

A Naked-Eye Colorimetric Ratio Method for the Selective and Sensitive Detection of L-Cys Based on a Silver Nanoflakes–Chromium (III) Ion System

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1. Supplementary Figure

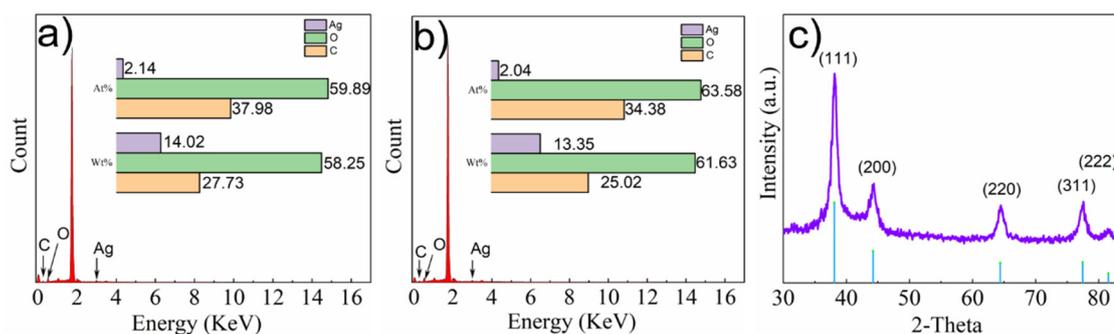


Figure S1. The picture describes the EDS results for (a) silver nanoflakes and (b) silver nanoflakes with the addition of Cr³⁺; the inset is the corresponding weight fraction and atomic fraction. (c) The results of the XRD analysis are compared with the standard chart for silver.

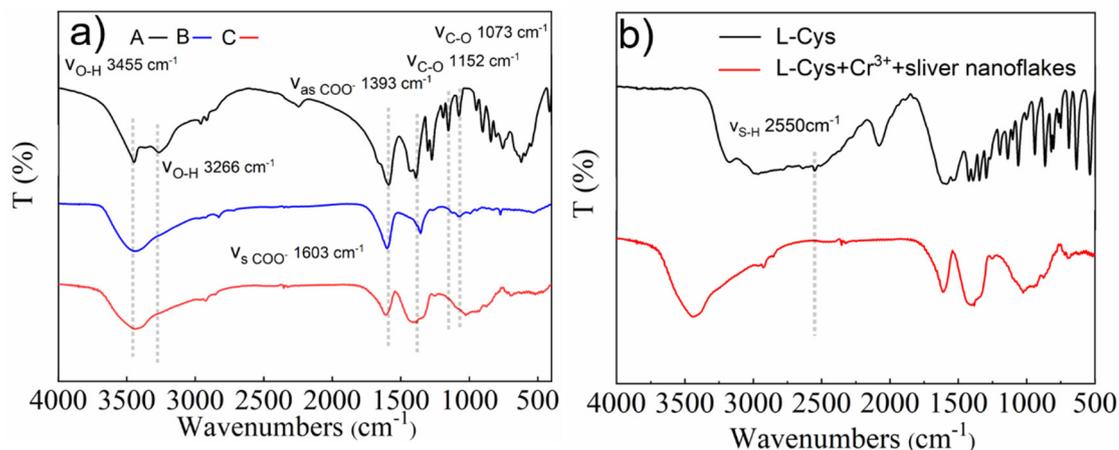


Figure S2. (a) FTIR spectra of (A) trisodium citrate, (B) silver nanoflakes, (C) silver nanoflakes with Cr³⁺ (b) FTIR spectra of L-Cys, and silver nanoflakes with Cr³⁺ and L-Cys.

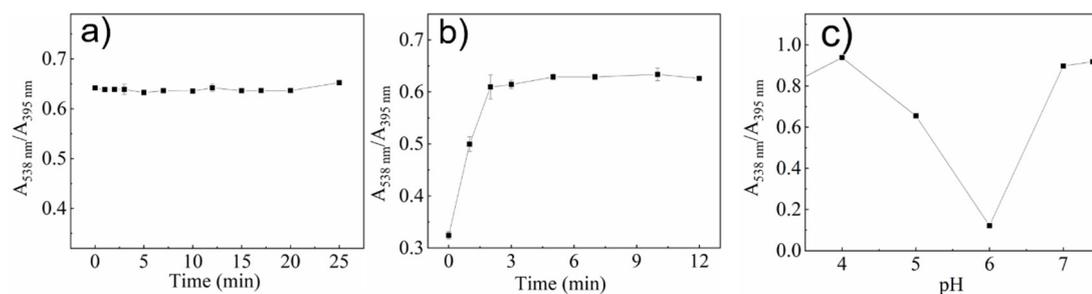


Figure S3. The picture describes (a) the reaction time of L-Cys with Cr^{3+} and (b) the reaction time with silver nanoflakes after their interaction. (c) The ratio of absorbance for different pHs (pH = 4, 5, 6, 7, 7.4).

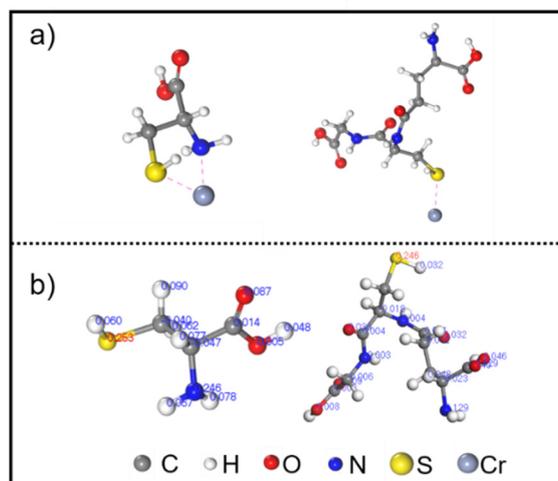


Figure S4. (a) Construction of binding energy models of L-Cys and SH with Cr^{3+} , respectively. (b) Calculation model and Fukui function data.

2. Supplementary Table

Table S1. Determination of L-Cys in beer using the proposed method (n = 3).

Existence (nM)	Spiked (nM)	Found (nM)	Recovery (%)	RSD (%)
221.13	100	301.23	93.80	1.19
221.13	200	398.13	94.50	1.47
221.13	300	511.98	98.20	1.93
221.13	400	621.34	100.03	2.24
221.13	500	750.22	104.03	2.40

Table S2. Determination of L-Cys in urine using the proposed method (n = 3).

Existence (μM)	Spiked (μM)	Found (μM)	Recovery (%)	RSD (%)
0.20	0.25	0.42	93.33	1.80
0.20	0.50	0.75	107.14	6.78
0.20	0.75	0.93	97.89	3.66

Table S3. Parameters characterizing molecular activity.

	LUMO	HOMO	(Ha)	$E_{\text{LUMO-HOMO}}$ (eV)
L-Cys	-0.060624	-0.206836	0.146212	3.9
GSH	-0.069953	-0.218457	0.148504	4.1