Electronic supplementary information

VISUAL AND OPTICAL DETECTION OF HYPOCHLORITE IN WATER SAMPLES BASED ON ETCHING OF GOLD/SILVER ALLOY NANOPARTICLES

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Preparation of citrate stabilized silver nanoparticles (AgNPs)

The silver colloid was prepared by using chemical reduction method.[1,2] Briefly, 50 mL of 1.00×10^{-3} mol dm^{-3} $AgNO_3$ was heated to boiling. To this solution 5 mL of 1 % trisodium citrate was added drop by drop with vigorous stirring until color change from colorless to pale yellow. Then heating is removed and stirred until cooled to room temperature. The prepared AgNPs suspension yielded spherical particles with an average size of 10-20 nm.[2]

Preparation of gold rich-gold/silver alloy nanoparticles

Gold rich Au/Ag alloy NPs were prepared by taking aqueous solutions of $HAuCl_4$ (1.50×10^{-4} mol dm^{-3}) and $AgNO_3$ (3.75×10^{-5} mol dm^{-3}) in 47.5 mL double distilled water with a final gold molar ratio of 0.80. The solution containing $HAuCl_4$ and $AgNO_3$ is refluxed under constant stirring with subsequent addition of 2.50 mL of 1% trisodium citrate.[3]The reduction of gold and silver ions by citrate ions are completed after 15 min. The resulting colloidal solution is then left to cool at room temperature (25^{o}C) for further use.

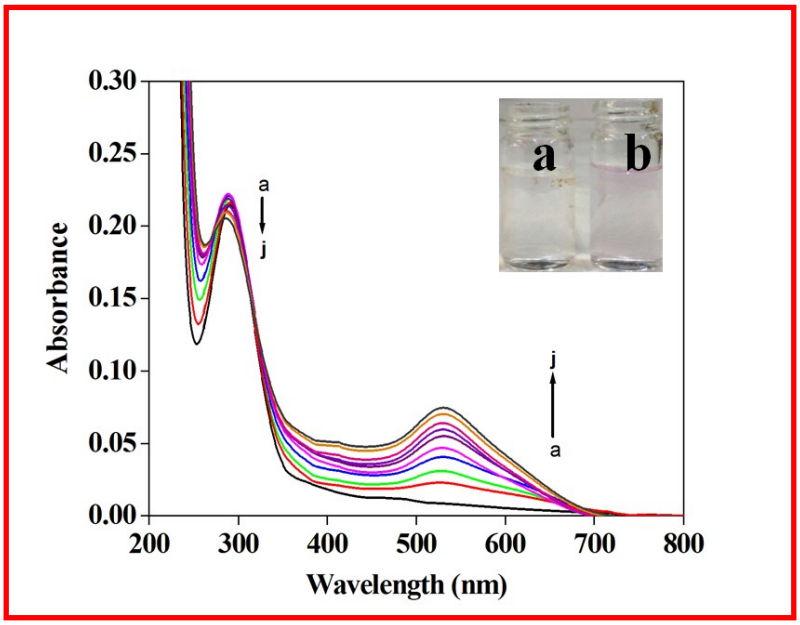

Fig. S1. Absorption spectra of ClO^- in the presence of different concentrations of Au/Ag alloy NPs: (a) 0.00, (b) 20.00 × 10^{-10}, (c) 40.00 × 10^{-10}, (d) 60.00 × 10^{-10}, (e) 80.00 × 10^{-10}, (f) 100.00 × 10^{-10}, (g) 120.00 × 10^{-10}, (h) 140.00 × 10^{-10}, (i) 180.00 × 10^{-10}, and (j) 200.00 × 10^{-10} mol dm^{-3}, (Inset shows the photographs of ClO^- (**a**) before and (**b**) after the addition of Au/Ag alloy NPs).

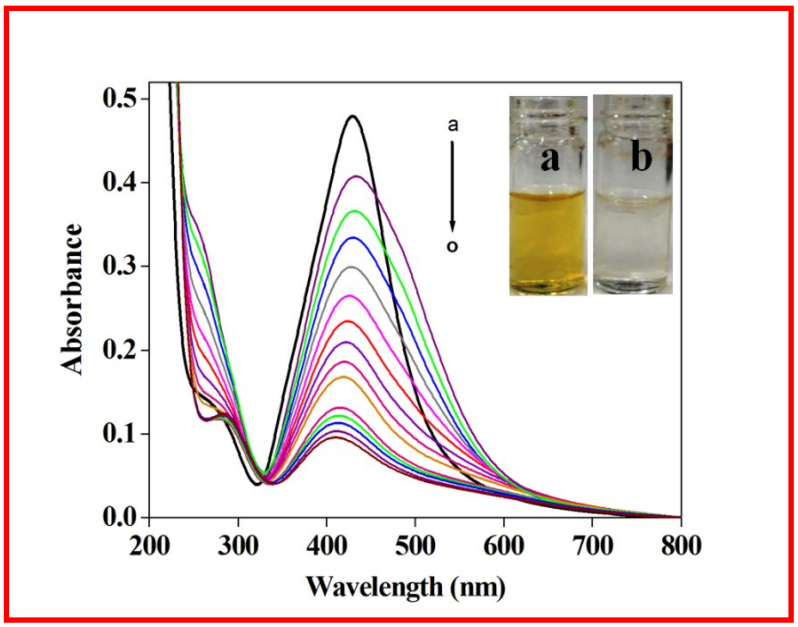

Fig. S2. Absorption spectra of AgNPs in the presence of different concentrations of ClO^-: (a) 0.00, (b) 3.00 × 10^{-5}, (c) 6.00 × 10^{-5}, (d) 9.00 × 10^{-5}, (e) 12.00 × 10^{-5}, (f) 15.00 × 10^{-5}, (g) 18.00 × 10^{-5}, (h) 21.00 × 10^{-5}, (i) 24.00 × 10^{-5}, (j) 27.00 × 10^{-5}, (k) 30.00 × 10^{-5}, (l) 33.00 × 10^{-5}, (m) 36.00 × 10^{-5}, (n) 39.00 × 10^{-5} and (o) 42.00 × 10^{-5} mol dm^{-3}, (Inset shows the photographs of AgNPs (**a**) before and (**b**) after the addition of 42.00 × 10^{-5} mol dm^{-3} of ClO^-).

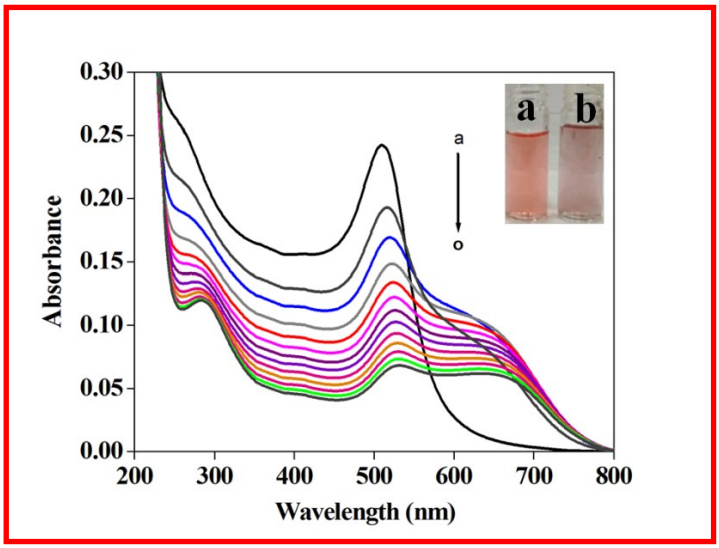

Fig. S3. Absorption spectra of gold rich Au/Ag alloy NPs in the presence of different concentrations of ClO^- : (a) 0.00, (b) 3.00×10^{-5}, (c) 6.00×10^{-5}, (d) 9.00×10^{-5}, (e) 12.00×10^{-5}, (f) 15.00×10^{-5}, (g) 18.00×10^{-5}, (h) 21.00×10^{-5}, (i) 24.00×10^{-5}, (j) 27.00×10^{-5}, (k) 30.00×10^{-5}, (l) 33.00×10^{-5}, (m) 36.00×10^{-5}, (n) 39.00×10^{-5} and (o) 42.00×10^{-5} mol dm^{-3}, (Inset shows the photographs of gold rich Au/Ag alloy NPs (**a**) before and (**b**) after the addition of ClO^-).

References

1. A. Sileikaite, I. Prsycevas, J. Puiso and A. Juraitis, *Material Science*, 2006, ***12***, 287-291.

2. Ratyakshi and R.P. Chauhan, *Asian J. Chem*., 2009, ***21***, S113-116

3. S. Link, Z.L. Wang and M.A. El-Sayed, *J. Phys. Chem. B,* 1999, ***103***, 3529-3533.