

Electronic Supplementary Information for

**A catalytic reaction-based colorimetric assay of alkaline
phosphatase activity based on oxidase-like MnO₂ microspheres**

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Figure S1. Photograph of the MnO_2 +TMB system in (1) air-saturated or (2) argon gas-saturated buffer.

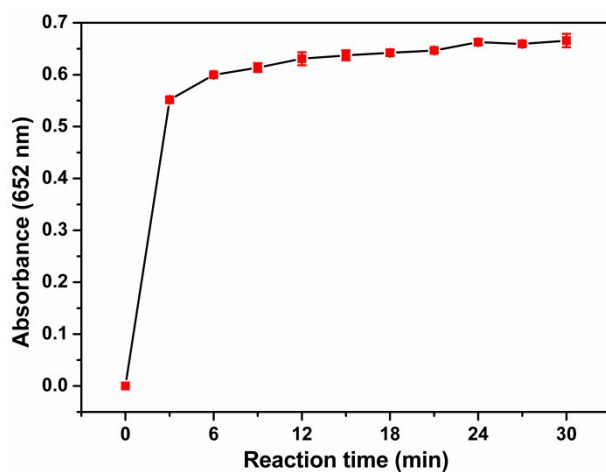


Figure S2. Reaction time-dependent absorbance change of the TMB chromogenic reaction catalyzed by MnO_2 microspheres.

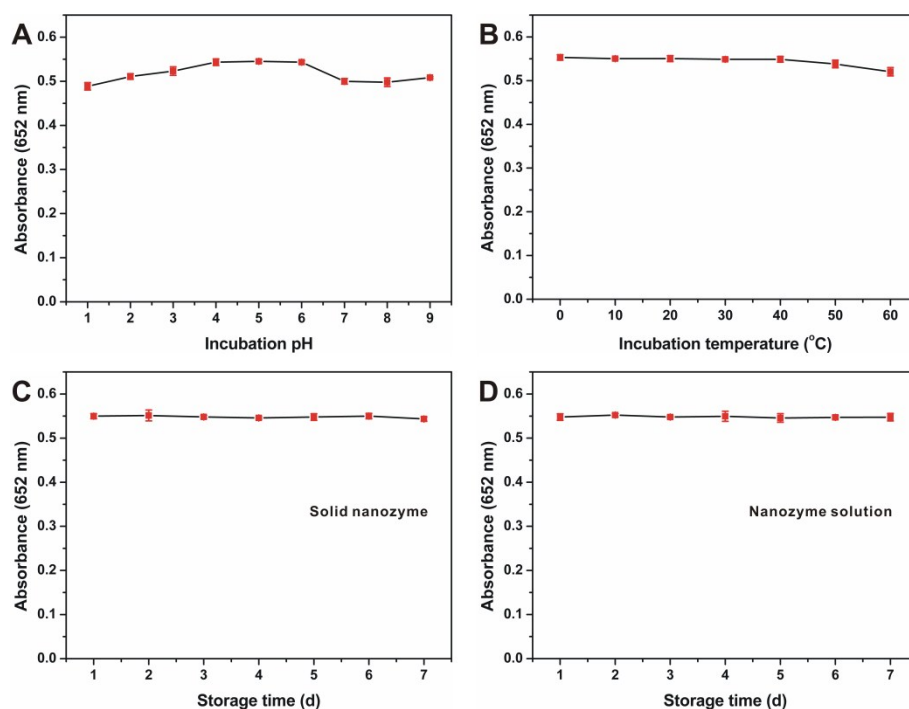


Figure S3. (A) shows the robustness of the MnO_2 enzyme mimic against harsh pH. The enzyme mimic is first incubated in buffers with different pH for 1 h, and then its oxidase-mimicking activity is tested. (B) shows the robustness of the MnO_2 enzyme mimic against harsh temperature. The enzyme mimic is first incubated at different temperatures for 0.5 h, and then its oxidase-mimicking activity is tested. (C) depicts the storage stability of the solid MnO_2 enzyme mimic. (D) depicts the storage stability of the MnO_2 enzyme mimic in solution.

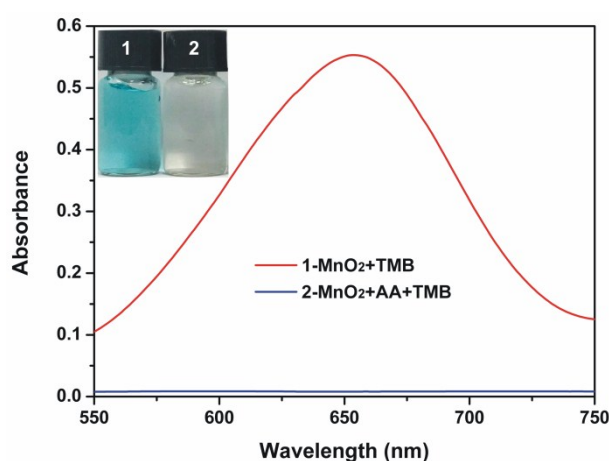


Figure S4. UV-vis spectra of the MnO_2 +TMB system with the presence of AA or not.

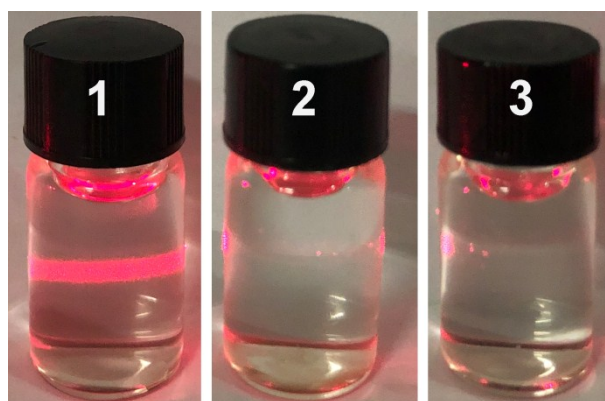


Figure S5. Tyndall effects of different systems (1-MnO₂+buffer; 2-MnO₂+AA+buffer; 3-buffer).

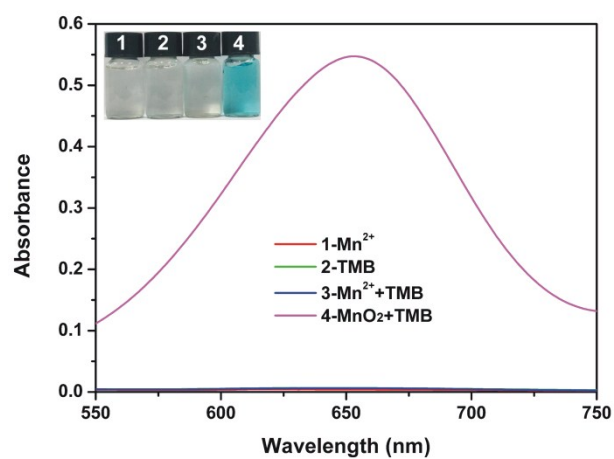


Figure S6. UV-vis spectra of different systems.

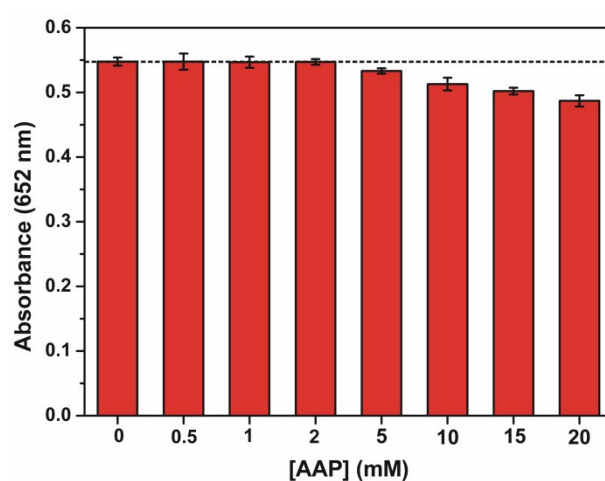


Figure S7. Effect of the concentration of AAP added on the colorimetric detection of ALP activity.

Table S1. Performance comparison of our colorimetric assay and previously reported methods for ALP activity detection.

Material	Role	Method	Linear range (U L ⁻¹)	LOD (U L ⁻¹)	Ref.
Ce ³⁺ -ATP-Tris CPNs	Fluorescent label	Fluorescent	0.1~10	0.09	1
Coumarin@Tb-GMP ICPs	Fluorescent label	Fluorescent	25~200	10	2
β-CD-CdTe QDs	Fluorescent label	Fluorescent	0~800	10	3
Au NCs	Fluorescent label	Fluorescent	1~200	0.05	4
MVCM+F-DNA	Fluorescent label	Fluorescent	2~100	0.18	5
dsDNA-Cu NPs	Fluorescent label	Fluorescent	0.3~7.5	0.3	6
Cu-MOFs	Peroxidase mimic	Colorimetric	1~34	0.19	7
Au NPs+CePO ₄ :Tb NRs	Fluorescent label	Fluorescent	0.2~100	0.06	8
Au NRs	Colorimetric label	Colorimetric	5~100	3.3	9
CTAB-Au NPs	Colorimetric label	Colorimetric	0.2~20	0.1	10
Cu NCs+CoOOH	Fluorescent label	Fluorescent	0.5~150	0.1	11
F-PDA NPs+MnO ₂ NSs	Fluorescent label	Fluorescent	1~80	0.34	12
MnO ₂ microspheres	Oxidase mimic	Colorimetric	0.5~120	0.42	This work

References

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