Electronic Supplementary Material (ESI) for Analytical Methods.

SUPPORTING INFORMATION

for

Stable gold nanoparticles as a novel peroxidase mimic for colorimetric detection of cysteine

Rong Sheng Li,[a] Hai Liu,[a] Bin Bin Chen,[b] Hong Zhi Zhang,[a] Cheng Zhi Huang*[,a,b] and Jian Wang *[,a,c]

[a] *Key Laboratory of Luminescent and Real-Time Analytical Chemistry (Southwest University) Ministry of Education, College of Pharmaceutical Science, Southwest University, Chongqing 400715, China. E-mail: chengzhi@swu.edu.cn, Tel: (+86) 23 68254659, Fax: (+86) 23 68367257.*

[b] *Chongqing Key Laboratory of Biomedical Analysis (Southwest University), Chongqing Science & Technology Commission, College of Chemistry and Chemical Engineering, Southwest University, Chongqing 400715, China.*

[c] *State Key Laboratory of Chemo/Biosensing and Chemometrics, Hunan University, Changsha 410082, China*

Figures

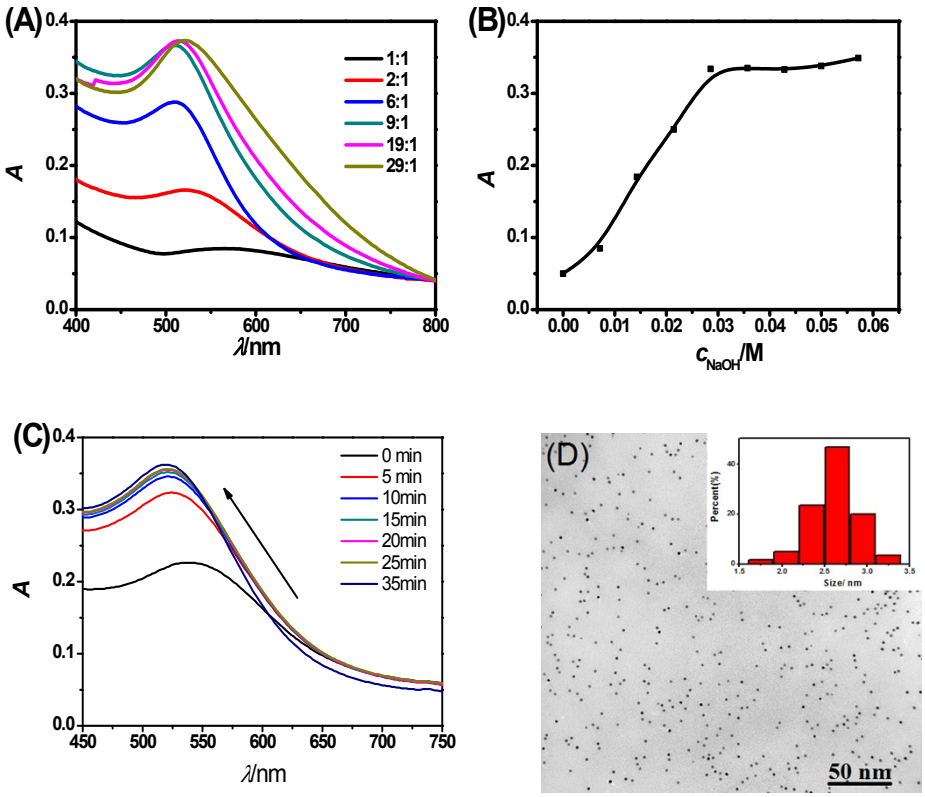

Fig. S1 The conditions for the synthesis of AuNPs. (A) The effect of kiwi juice and $HAuCl_4$ concentrations on the synthesis of AuNPs. c_{NaOH}, 0.04 M; The volume fraction of kiwi juice were 41.6%, 55.6%, 71.4%, 75.0%, 79.2%, 80.6%, and 2.0 mM $HAuCl_4$ were 41.6%, 27.8%, 11.9%, 8.3%, 4.2%, 2.8%, respectively. (B) The effect of NaOH concentration on the synthesis of AuNPs. Volume ratio of 2.0 mM M $HAuCl_4$ and as-obtained kiwi juice was 19:1. (C) The effect of reaction time on the synthesis of AuNPs. c_{NaOH}, 0.04 M; volume ratio of 2.0 mM M $HAuCl_4$ and as-obtained kiwi juice was 19:1. (D) The size distribution of AuNPs.

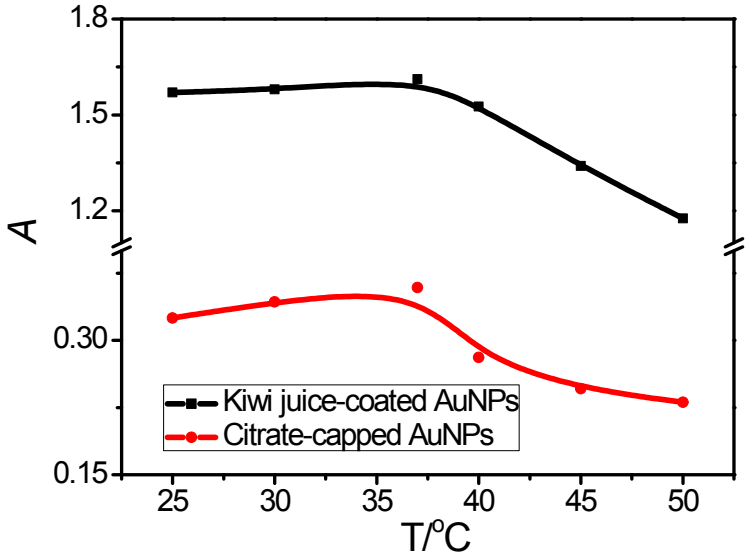

Fig. S2 The effect of temperature on the catalytic activity of AuNPs. Conditions: TMB, 0.125 mM; AuNPs, 0.4 nM; pH 4.0; H_2O_2, 0.15 M; t, 30 min.

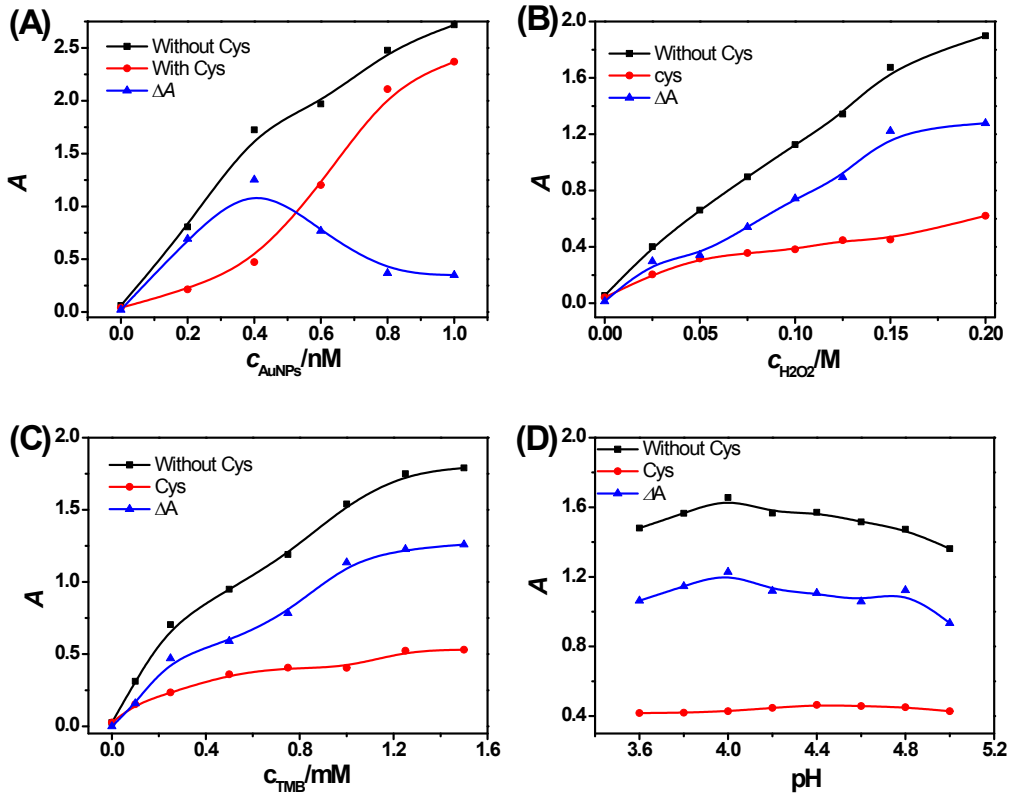

Fig. S3 The dependence of AuNPs on catalytic activity. (A) AuNPs concentration. Conditions: TMB, 1.25 mM; H_2O_2, 0.15M; pH 4.0; cys, 1.0×10^{-6} M. (B) H_2O_2 concentration. Conditions: AuNPs, 0.4 nM; TMB, 1.25 mM; pH 4.0; cys, 1.0×10^{-6} M. (C) Concentration of TMB. Conditions: AuNPs, 0.4 nM; H_2O_2, 0.15 M; pH 4.0; cys, 1.0×10^{-6} M; (D) pH. TMB, 0.125 mM; H_2O_2, 0.15M; AuNPs, 0.4 nM; pH 4.0; cys, 1.0×10^{-6} M.

Table S1 The comparison of colorimetric assays for cysteine sensing

Probes	Color transition	Concentration	LOD	Ref.
Nickel oxide nanoflowers	Blue-to-colorless	20-100 μM	1.1 μM	[1]
Fe_3O_4 magnetic nanoparticles	Blue-to-colorless	6-50 μM	6 μM	[2]
PtNPs/GO nanocomposites	Blue-to-colorless	25-5000 nM	1.2 nM	[3]
ssDNA-stabilized AuNPs	Red to blue	0.1-5 μM	0.1 μM	[4]
Fluorosurfactant-capped AgNPs	Red to blue	1.0-4.5 □M	0.8 μM	[5]
Silver nanoprisms	Blue to red	0.16-1.65 μM	160 nM	[6]
CuO/ZnO nanocomposites	Light blue to dark grey	40-96 μM	40 μM	[7]
Kiwi juice capped-AuNPs	Blue-to-colorless	50-1000 nM	6.2 nM	Our work

References:

1 C. Ray, S. Dutta, S. Sarkar, R. Sahoo, A. Roy and T. Pal, *J. Mater. Chem. B*, 2014, **2**, 6097-6105.

2 X. Q. Wu, Y. Xu, Y. L. Chen, H. Zhao, H. J. Cui, J. S. Shen and H. W. Zhang, *RSC Adv.*, 2014, **4**, 64438-64442.

3 X. Q. Lin, H. H. Deng, G. W. Wu, H. P. Peng, A. L. Liu, X. H. Lin, X. H. Xia and W. Chen, *Analyst*, 2015, **140**, 5251-5256.

4 Z. Chen, S. L. Luo, C. B. Liu and Q. Y. Cai, *Anal. Bioanal. Chem.*, 2009, **395**, 489-494.

5 C. Lu and Y. B. Zu, *Chem. Commun.*, 2007, 3871-3873.

6 T. Wu, Y. F. Li and C. Z. Huang, *Chinese Chem. Lett.*, 2009, **20**, 611-614.

7 M. Simsikova, J. Cechal, A. Zorkovska, M. Antalik and T. Sikola, *Colloid. Surface. B*, 2014, **123**, 951-958.