Electronic Supplementary Material (ESI) for RSC Advances.

Development of selective and sensitive colour reagent for gold and silver ions and its application to Desktop scanner analysis

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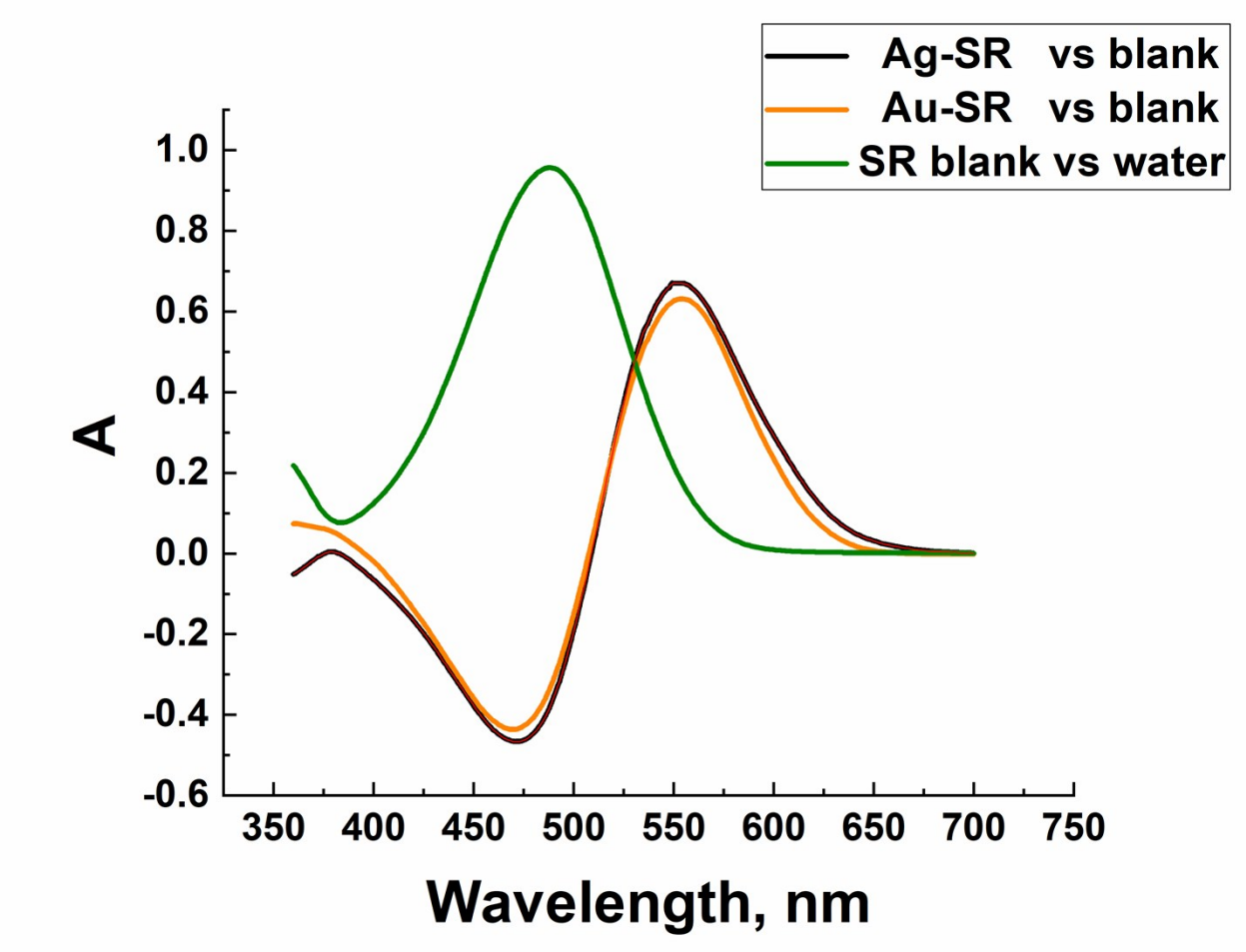

Figure S1 Absorption spectra of silver and gold ternary complexes and their reagent blank. $[Ag^{+}]$ = $[Au^{3+}]$ = 2 µg mL^{-1}, [SR] = 0.05 mmol L^{-1}, [Surfactant]= 2.0 mmol L^{-1}, pH = 10.

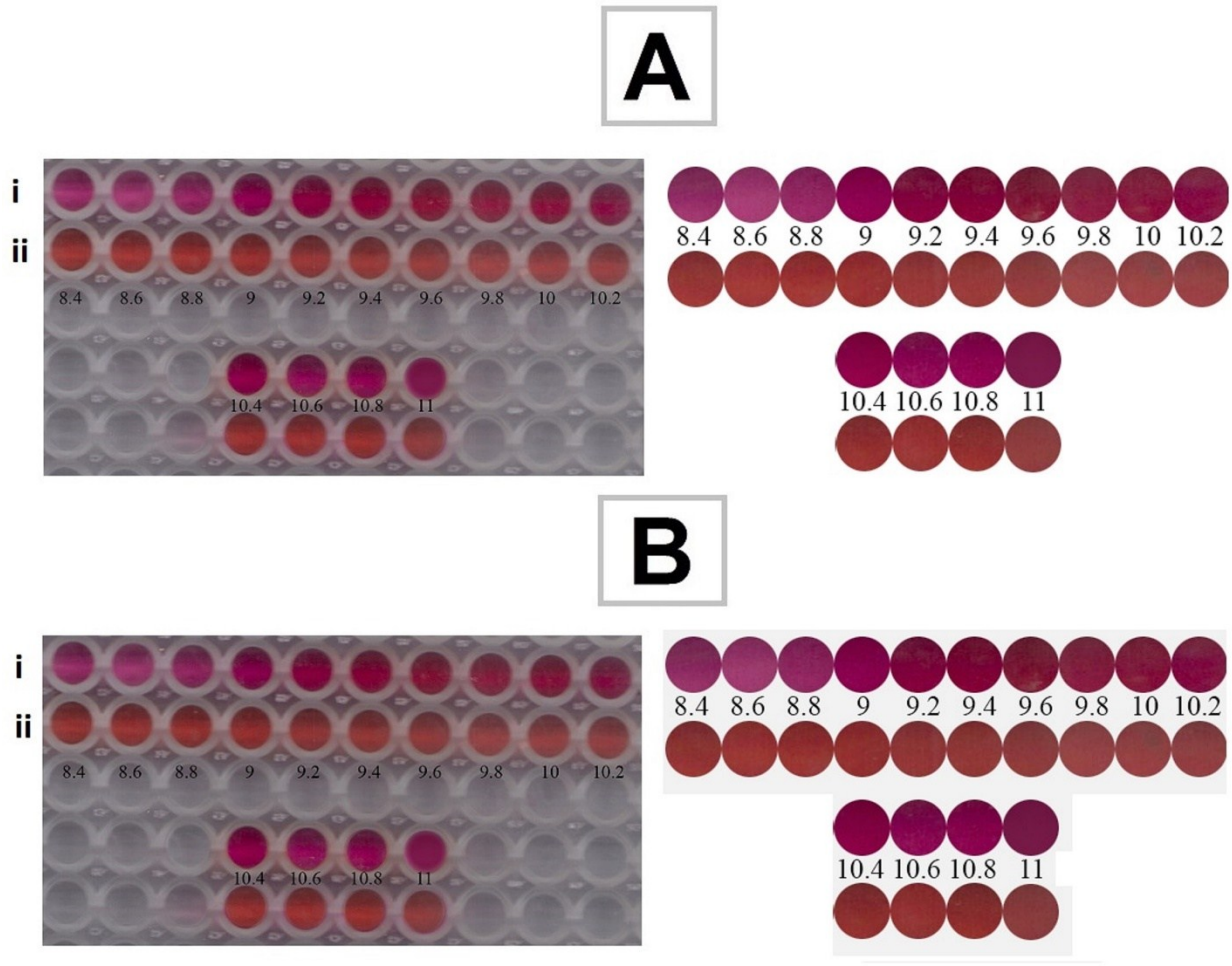

Figure S2. Digital images of the effect of pH on the spectral characteristics of Ag-SR-CPC (A) and Au-SR-CTAC (B) complexes recorded using the desktop scanner at 300-dpi. i) sample; ii) blank. Except for the pH value, other conditions were those given in the recommended procedure. Captured images were arbitrarily compressed to fit into the page margins; however, for image analysis, the original uncompressed images were used.

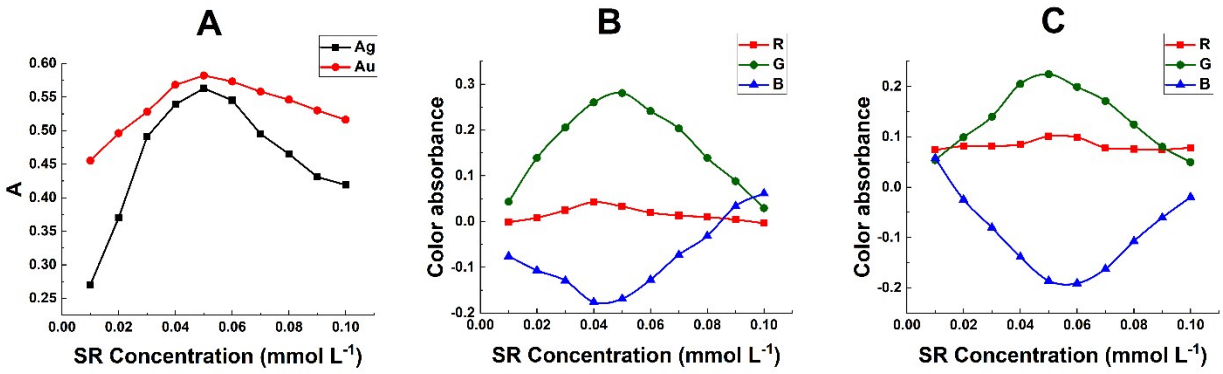

Figure S3 Effect of SR concentration on the characteristics of Ag-SR-CPC and Au-SR-CTAC chelates; (A) based on spectrophotometric measurements; (B & C) based on digital image measurements. (B) Ag-SR-CPC chelate, (C) Au-SR-CTAC chelate. Except for the abscissa variable, other conditions are those of Figure S2.

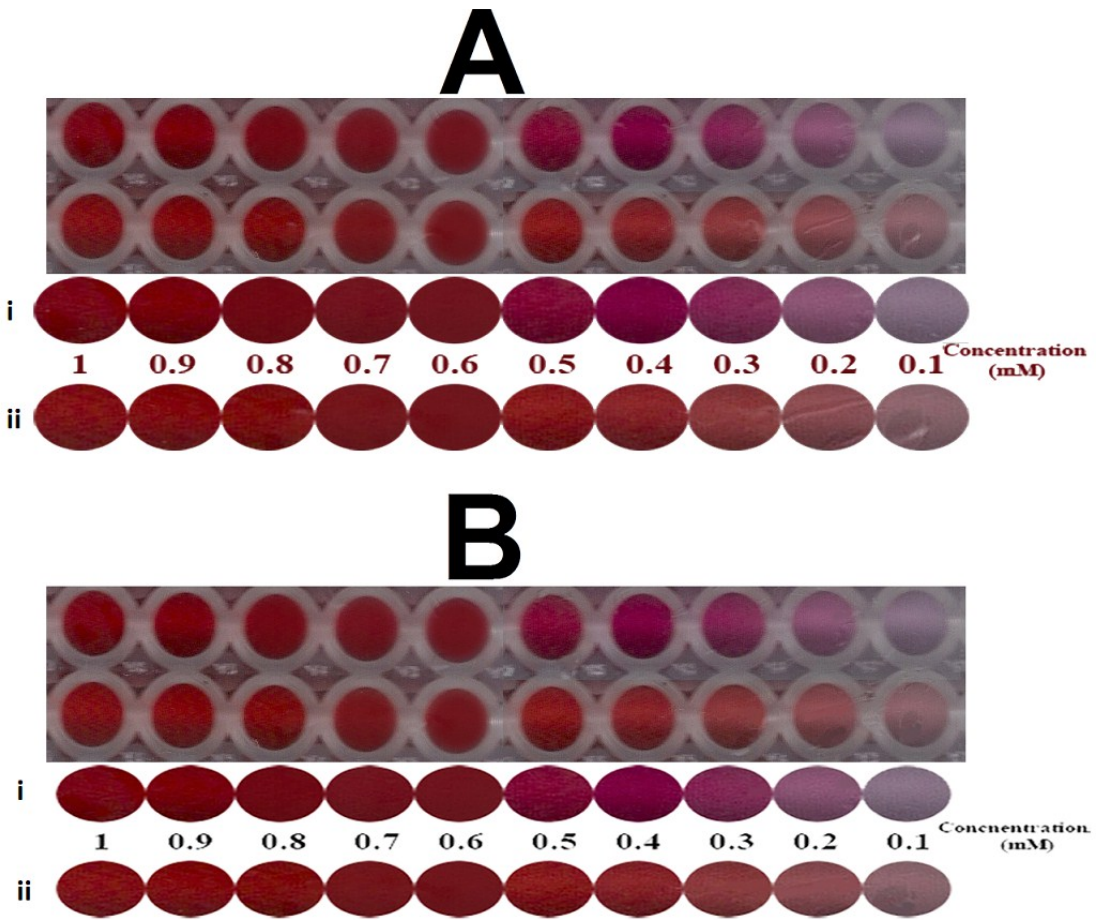

Figure S4. Digital images of the effect of SR concentration on the characteristics of Ag-SR-CPC (A) and Au-SR-CTAC (B) complexes. Except for the SR concentration, other conditions were those given in Figure S2.

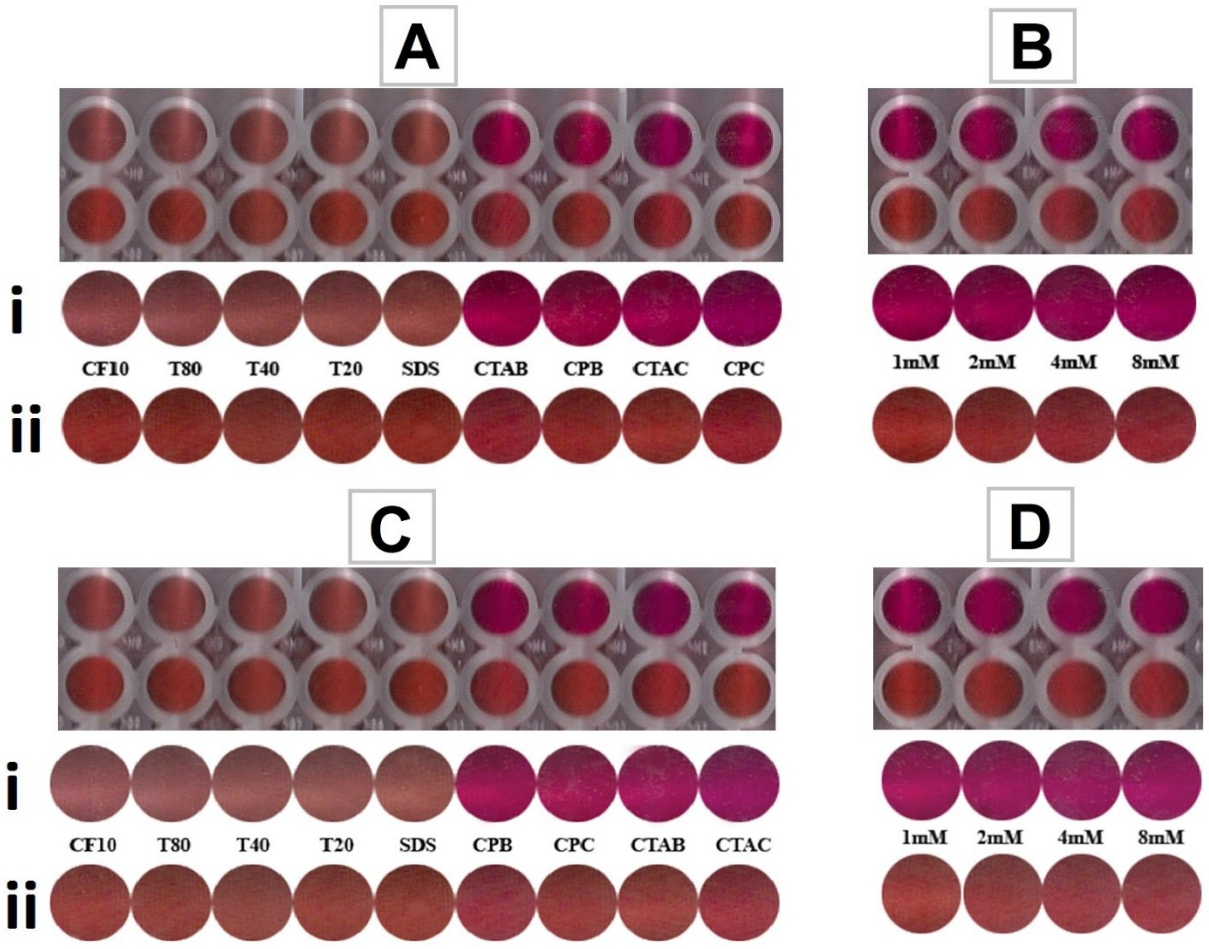

Figure S5 Digital images of the effect of some surfactants on the spectral characteristics of (A, B) Ag-SR chelate and (C, D) Au-SR chelate, respectively. Except for the surfactant type and concentration, other conditions were those given in Figure S2.

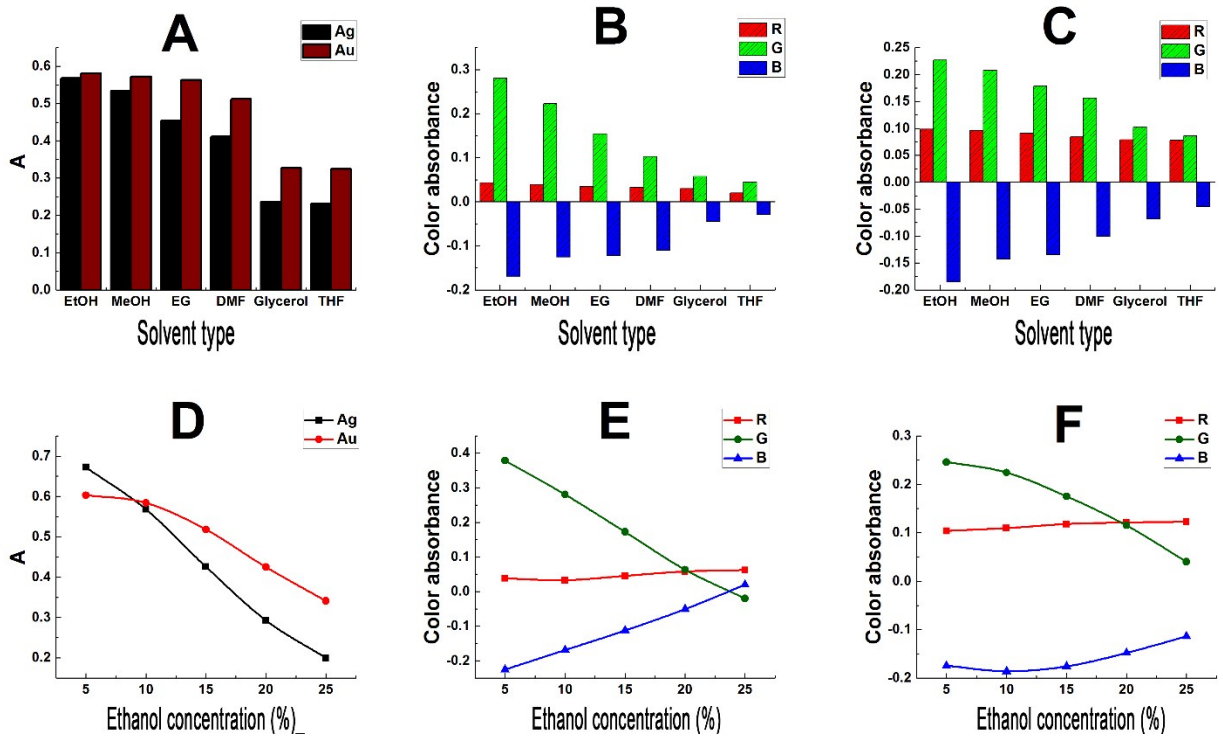

Figure S6 Effect of some solvents on the absorbances of the Ag-SR and Au-SR chelates; (A, D) based on spectrophotometric measurements; (B, C, E, F) based on digital image measurements. Except for the abscissa variable, other conditions are those of figure 2.

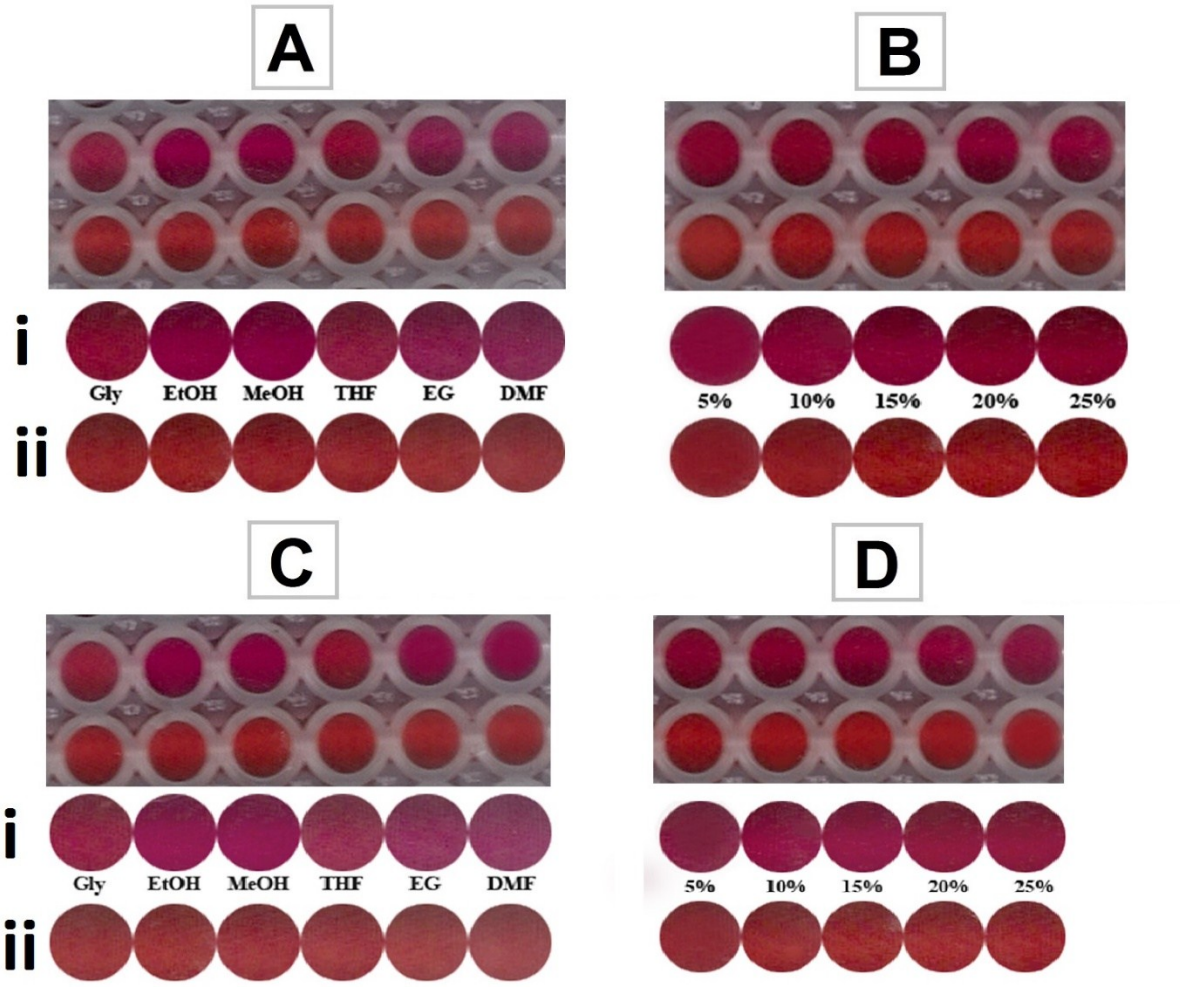

Figure S7. Digital images of the effect of solvent on the spectral characteristics of Ag-SR-CPC (A, B) and Au-SR-CTAC (C, D) complexes. Except for the solvent type and concentration, other conditions and symbols were those of Figure S2.

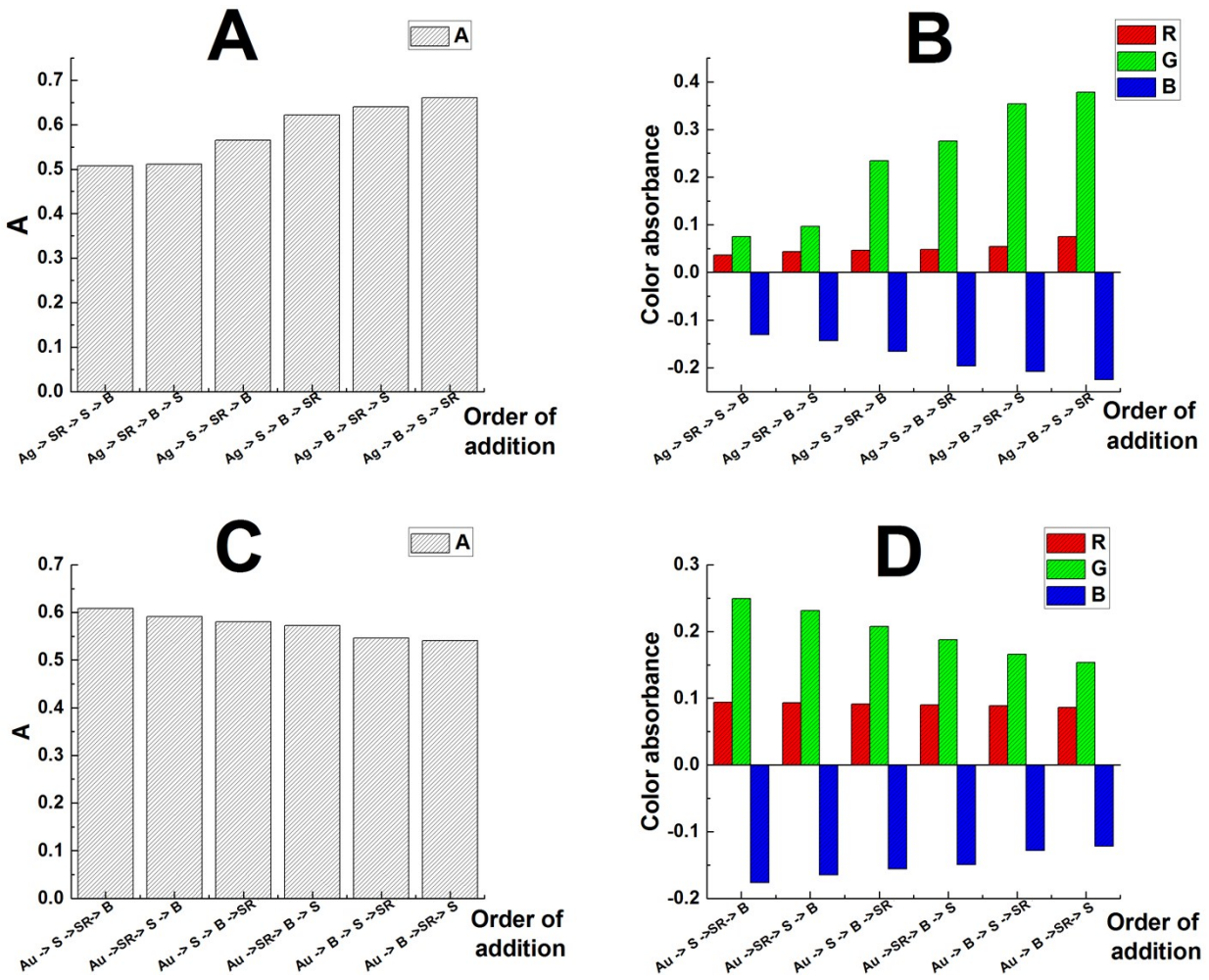

Figure S8 Effect of the order of addition on the spectral characteristics of Ag-SR-CPC (A, B) and Au-SR-CTAC (C, D) chelates. Except for the abscissa variable, other conditions and symbols are those of Figure S2. S, surfactant; B, buffer, SR, reagent.

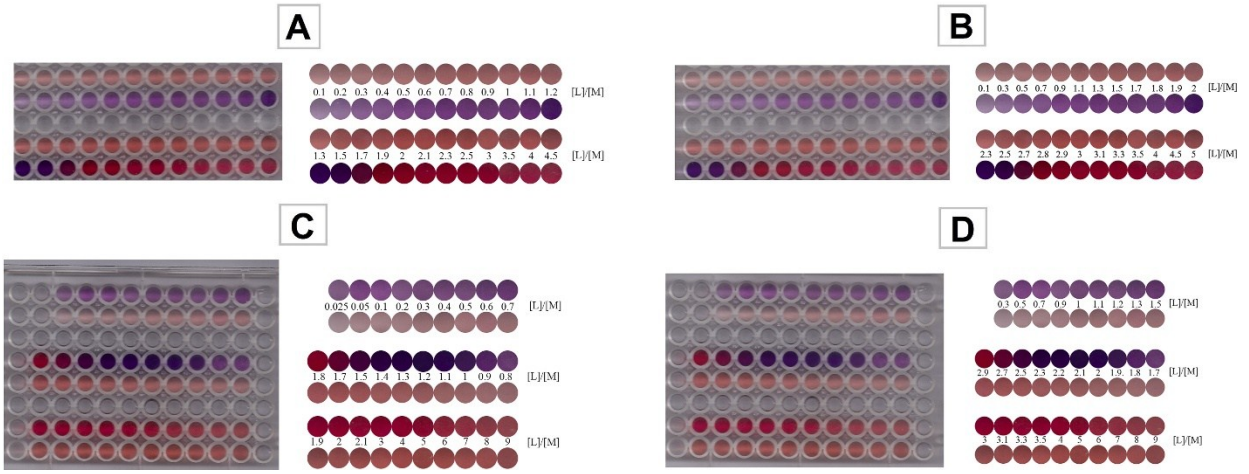

Figure S9 Digital images of the molar ratio (A&B) and continuous variation (C&D) studies of Ag-SR (A, C) and Au-SR (B, D) chelates, respectively. Except for the molar ratio and mole fraction, other conditions were those of Figure S2.

Table S1. Stability constant values of the silver and gold ternary complexes

			Log β			
			Spectrophotometry	**R**	**G**	**B**
Ag	1: 1	Molar ratio	4.584	4.585	____	____
		Continuous variation	4.585	4.587	____	____
	1: 2	Molar ratio	8.896	____	8.899	8.888
		Continuous variation	8.894	____	8.896	8.883
Au	1: 2	Molar ratio	6.87	6.87	____	____
		Continuous variation	6.909	6.891	____	____
	1: 3	Molar ratio	10.841	____	10.818	10.876
		Continuous variation	10.825	____	10.828	10.85

Table S2. Comparison of spectrophotometric and DIBA-based Regression parameters of calibration curves of Ag(I)-SR-CPC and Au(III)-SR-CTAC systems

Parameter	Ag-determination		Au-determination	
	Spectrophotometry	DIBA*	Spectrophotometry	DIBA*
Slope ± SD	0.337±0.0007	0.3385 ± 0.0047	0.3122±0.0013	0.3098 ± 0.0035
Intercept ± SD	0.0016±0.001	-0.3225 ± 0.0054	-0.0056±0.0017	-0.3854 ± 0.0027
ε x 10^{-4}, L mol^{-1} cm^{-1}	3.63	3.65	6.15	6.10
R^2	0.9999	0.9982	0.9998	0.9989
Linear range, µg mL^{-1}	Up to 2.5	Up to 2.5	Up to 2.25	Up to 2.25
LOD, µg mL^{-1}	0.0089	0.0478	0.0163	0.02
LOQ, µg mL^{-1}	0.0296	0.1595	0.0544	0.0871
Sandell's sensitivity, µg cm^{-2}	0.0029	0.0029	0.0032	0.0032

* Based on color absorbance of the green channel (A_G).