Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting Information

One-pot Synthesis of Dual-emitting BSA-Pt-Au Bimetallic Nanoclusters for Fluorescence Ratio-metric Detection of Mercury Ions and Cysteine

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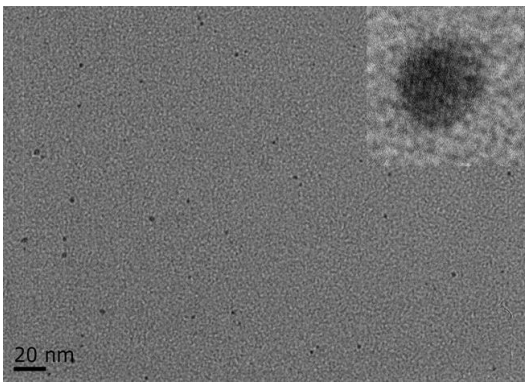

Fig. S1 TEM image of as-prepared BSA-Pt-Au NCs. The inset is the HRTEM of BSA-Pt-Au NCs.

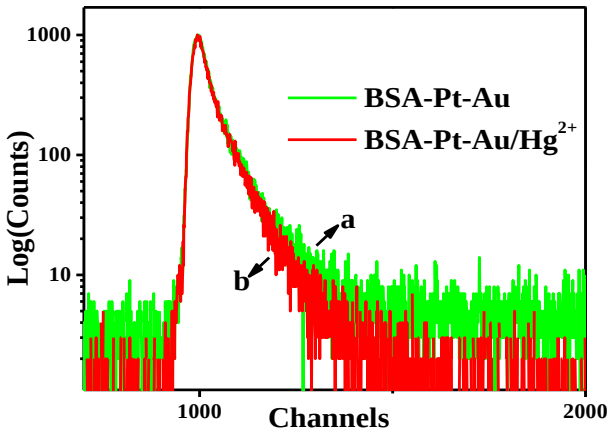

Fig. S2 Fluorescence decay of BSA-Pt-Au NCs in the absence (a) and presence (b) of Hg^{2+} ions.

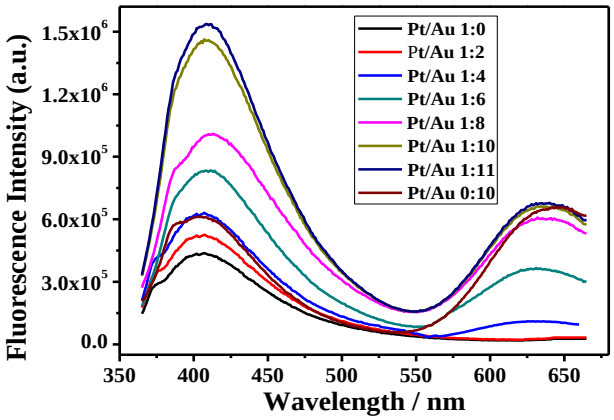

Fig. S3 Fluorescence spectra of as-prepared BSA-Pt-Au NCs with different molar ratios of Pt/Au precursors.

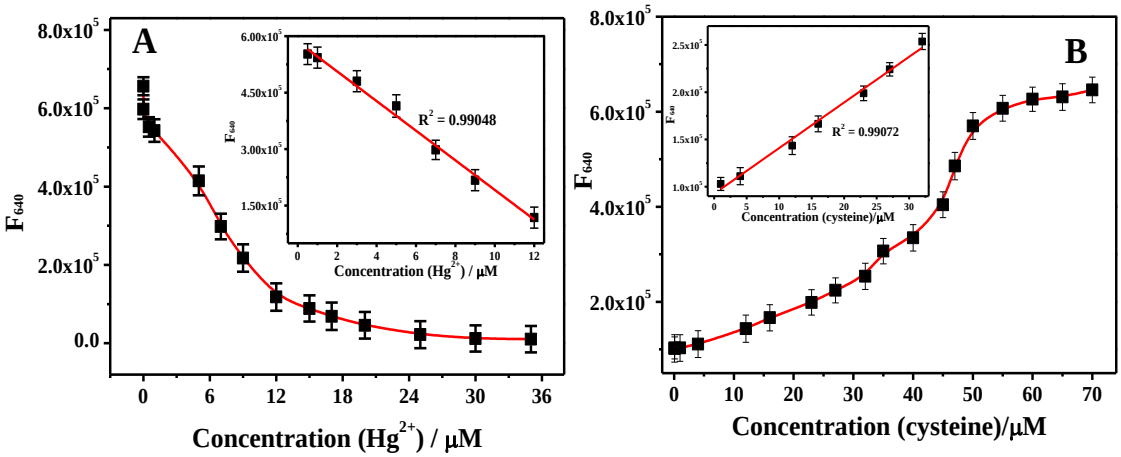

Fig. S4 (A) The fluorescence intensity (F_{640}) of BSA-Pt-Au NCs in the presence of different concentrations of Hg^{2+} ions. (b) The fluorescence intensity (F_{640}) of BSA-Pt-Au NCs in the presence of 22 μM Hg^{2+} ions and different concentrations of Cys.

Table S1 Comparison of the linear range and detect limit for Hg^{2+} ions using different methods.

Metal ion	Method	Linear range	Detect limit	Reference
Hg^{2+}	Based on AuNCs@FabI	1 nM-10 μM	not shown	[1]
Hg^{2+}	Based on BSA-AuNCs	25 nM-250 nM	7 nM	[2]
Hg^{2+}	Based on DHLA-AuNCs	1 nM-10 μM	0.5 nM	[3]
Hg^{2+}	Based on LsGFC	10 nM-5 μM	not shown	[4]
Hg^{2+}	Based on BSA-Pt-Au NCs	0.5nM-22 μM	0.2nM	This work

FabI: Drug target bacterial enoyl-ACP reductase;

DHLA: Dihydrolipoic acid;

LsGFC: Lysozyme-stabilized gold fluorescent clusters.

Table S2 Comparison of the novel method for the analysis of cysteine with that of other studies.

Amino acid	Method	Linear range	Detect limit	Reference
cysteine	Based on PI-Ag NCs	0.1-5.0 μM	not shown	[5]
cysteine	Based on CdTe/CdS quantum	1.0–20 μM	0.28 μM	[6]
cysteine	Based on Surfactant-capped AgNPs	1.5–6.0 μM	0.05 μM	[7]
cysteine	Based on BSA-Pt-Au NCs and Hg^{2+}	0.1-50 μM	0.04 μM	This work

PI-Ag NCs: Polyionosinic acid-Ag NCs;

Surfactant-capped AgNPs: Fluorosurfactant-capped silver nanoparticles.

Table S3 Analytical results for the determination of Hg^{2+} or cysteine in urine and serum samples using the BSA-Pt-Au NCs.

sample	Substances	Added Substances (μM)	Measured (μM)	Recovery (%)
Urine 1	Hg^{2+}	20	20.13	100.65
	cysteine	50	50.54	101.08
Urine 2	Hg^{2+}	20	19.93	99.65
	cysteine	50	50.82	101.64
Urine 3	Hg^{2+}	20	20.18	100.90
	cysteine	50	49.76	99.52
Serum 1	Hg^{2+}	20	20.11	100.55
	cysteine	50	51.25	102.50
Serum 2	Hg^{2+}	20	19.87	99.35
	cysteine	50	50.13	100.26
Serum 3	Hg^{2+}	20	20.08	100.4
	cysteine	50	50.26	100.52

Notes and reference

1. H. Ding, H. Li, P. Liu, J. K. Hiltunen, Y. Wu, Z. Chen and J. Shen, *Microchim. Acta*, 2014, **181**, 1029-1034.
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