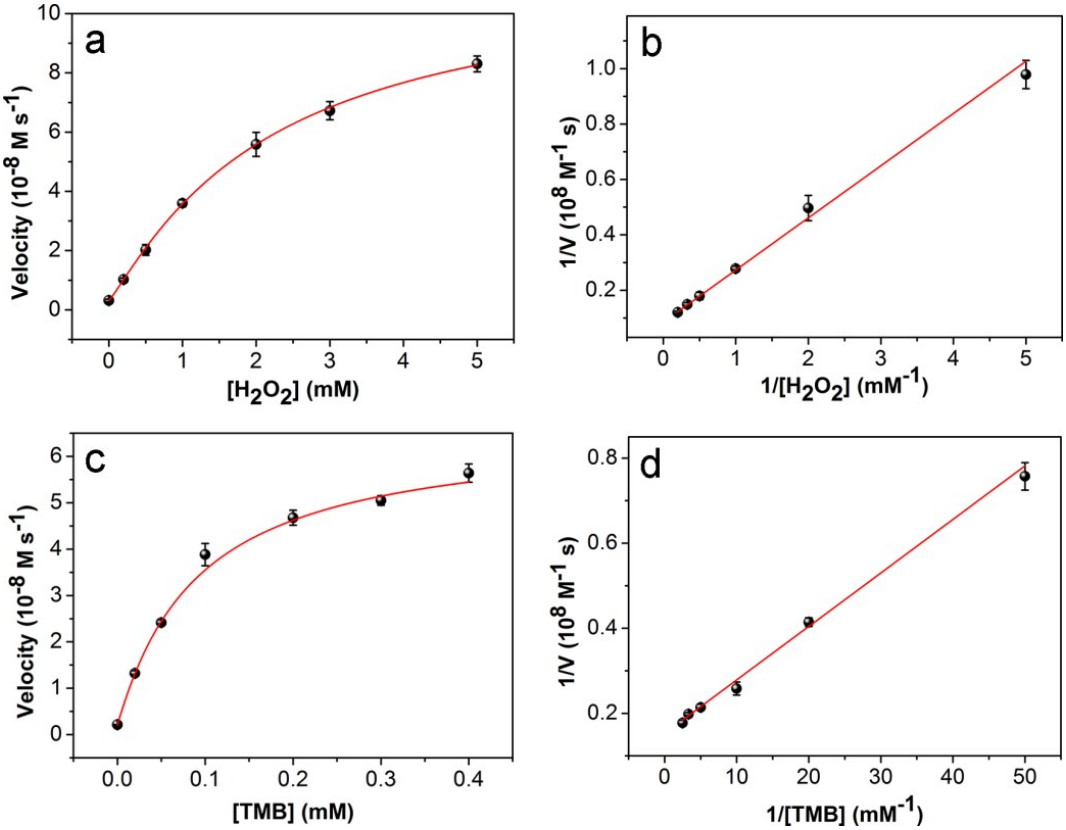

Fig. S4. Steady-state kinetic assay of Co_3O_4-F. The concentration of TMB in (a) was 0.25 mM and the H_2O_2 concentration in (c) was 2 mM. (b) and (d) Double reciprocal plots of activity of Co_3O_4-F. The error bars represented the standard deviation of three measurements.

Table S1. Comparison of the apparent Michaelis-Menten constant (K_m) and maximum reaction rate (V_m).

Catalyst	K_m (mM)		V_m (10^{-8} M s^{-1})		Ref.
	H_2O_2	TMB	H_2O_2	TMB	
HRP	3.7	0.434	8.71	10	1
Fe_3O_4	154	0.098	9.78	3.44	1
TiO_2 NTA	5.26	0.127	760	7.02	2
Co_3O_4	173.51	0.103	1.89	2.56	3
Co_3O_4-F	2.22	0.082	11.82	6.55	This work

Table S2. Determination results of glucose in the fetal bovine serum samples.

Original amount (mM)	Added (mM)	Found (mM)	Recovery (%)	RSD (%)
	0.080	0.077	91.2	1.0
0.004	0.150	0.145	94.0	0.3
	0.200	0.188	92.0	3.0

References

1. L. Z. Gao, J. Zhuang, L. Nie, J. B. Zhang, Y. Zhang, N. Gu, T. H. Wang, J. Feng, D. L. Yang, S. Perrett and X. Yan, *Nat. Nanotechnol.*, 2007, **2**, 577-583.
2. L. Zhang, L. Han, P. Hu, L. Wang and S. Dong, *Chem. Commun.*, 2013, **49**, 10480-10482.
3. J. Dong, L. Song, J.-J. Yin, W. He, Y. Wu, N. Gu and Y. Zhang, *ACS Appl. Mat. Interfaces*, 2014, **6**, 1959-1970.