

Supporting Information

Colorimetric detection of Hg^{2+} based on inhibiting the peroxidase-like activity of DNA-Ag/Pt nanoclusters

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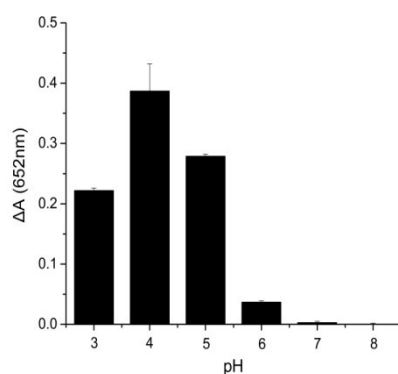
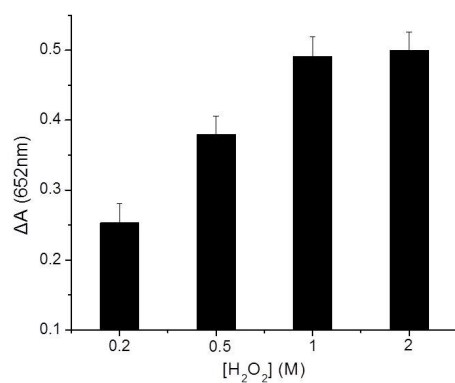


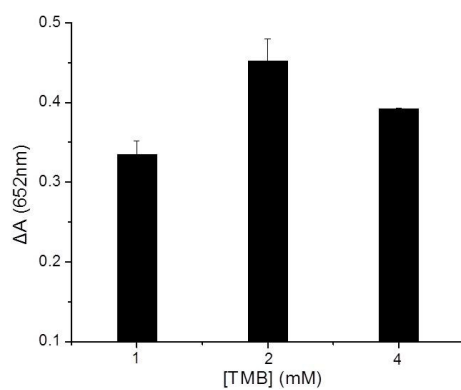
Fig. S1 Different pH values of citrate buffer were investigated. Condition: [citrate buffer] = 0.1 M, [TMB] = 4mM, [DNA-Ag/Pt NCs] = 1.0 μM , and the reaction time was 15 min.



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15 Fig. S2 Different concentrations of H_2O_2 were investigated. Condition: [citrate buffer] = 0.1 M,

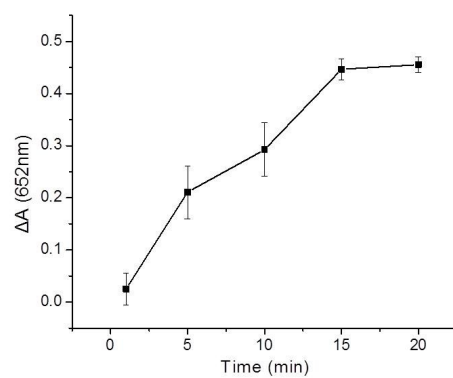
16 [TMB] = 4mM, [DNA-Ag/Pt NCs] = 1.0 μ M, and the reaction time was 15 min.



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18 Fig. S3 Different concentrations of TMB were investigated. Condition: [citrate buffer] = 0.1 M,

19 $[H_2O_2] = 1.0$ M, [DNA-Ag/Pt NCs] = 1.0 μ M, the reaction time was 15 min.

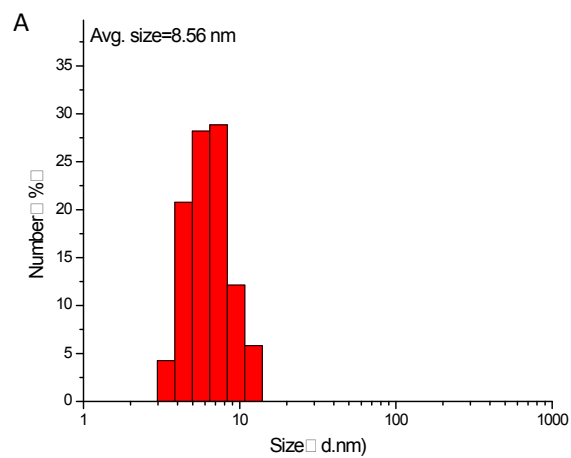


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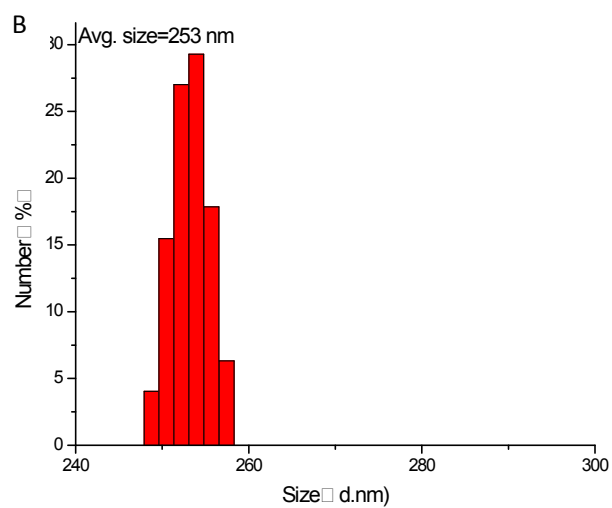
21 Fig. S4 Different reaction time between Hg^{2+} and DNA-Ag/Pt NCs. Condition: [citrate buffer]

22 =0.1 M, $[\text{H}_2\text{O}_2] = 1.0 \text{ M}$, $[\text{TMB}] = 4 \text{ mM}$, $[\text{DNA-Ag/Pt NCs}] = 1.0 \mu\text{M}$.

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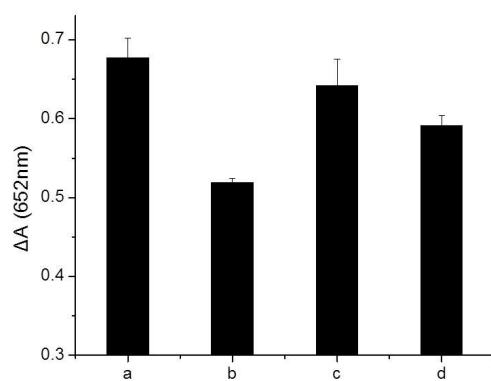
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26 Fig. S5 The size distribution of DNA-Ag/Pt NCs measured by DLS in the (A) absence and (B)

27 presence of 5.0 μM Hg^{2+} .



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30 Fig. S6 Effect of concentrations of Tween-20 on the catalytic activity of DNA-Ag/Pt NCs in tap
31 water, (a) ultrapure water; (b) tap water; (c) b +0.01% Tween-20; (d) b +0.02% Tween-20.

32 Table S1 Comparison of the proposed Hg²⁺ detection method with other reported optical assays.

Methods	Limit of detection	Real samples	Detection time	Ref.
Colorimetric (ssDNA-attached Au NPs)	50 nM	Pond water and river	30 min	1
Colorimetric (MnO ₂ nanorods)	0.08 μM	Pool and River water	15 min	2
Colorimetric (BSA-Pt nanozyme)	7.2 nM	Drinking water	20 min	3
Colorimetric (Au NPs)	0.3 nM	Lake	Not reported	4
Colorimetric (quaternary ammonium group-capped gold nanoparticles)	30 nM	Drinking water	Not reported	5
Colorimetric (CTAB-coated nanogold)	30 nM	Tap water	10 min	6
Colorimetric (BSA-Ag NCs)	25 nM	Not reported	10 min	7
Colorimetric (Citrate-capped Ag NPs)	28 nM	Not reported	2 min	8
Colorimetric (Citrate-capped Ag NPs)	2.0 nM	Not reported	2 min	9
Colorimetric (Au NPs)	2.9 nM	Drinking water	2 min	10
Colorimetric (MPA-Au NPs)	4.0 nM	Lake and tap water	1 h	11
Fluorescence (DNA-templated Ag NPs)	2.6 nM	Environmental water	20 min	12
Fluorescence (H ₂ O ₂ -AUR-Au NPs)	4.0 nM	Pond water	> 2 h	13
Fluorescence (H ₂ O ₂ -AUR-Au NPs)	2.2 nM	Drinking water	25 min	14
Colorimetric (DNA-Ag/Pt NCs)	5.0 nM	Tap water	15 min	This work

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Table S2 Assay results of Hg²⁺ in tap water.

Sample	Spiked/nM	Measured/nM	Recovery/%
tap water	0	1.4 ± 1.3	—
	10	9.1 ± 1.2	91.0
	20	21.2 ± 2.5	106.2
	50	47.2 ± 6.5	94.3
	100	95.3 ± 5.0	95.3
	200	194.8 ± 12.5	97.4

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