Supplementary Material for:

Investigating the extraction performance and mechanism of a multifunctional thiourea molecule for the effective removal of Ag(I) from aqueous solutions

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1.1 The method to measure the concentration of Ag^+ ions in aqueous solution by UV/Vis spectroscopy

The standard solutions of Ag^+ ions with different concentrations were added into a 25 mL colorimetric tube which contained 2 ml of 1.0×10^{-4} mol/L tannic acid solution. And then, 1ml of 1.0 mol/L NaOH solution was added into the mixture to adjust the solution pH value greater than 9. After it was stand for 30 minutes, the concentration of Ag^+ ions in the solution was measured by a UV-vis spectrophotometer (UV-2600, Shimadzu, Japan) under the characteristic wavelength of 415 nm, and the linear relationship of the concentration of Ag^+ ions and absorbance were presented in Fig. S4. It indicated that the correlation coefficient (R^2) was 0.9995, suggesting that the method could be used for the determination of the concentration of Ag^+ ions.

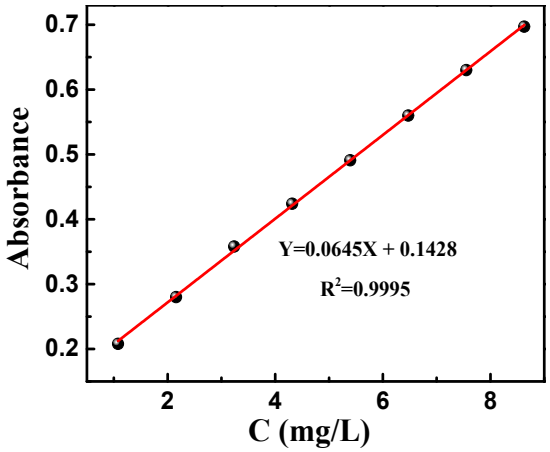

Fig. S1 Linear relationship of the Ag^+ ions concentration vs. absorbance.

1.2 The method for measuring Cu(II)

The standard solutions of copper ions with different concentrations were added into the 25 mL colorimetric tube which contained 1 mL of sodium N,N-diethyl thiocarbamate (1.0 g/L). After adjusting the solution pH to 9.0 by ammonium hydroxide, deionized water was added into the mixture until the total volume of the

solution reached 25 mL. Finally, the UV-vis spectrum of the solution was recorded on a Shimadzu spectrophotometer (UV-2600, Japan) with the wavenumber ranges from 300 to 800 nm. The absorbances of the Cu(II) solution with various concentration were obtained at the maximum absorption peak of 452 nm, and the linear relationship of concentration and absorbances were presented in Fig. S2. It indicated that the correlation coefficient (R^2) obtained was 0.9992, suggesting that the method was accurate for the determination of copper ions concentration in aqueous solution.

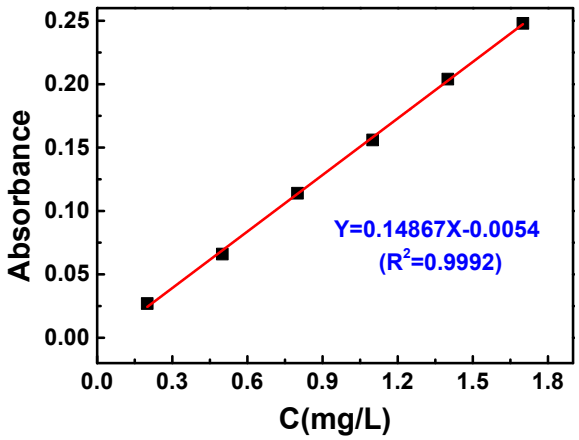

Fig. S2 Linear relationship of concentration vs. absorbance.

1.3 The method for measuring Mn(II)

The standard solutions of manganese ions with different concentrations were added into the 50 mL colorimetric tube which contained 10 mL of sodium potassium pyrophosphate-sodium acetate buffer solution. Then, 3 mL potassium periodate solution with concentration of 2% was added into the colorimetric tube. After that, deionized water was added into the mixture until the total volume of the solution reached 50 mL, and the mixture was stand for 10 min. Finally, the UV-vis spectrum of the solution was recorded on a Shimadzu spectrophotometer (UV-2600, Japan) with the wavenumber ranges from 300 to 800 nm. The absorbances of the Mn(II) solution with

various concentration were obtained at the maximum absorption peak of 525 nm, and the linear relationship of concentration and absorbances were presented in Fig. S3.

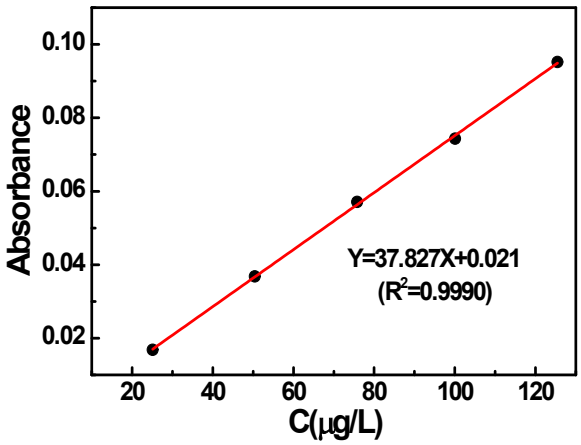

Fig. S3 Linear relationship of concentration vs. absorbance.

2 The solution pH of Ag(I) ions at initial and equilibrium conditions

Table S1 The solution pH of Ag(I) ions solution before and after agitated with BDBTU

Initial pH	1.02	1.98	3.05	4.00	5.01	6.04
Equilibrium pH	0.97	1.95	2.48	2.62	2.64	2.65