Electronic Supplementary Information

for

Highly selective and rapid detection of silver ion by "turn on" a non-fluorescent cysteine stabilized gold nanoclusters probe

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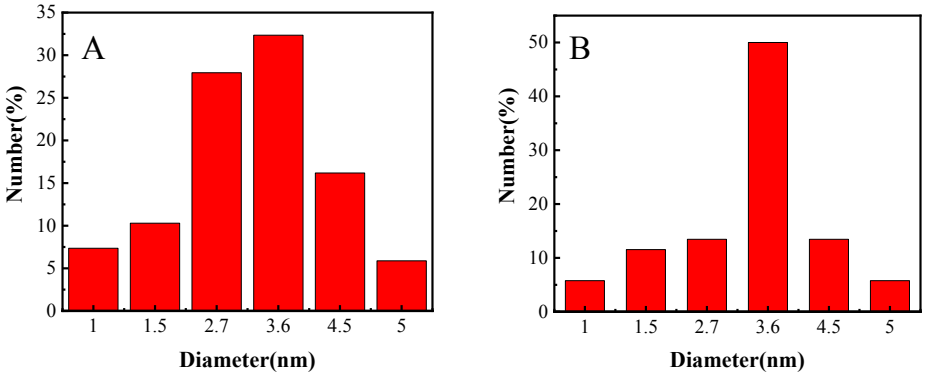

Figure S1. Size distribution of the Cys-Au NCs (A) and Cys-Au NCs-Ag^{+} (B).

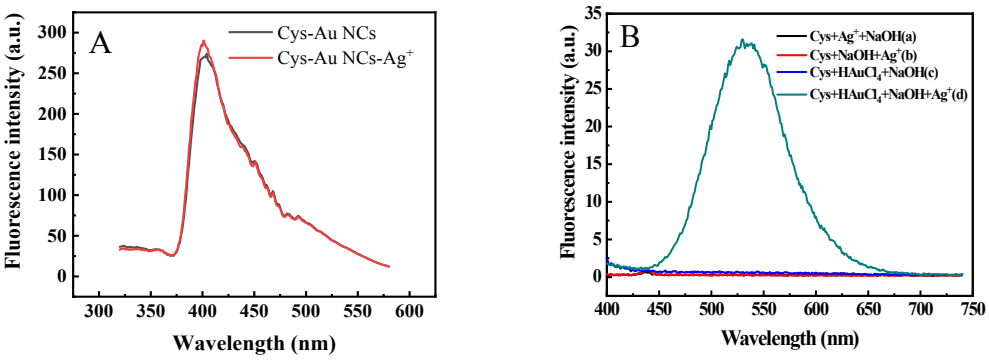

Figure S2. The scattering spectra of Cys-Au NCs and Cys-Au NCs-Ag^+ (A) and the fluorescence spectra (B) of (a) Cysteine (1.5 mM), Ag^+ (30.0mM) and NaOH (6 mM) reaction at 90 ^oC heating for 3 h. (b) Cysteine (1.5 mM) and NaOH (6 mM) reaction at 90 ^oC heating for 3 h, then adding Ag^+ (30.0 μM). (c) Cysteine (1.5 mM), NaOH (6 mM) and $HAuCl_4$ (1 mM), reaction at 90 ^oC for 3 h. (d) Cysteine (1.5 mM), NaOH (6 mM) and $HAuCl_4$ (1 mM), reaction at 90 ^oC for 3 h, then adding Ag^+ (30.0 μM).

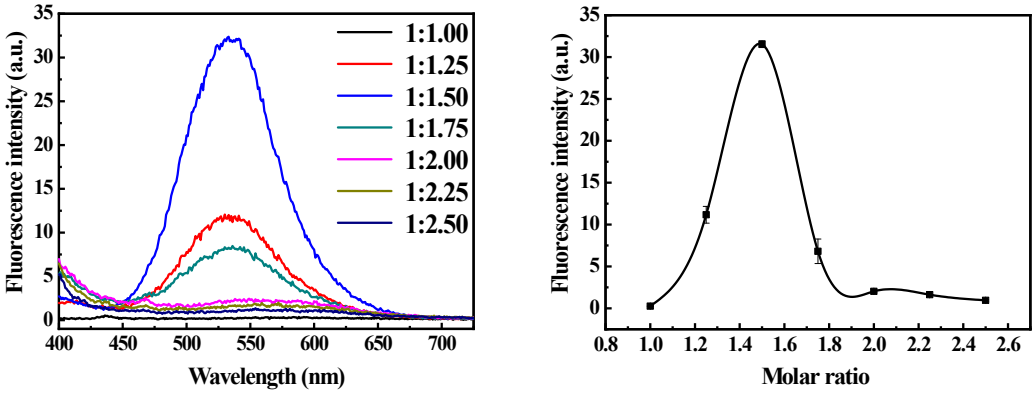

Figure S3. Fluorescence spectra (A) and intensity (B) of Ag^+ enhanced Cys-Au NCs synthesized under different molar ratio of $HAuCl_4$ and cysteine. Experimental condition: cysteine (1.5 mM), NaOH (6 mM), Ag^+ (30.0 μM) and $HAuCl_4$ (1.0 mM); reaction time, 3 h; reaction temperature, 90 ^oC.

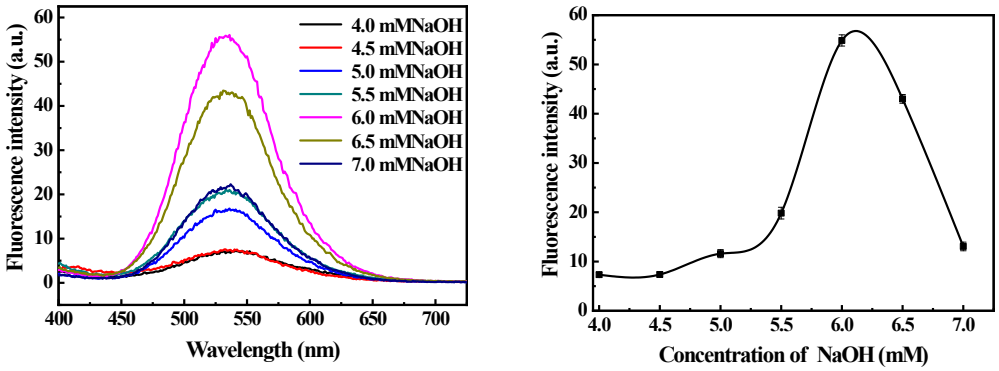

Figure S4. Fluorescence spectra (A) and intensity (B) of Ag^+ enhanced Cys-Au NCs synthesized with different concentration of NaOH. Experimental condition: Cysteine (1.5 mM), NaOH: 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0mM, Ag^+ (30.0 μM), $HAuCl_4$ (1 mM); reaction time, 3 h; reaction temperature, 90 ^oC.

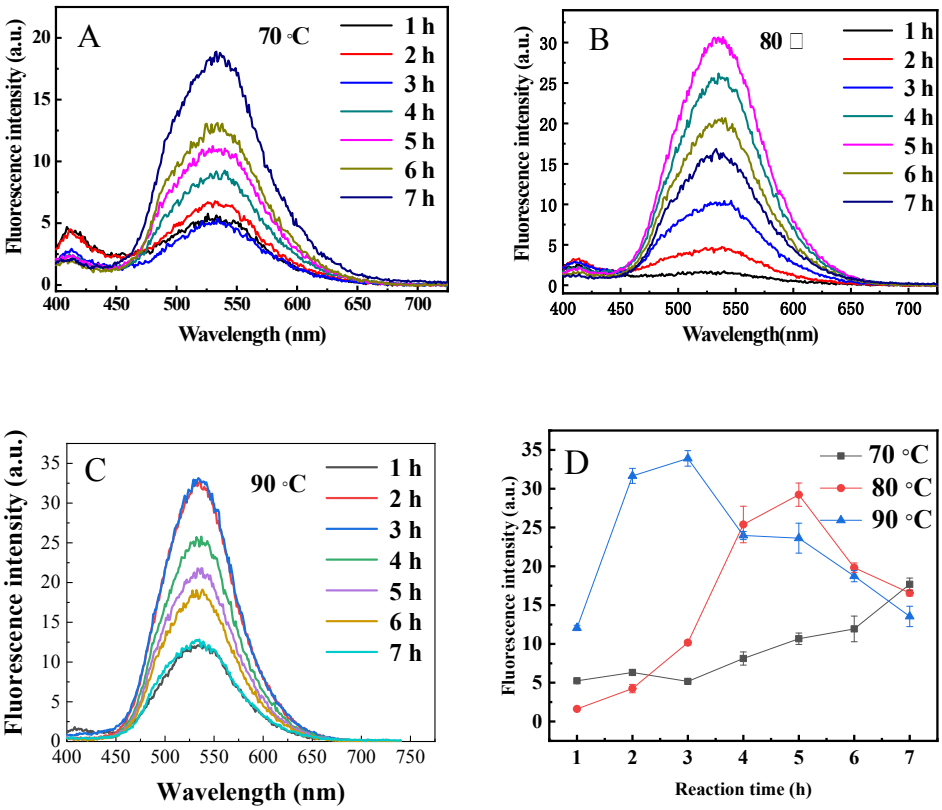

Figure S5. Fluorescence spectra of Ag^+ enhanced Cys-Au NCs synthesized under different temperature and different reaction time: 70 °C (A), 80 °C (B), 90 °C (C). Effect of temperature on generation of luminescent Cys-Au NCs (D). Experimental condition: cysteine (1.5 mM), NaOH (6 mM), Ag^+ (30.0 μM) and $HAuCl_4$ (1 mM); reaction time, 3 h; reaction temperature: 70, 80, 90 °C.

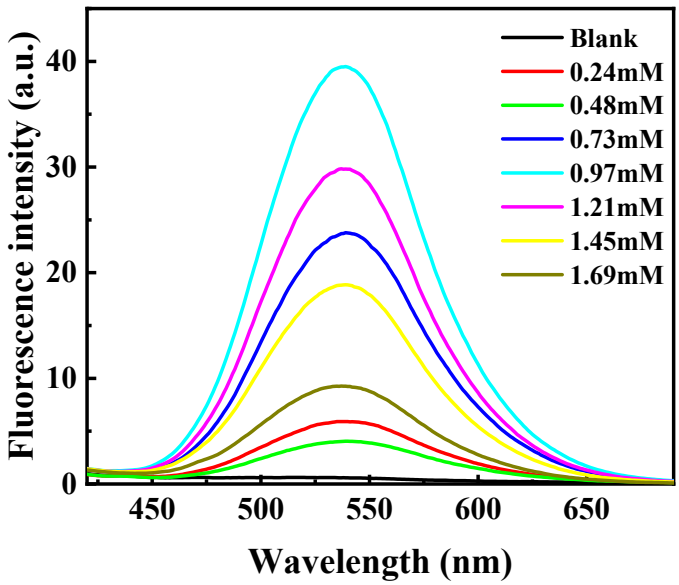

Figure S6. Fluorescence spectra of Cys-Au NCs-Ag^{+} with different concentration of Cys-Au NCs in the range from 0.24 mM to 1.69 mM. Experimental condition: Cys-Au NCs (1.5 mM, represented by the concentration of $HAuCl_4$), Cysteine (1.5 mM), NaOH (6 mM), Ag^{+} (30.0 μM) and $HAuCl_4$ (1 mM); reaction time, 3 h; reaction temperature: 90 ^{o}C.

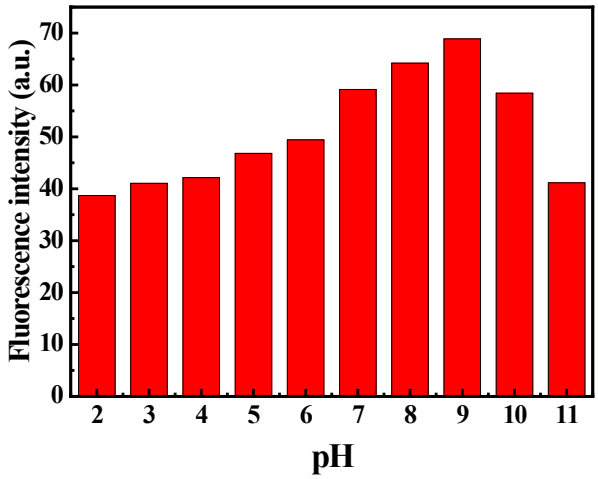

Figure S7. Fluorescence spectra of Cys-Au NCs under different pH conditions. Experimental condition: Cysteine (1.5 mM), NaOH (6 mM), Ag^{+} (30.0 μM) and $HAuCl_4$ (1 mM); reaction time, 3 h; reaction temperature: 90 ^{o}C, PB buffer solution (6.0-8.0), BR buffer solution (2.0-11.0).