

**Electronic Supplementary Information (ESI) for**  
**Colorimetric detection of quaternary ammonium surfactants**  
**using citrate-stabilized gold nanoparticles (Au NPs)**

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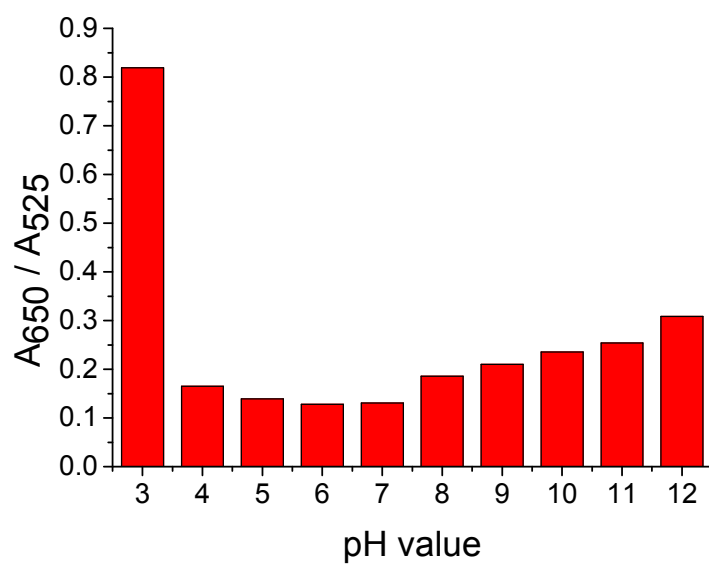
**Experimental details:**

The preparation of citrate-stabilized Au NPs: 0.019g  $\text{HAuCl}_4 \cdot 4\text{H}_2\text{O}$  was dissolved in 100 mL ultrapure water. The solution was transferred into the flask with reflux and was heated with stirring. After the solution boiling, 4 mL citrate sodium solution ( $\text{C}_6\text{H}_5\text{Na}_3\text{O}_7 \cdot 2\text{H}_2\text{O}$ , 1.14 g/100 mL) was quickly added into the solution, allowed to react for 60 minutes. The resulting wine red colloidal Au NPs were finally obtained.

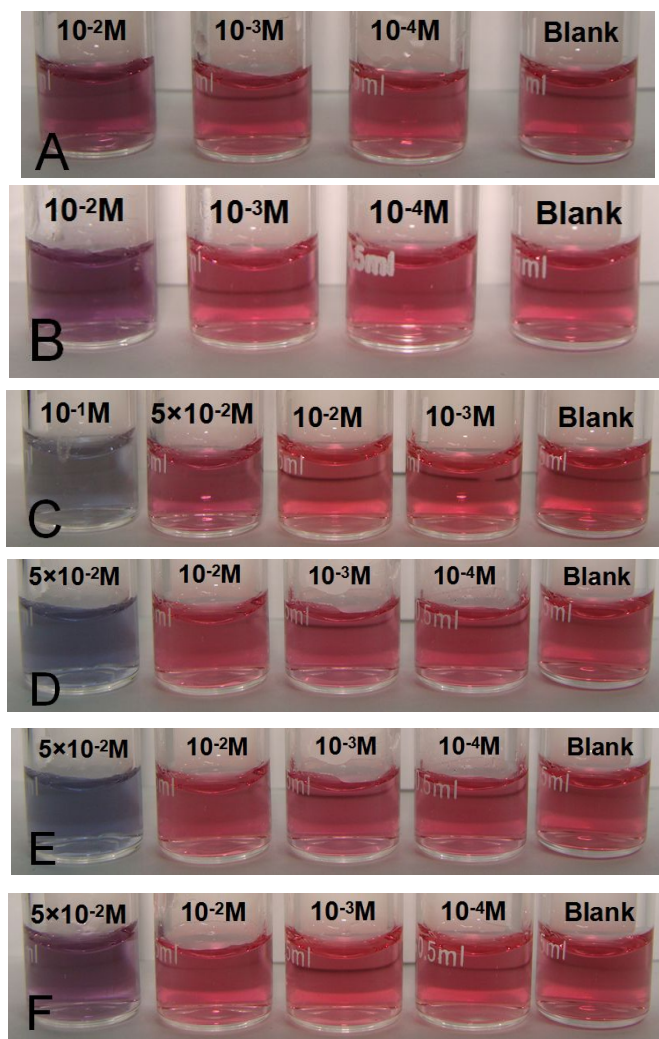
UV-vis absorption spectra were recorded by UV-3600 spectrophotometer (Shimadzu, Japan). Transmission electron microscopy (TEM) was recorded by a JEM-2100 electron microscope (JEOL, Japan) at 200 KV. All of the chemicals were of analytical grade. The water used throughout all experiments was purified by a Elix 5 Pure Water System (Millipore, USA).

Determination of BZKB in disinfectant residual sample by RP-HPLC was performed with Elite P230 chromatographic system (Dalian, China) containing a Beckman Ultrasphere ODS column (4.6 mm×25 cm, 5  $\mu\text{m}$  particle ) at 40 °C. The

mobile phase was consisted of acetonitrile and 0.02 mol/L NaClO<sub>4</sub> solution (v:v = 7:3, pH 2.7). The flow rate was 1 ml/min, UV detection was performed at 258 nm.

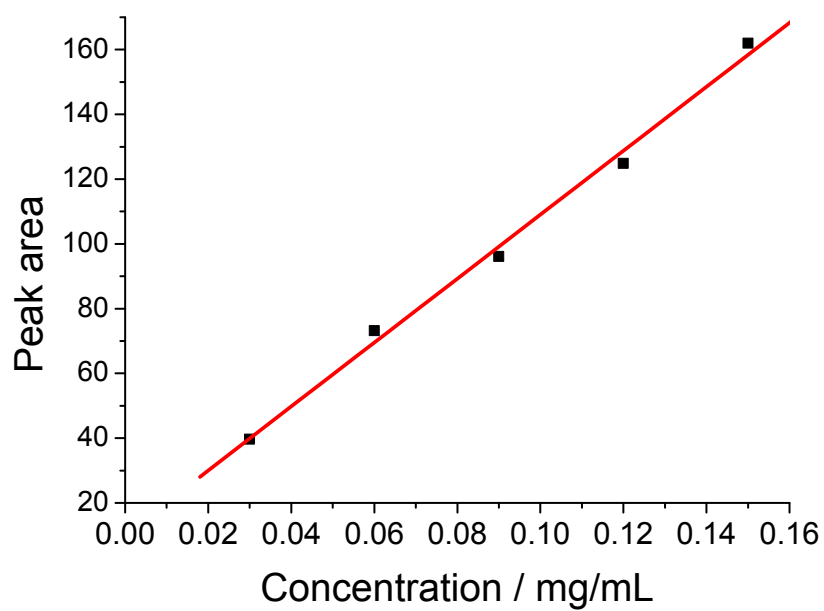


**Fig. S1** Absorbance ratio  $A_{650}/A_{525}$  of the Au NPs solutions with addition of 1  $\mu\text{M}$  TTAB against pH.

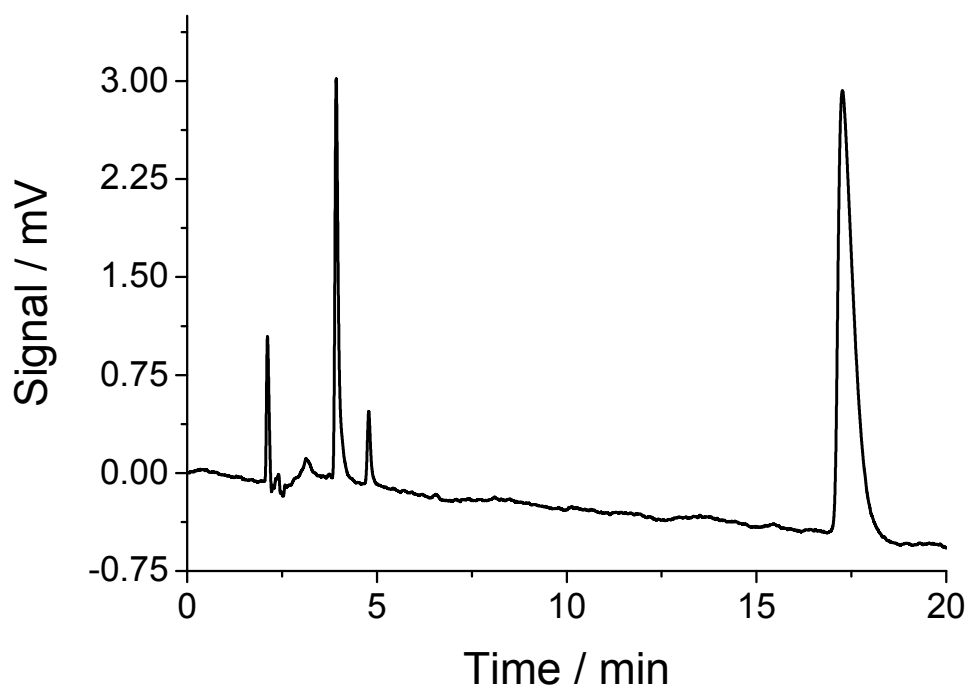


**Fig. S2** Colorimetric response of AuNPs solution upon the addition of various anionic salts. (A)  $\text{NaClO}_4$ ; (B)  $\text{Na}_2\text{SO}_4$ ; (C)  $\text{Na}_3\text{PO}_4$ ; (D)  $\text{NaNO}_3$ ; (E)  $\text{NaCl}$ ; (F)  $\text{Na}_2\text{SO}_3$ .

Linear relationship of the peak area over the known concentration ranges for BZKB by RP-HPLC was obtained, which was shown in Fig. S3. The linear range of concentration of BZKB is from 0.03 to 0.15 mg/mL. The linear regression equation was  $y = 987.6x + 10.26$  ( $R=0.997$ ). The result of disinfectant residual sample by RP-HPLC was shown in Fig. S4. The peak area of BZKB in the disinfectant residual sample was 96.25 ( $t=17.26$  min), so the concentration of BZKB in the disinfectant residual sample was 0.0871 mg/mL ( $2.267 \times 10^{-4}$  M).



**Fig. S3** The calibration curve for BZKB detection by RP-HPLC



**Fig. S4** The chromatogram of disinfectant residual sample by RP-HPLC