Supporting Information (ESI)

Porous nanozymes: peroxidase-mimetic activity of mesoporous iron oxide for colorimetric and electrochemical detection of global DNA methylation

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Table S1 Comparison of different NPs and their kinetics parameter for TMB/H_2O_2 substrate.

Catalyst	**Substrate**	K_m **mM**	V_{max} **/ 10^{-8} M s^{-1}**	**Reference**
Fe_2O_3 Mesoporous	H_2O_2	146.7	6.37	This assay
	TMB	0.298	7.36	
HRP	H_2O_2	3.70	10	S1
	TMB	0.434	8.71	
Prussian Blue-Fe_2O_3 (Nanoparticle)	H_2O_2	323.6	117	S2
	TMB	0.307	106	
$ZnFe_2O_4$	H_2O_2	1.66	7.74	S3
	TMB	0.85	13.31	
CuZnFeS NCs	H_2O_2	0.07	0.56	S4
	TMB	2.2	39	

1. Supplementary Figures

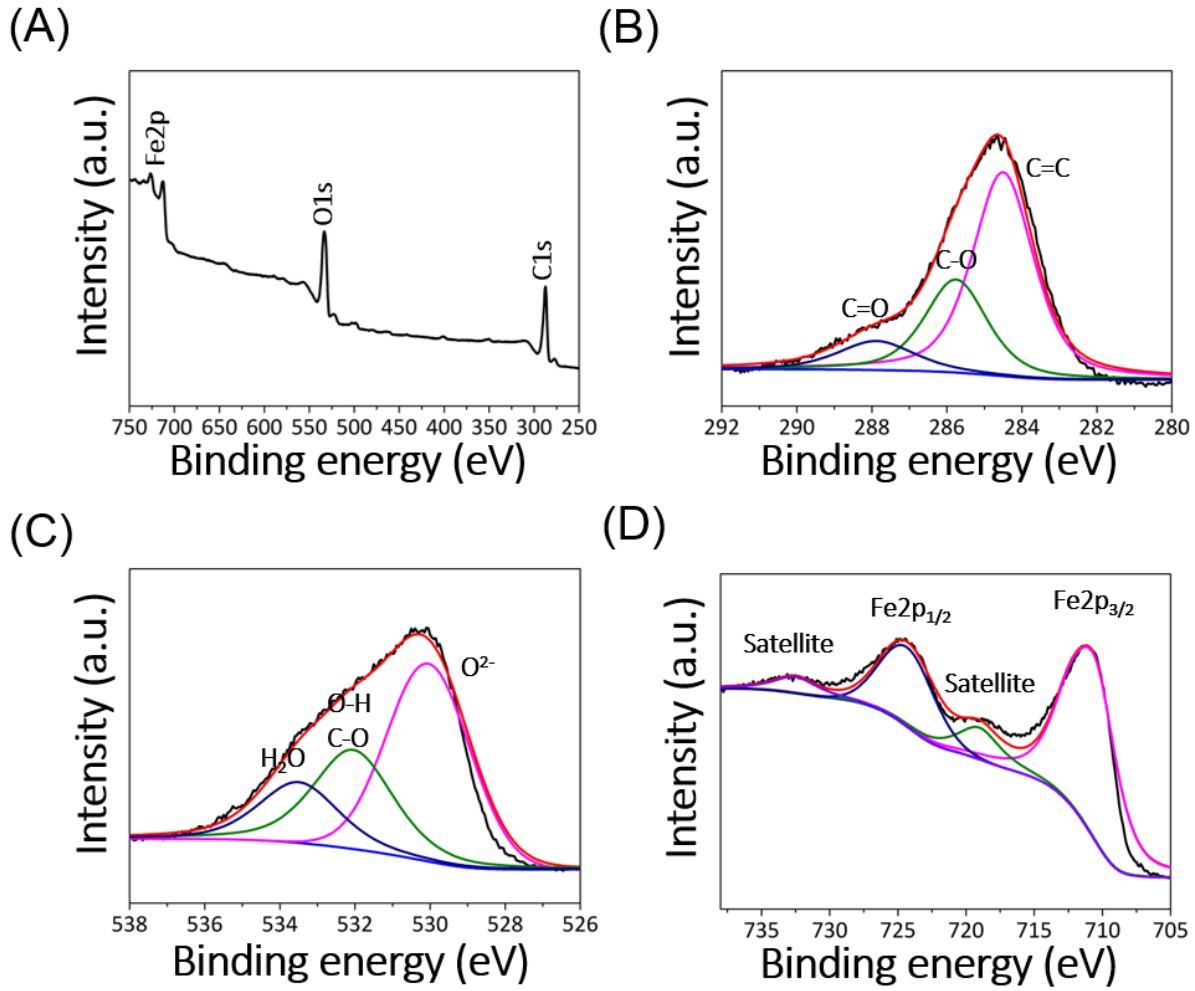

Figure S1 (A) XPS survey spectrum, (B) and (C) high-resolution C and O 1s XPS spectrum, respectively and (D) high-resolution Fe 2p XPS spectrum of the mesoporous iron oxide.

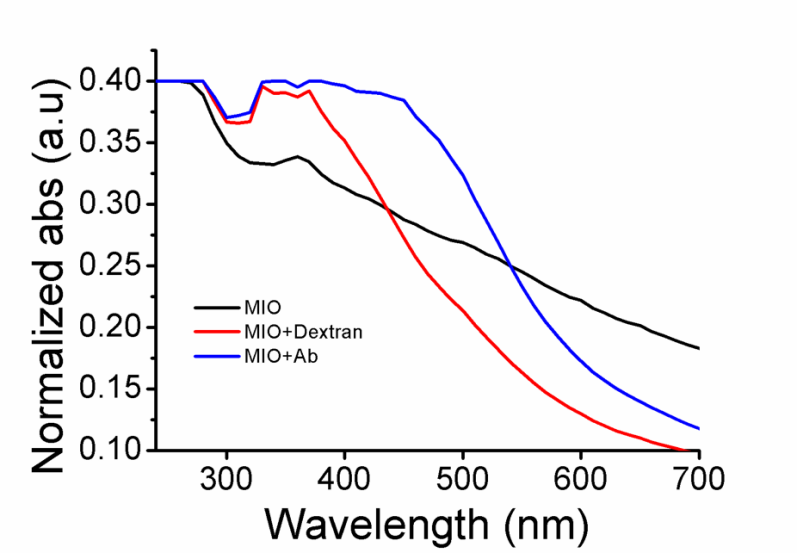

Figure S2. UV-vis absorption spectra for Fe_2O_3 (black), dextran-(red) and dextran/5mC antibody-modified (blue) mesoporous Fe_2O_3.

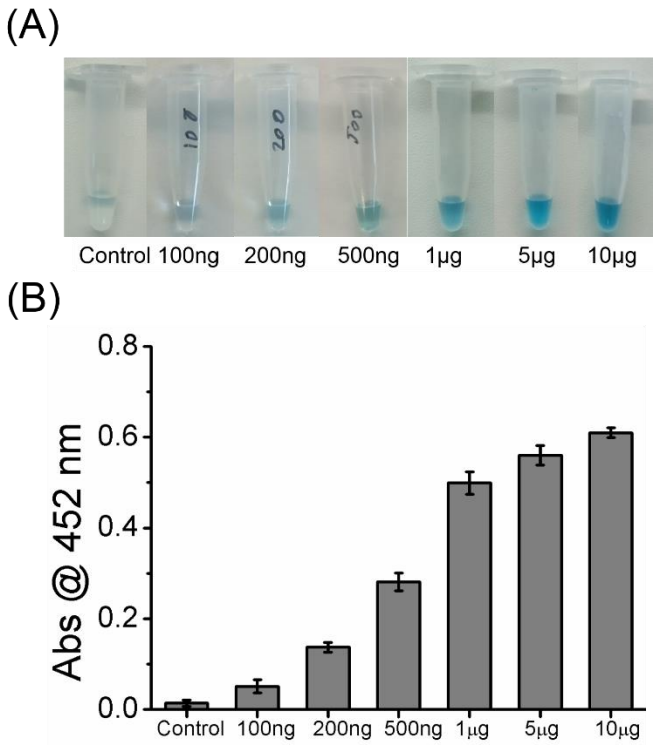

Figure S3 Optimization of mesoporous Fe_2O_3 nanoparticle quantity. (A) naked eye evaluation and (B) mean values of corresponding samples. In the experiment, different quantity (10 µg to 100 ng) of mesoporous Fe_2O_3 nanoparticle were used. For all experiments, required amount of MIO added to 60 µL (0.2 M NaAc buffer, pH 3.5) containing 700 mM of H_2O_2 and 800 µM of TMB. Incubation was 10 min. Error bars represent standard deviation of three independent experiments.

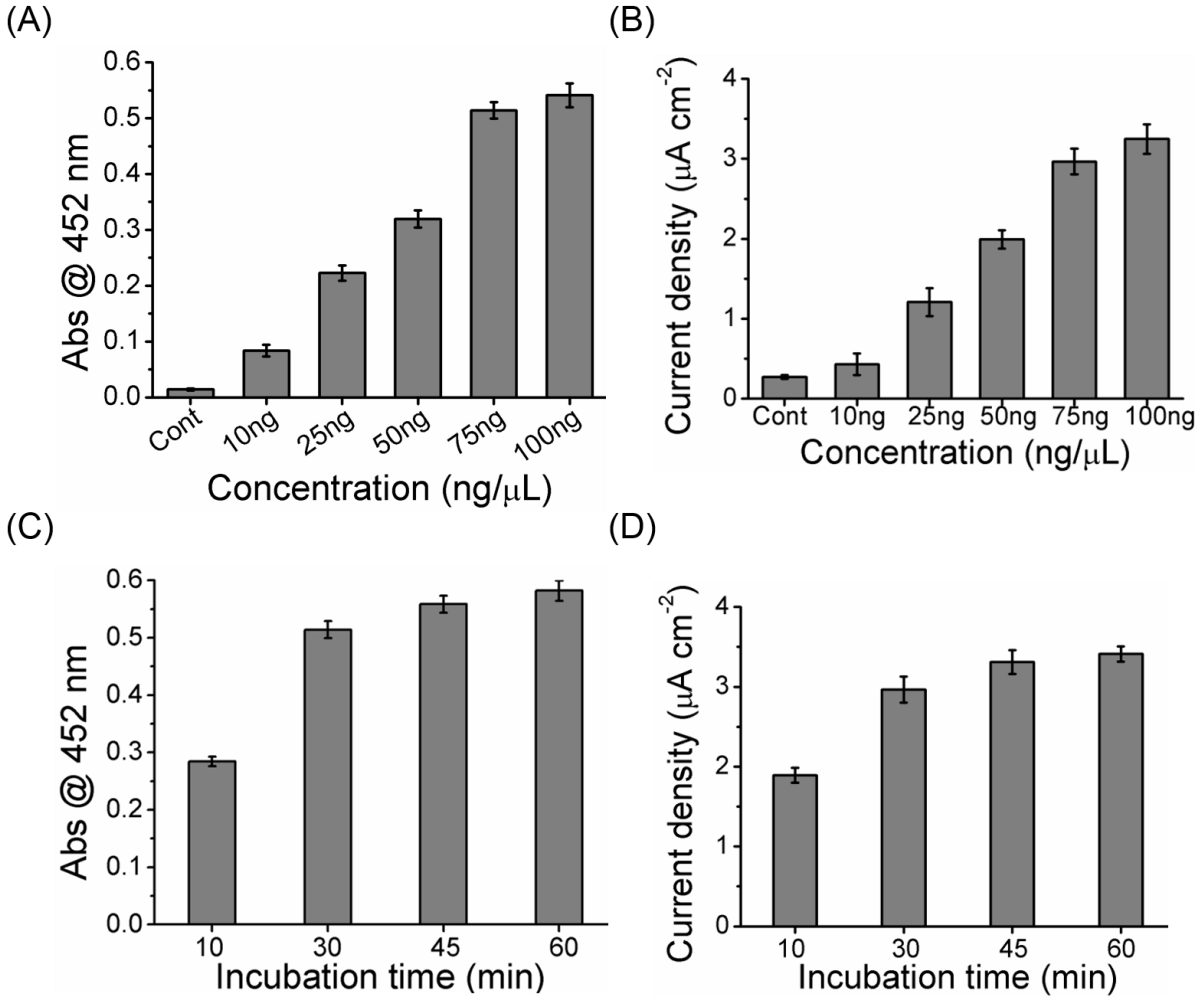

Figure S4 Optimization of 5mC antibody concentration and incubation time. Mean response for the Fe_2O_3-mC antibody concentrations of 10-100 ng (fixed 1µg of Fe_2O_3 and 50 ng methylated DNA input) absorbed on the SPGE for 30 min for (A) absorbance and (B) amperometric current density. (C) and (D) represent corresponding absorbance and amperometric current density for different incubation time of NPS-mC antibody from 10-60 min (fixed 1µg of Fe_2O_3, 50 ng methylated DNA input and 75 ng of Fe_2O_3-mC antibody). Error bars represent standard deviation of three independent experiments.

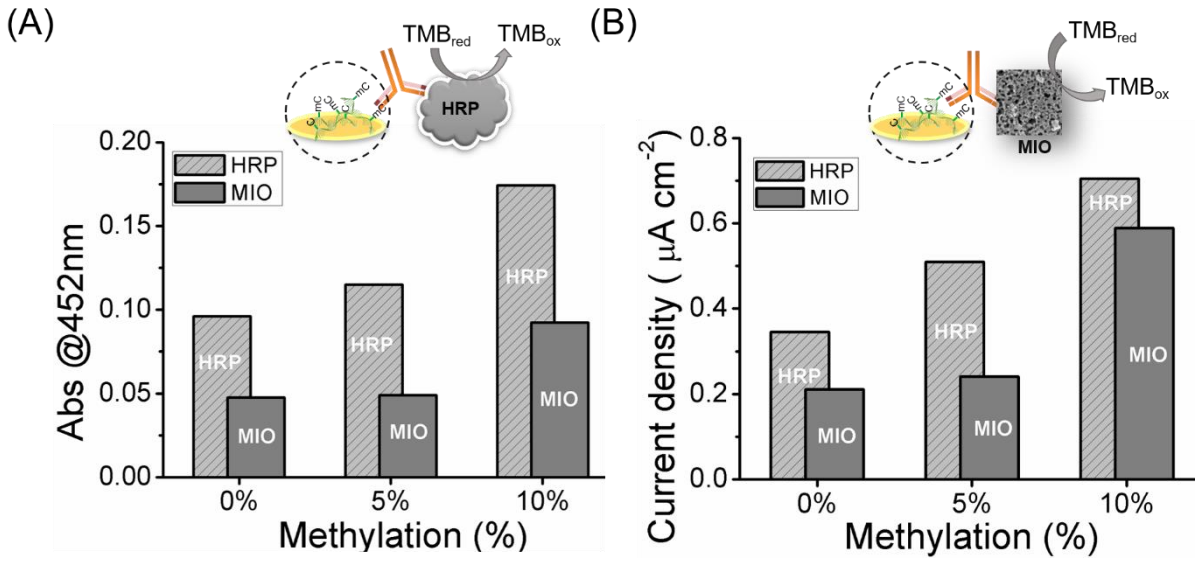

Figure S5. UV-vis (A) and electrochemical (B) data obatined for the synthetic heterogenious samples containing 5% and 10% methylation. Assays were peromed using both the HRP/H_2O_2 and MIO/H_2O_2 systems.

Reference

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