

A recyclable colorimetric probe: in-situ fabrication of highly stable HPEI-AuNPs for selective Ag⁺ detection

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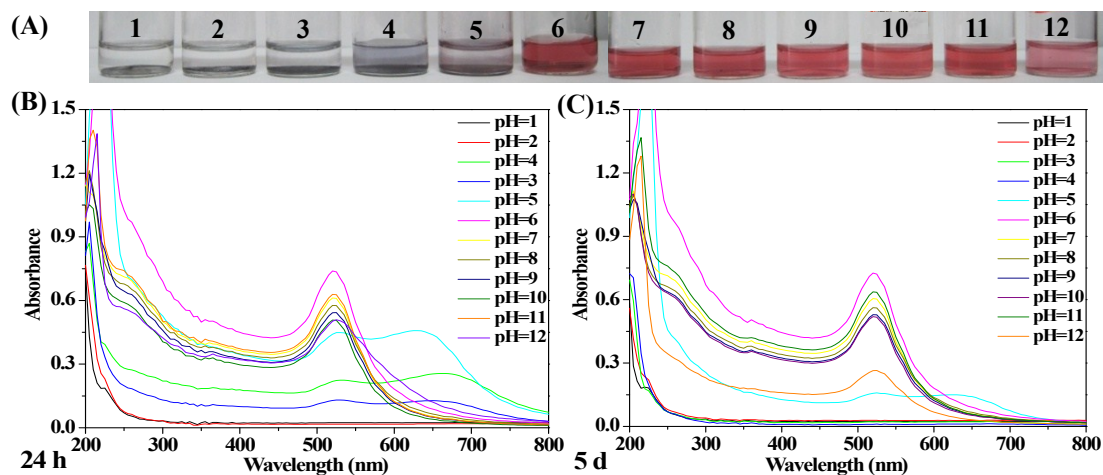


Fig. S1 (A) The color of the citrate-capped AuNPs after 5 d under different pH value; The UV-Vis spectra of the citrate-capped AuNPs after (B) 24 h and (C) 5 d under different pH environment.

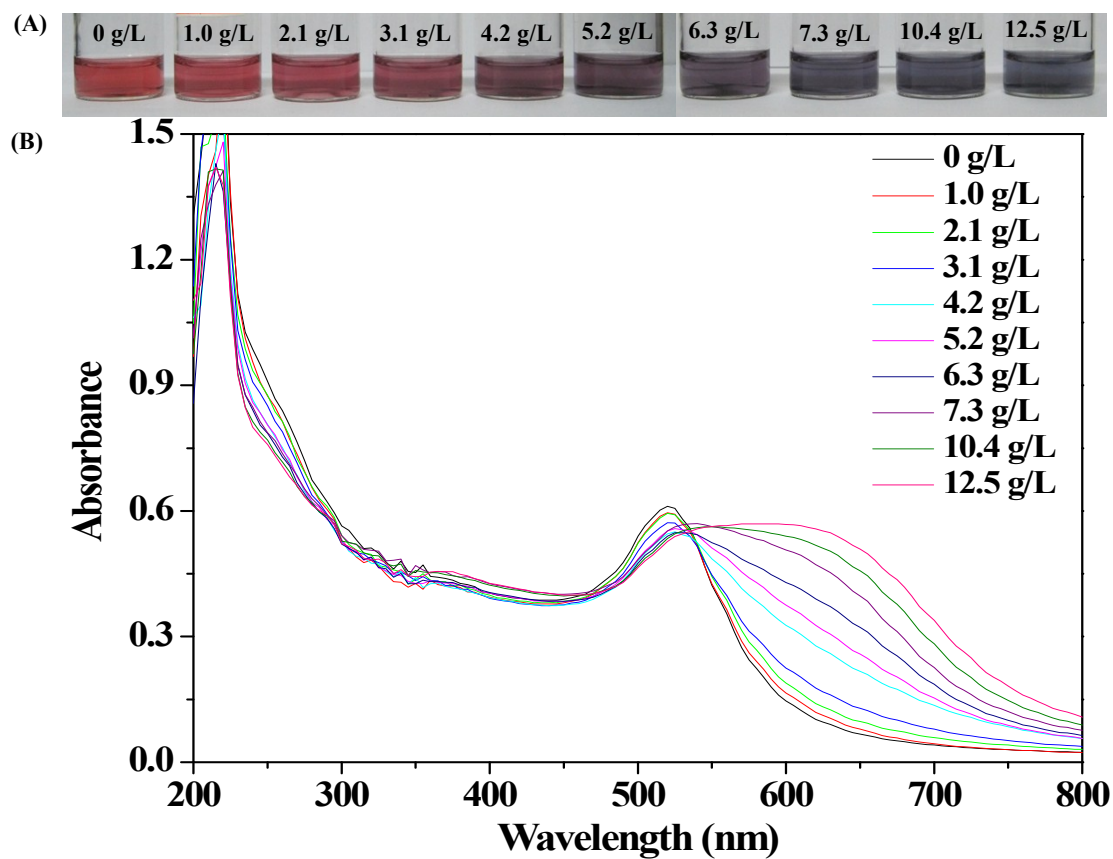


Fig. S2 The (A) photographs and (B) UV-Vis spectra of the citrate-capped AuNPs after 24 h under different salt concentrations.

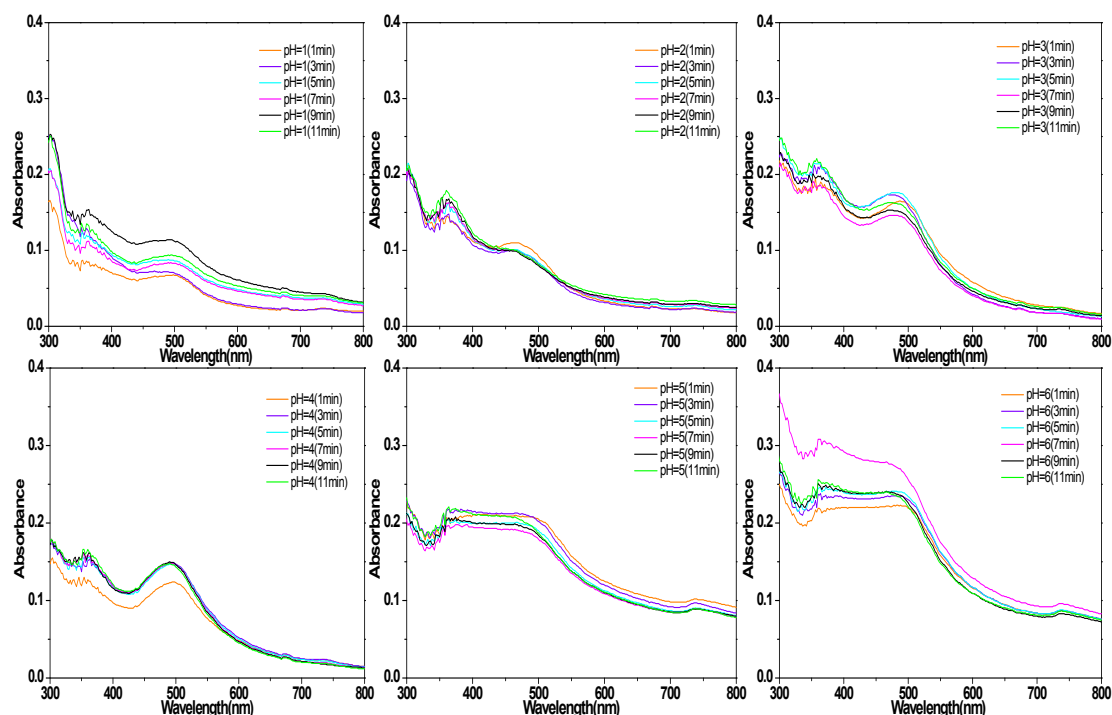


Fig. S3 Effect of the pH from 1 to 6 on the absorption spectra in the presence of $0.11 \mu\text{M Ag}^+$ after 1-11 min.

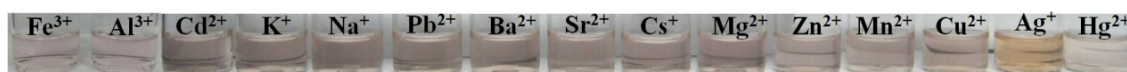


Fig. S4 For the selectivity of the sensor: the photographs of the HPEI-AuNPs (0.34 nM) solutions in the presence of different metal ions ($10.7 \mu\text{M}$).

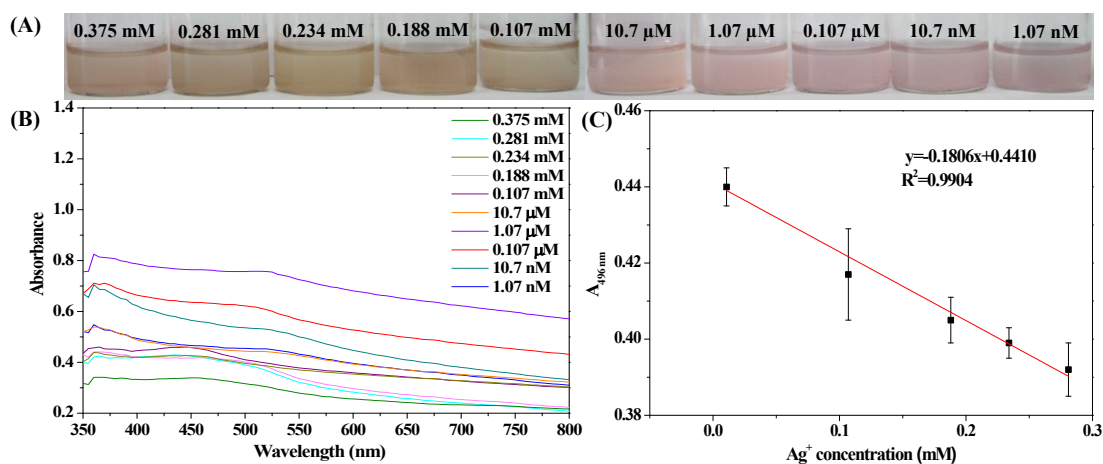


Fig. S5 Colorimetric sensing of Ag^+ in tap water: (A) photographs and (B) absorption spectra of 0.34 nM HPEI-AuNPs in tap water with different Ag^+ concentrations (1.07 nM to 0.375 mM). (C) Plot of $A_{496 \text{ nm}}$ and the concentration of Ag^+ in the range of $10.7 \mu\text{M}$ to 0.281 mM .

Table S1. Comparison of LOD for Ag⁺ detection of this work with other reported methods.

Method	Materials	Detection limit	Linear range	Ref.
Colorimetry	Pyridines-functionalized AuNPs	1 μ M	— ^a	1
Colorimetry	DNA probe and AuNPs	0.5 μ M	1.5-4 μ M	2
Colorimetry	Tetrakis (hydroxymethyl) phosphonium Chloride/ AuNPs	1 μ M	1-170 μ M	3
Colorimetry	AuNPs/AA	0.85 μ M	0.1-5 μ M	4
Colorimetry	poly(N,N'-methylenebisacrylamide) protected AuNPs	0.5 μ M	1-1000 μ M	5
Colorimetry	Creatinine-functionalized AuNPs	1 μ M	5-40 μ M	6
Colorimetry	AuNP-based chromogenic reaction	1 μ M	1-170 μ M	7
Colorimetry	HPEI-AuNPs	410 nM	1.07-375 μ M	This work

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