Supporting information

Small silver nanoparticles-assisted homogeneous sensing of thiocyanate ions with ultra-wide window based on surface-enhanced Raman-extinction spectroscopy

Xiang-Ru Bai,[*a] Lei Zhang,[b] Jia-Qiang Ren,[*c] Ai-Guo Shen,[*de] Ji-Ming Hu[d]

[a] Institute of Environment and Safety, Wuhan Academy of Agricultural Science, Wuhan 430207, P.R. China

[b] Department of Emergency Medicine, Fuwai Central China Cardiovascular Hospital, Zhengzhou 450003, P.R. China

[c] National & Local Joint Engineering Research Center of High-throughput Drug Screening Technology, Hubei Province Key Laboratory of Biotechnology of Chinese Traditional Medicine, School of Life Sciences, Hubei University, Wuhan 430062, P.R. China

[d] College of Chemistry and Molecular Sciences, Wuhan University, Wuhan 430072, P.R. China

[e] School of Printing and Packaging, Wuhan University, Wuhan 430079, P.R. China

[*] To whom correspondence should be addressed.
Dr. X. R. Bai, E-mail: baimaster@126.com.
Dr. A. G. Shen, E-mail: agshen@whu.edu.cn. Tel: ++86-27-68752439-8063, Fax: ++86-27-68752136.
Dr. J. Q. Ren, E-mail: renjq1978@yahoo.com.

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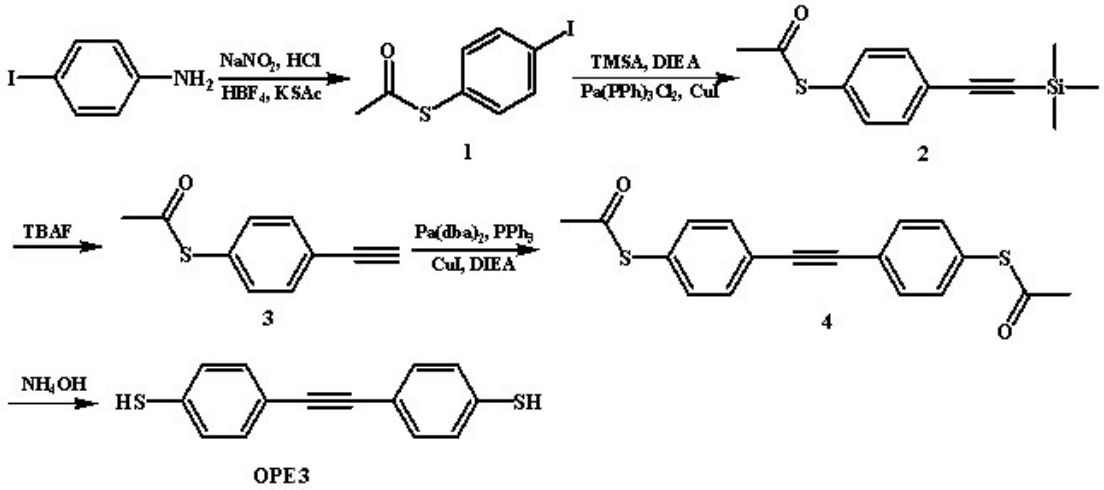

Figure S1. Schematic diagram of the syntheses of the 4-ethynylbenzenethiol derivatives.

To the degassed THF (10 mL) solution of 1-thioacetyl-4-((trimethylsilyl) ethynyl) benzene (SAc-OPE3, 2.5 mg, 0.001 mol), NH_4OH (28% of NH_3, 10 μL) was added dropwise. The solution was stirred for 30 min at room temperature under N_2. The resulution solution of OPE3 was used without further purification.

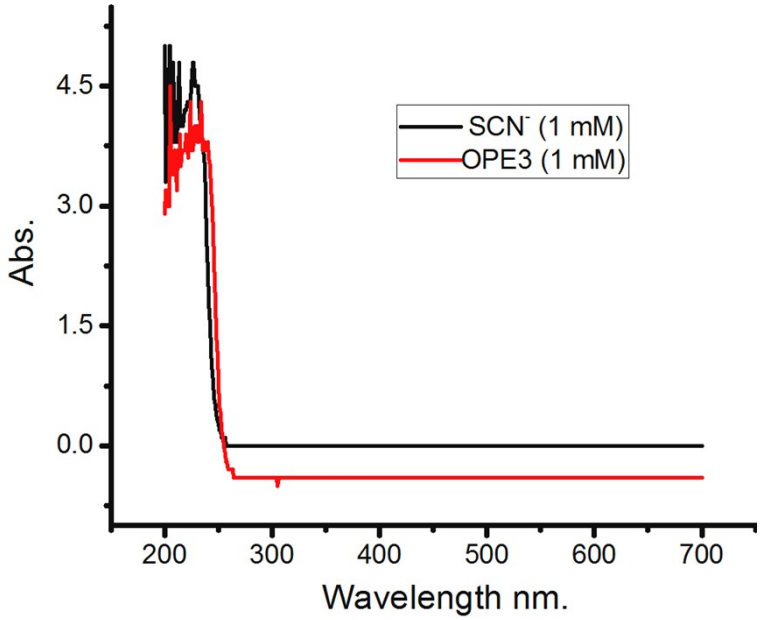

Fig S2. The absorption spectra of SCN^- (black line) and OPE3 (red line).

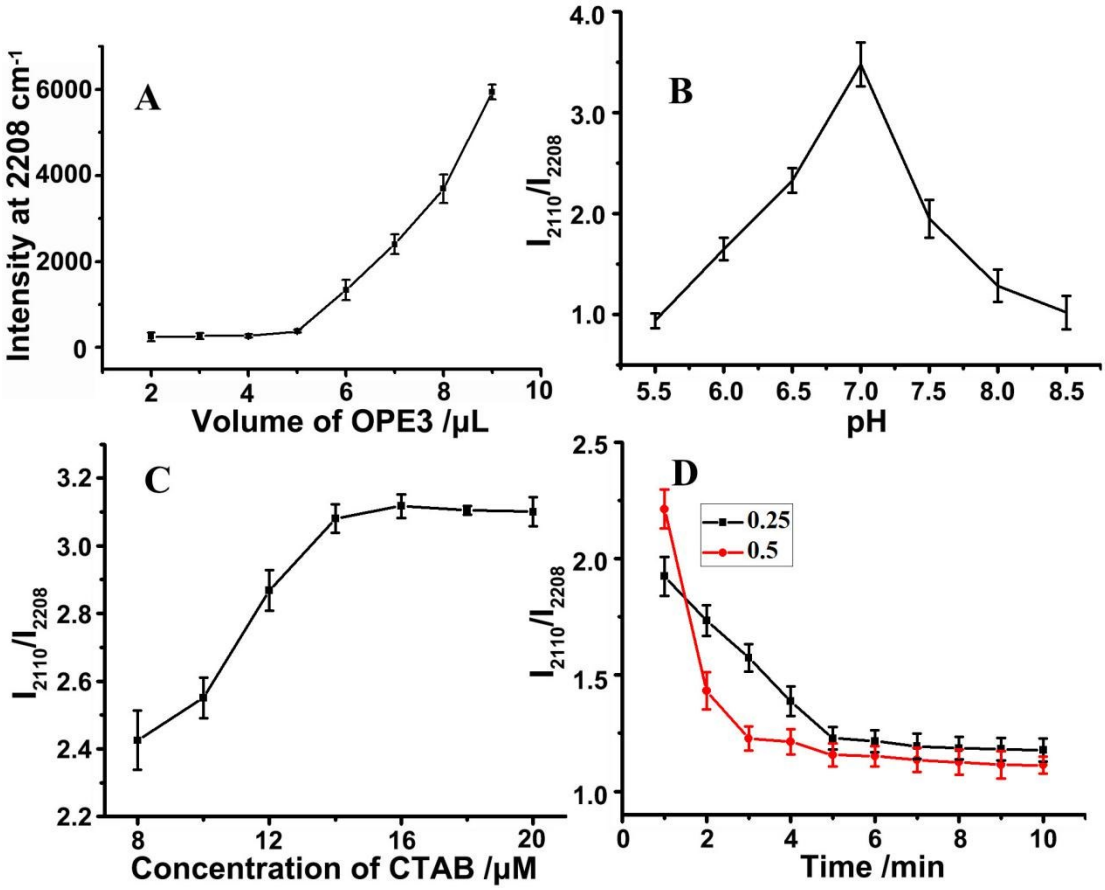

Figure S3. Optimization of experimental conditions: (A) the volume of OPE3, (B) pH of the PB buffer, (C) the concentration of CTAB used in the experiments, (D) the optimization of reaction time, the concentration of CTAB is 0.28 μM and the two different concentrations of SCN^- are 0.25 and 5 μM, respectively.

Table S1. Comparison of LOD for SCN^- with the other existing methods.

LOD	Refs.
1 μM	Deng et al., 2014 [12]
100 μM	Zhang et al., 2012 [13]
0.2 μM	Zhang et al., 2012 [14]
0.6 mM	Zhang et al., 2007 [15]
0.01 μM	Banerjee et al.,2013 [16]
0.05 μM	Pienpinijtha et al., 2011 [25]
8.6 nM	Zhang et al., 2015 [27]
17 μM	Tan et al., 2017 [29]
34 μM	Yang et al., 2014 [30]
0.17 μM	Lin et al., 2014 [31]
17 nM	Our method

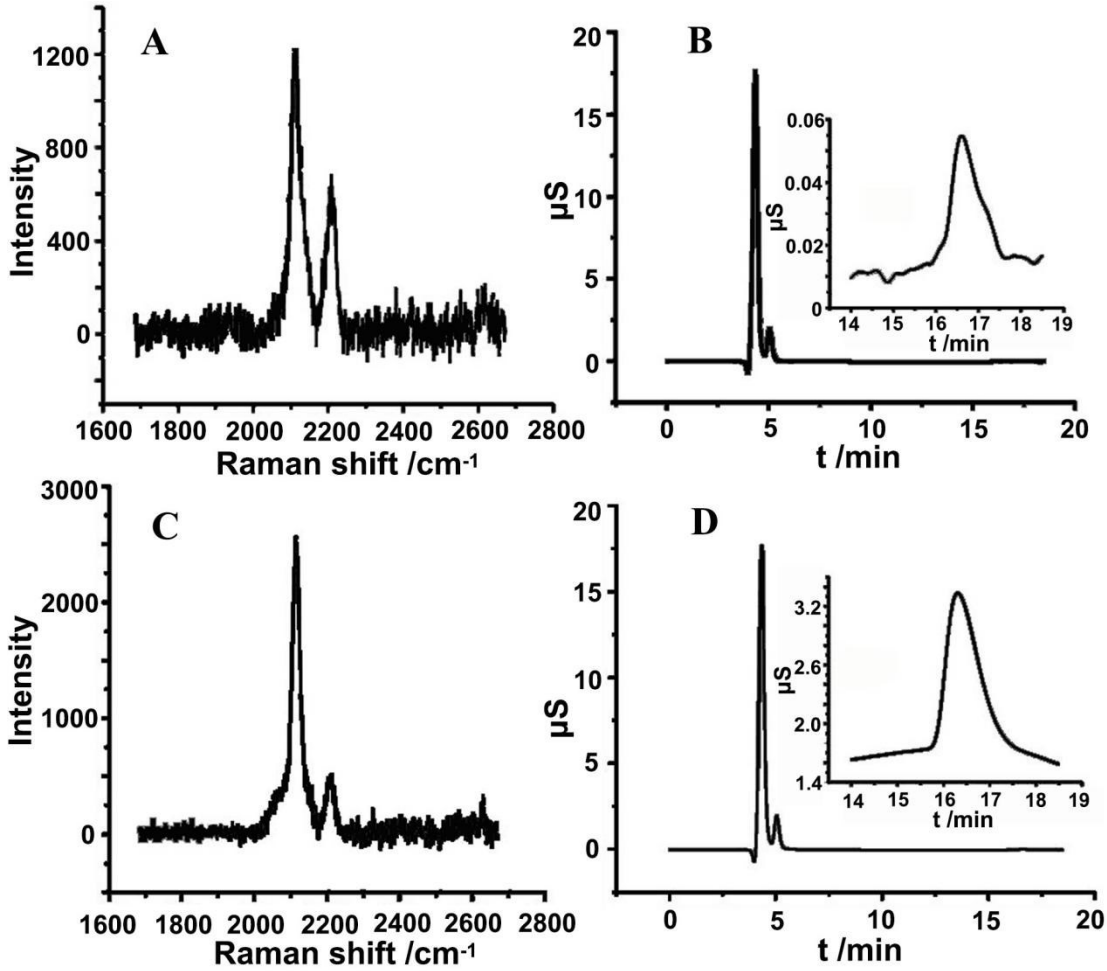

Figure S4. (A, B) Original SERS spectrum and ion chromatogram of SCN^- in nonsmokers' saliva; (C, D) Original SERS spectrum and ion chromatogram of SCN^- in smokers' saliva.

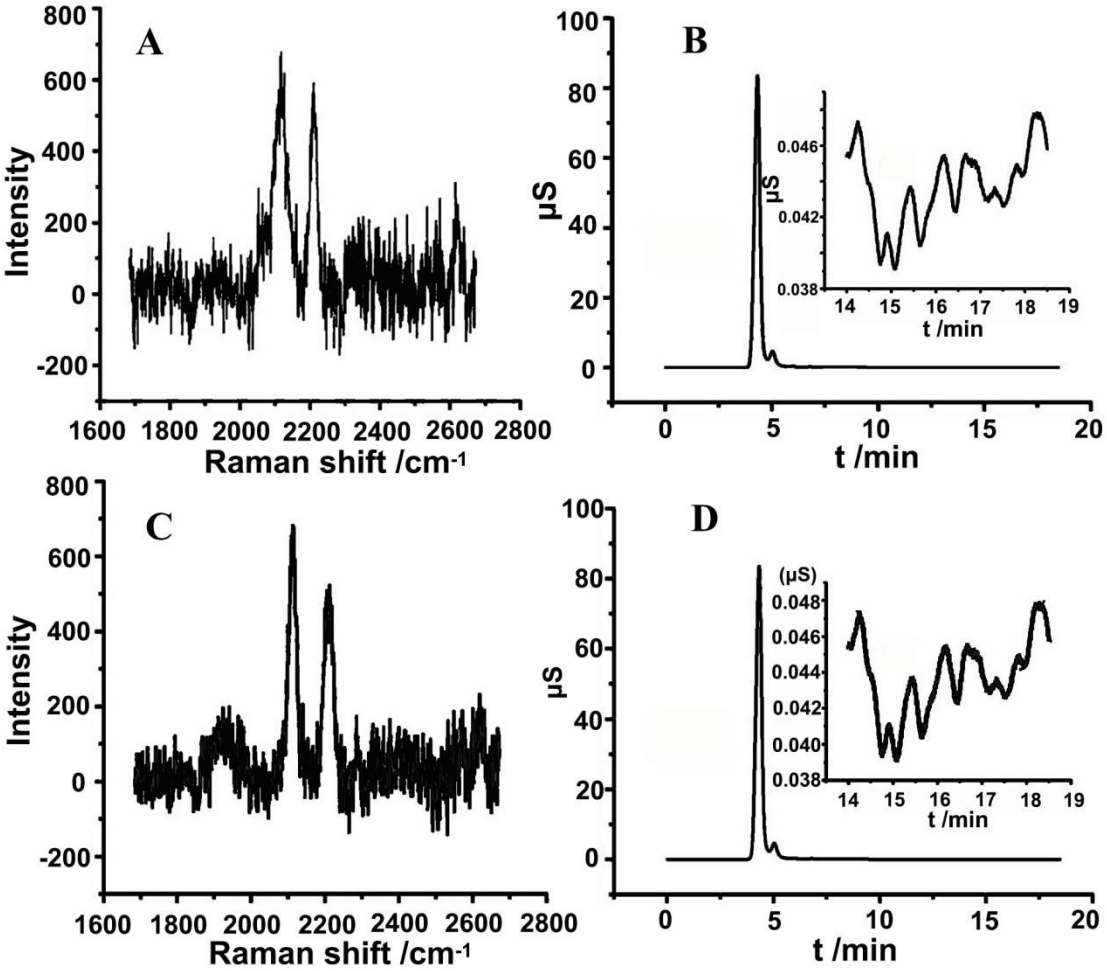

Figure S5 (A, B) Original SERS spectrum and ion chromatogram of SCN^- in nonsmokers' urine; (C, D) Original SERS spectrum and ion chromatogram of SCN^- in smokers' urine.

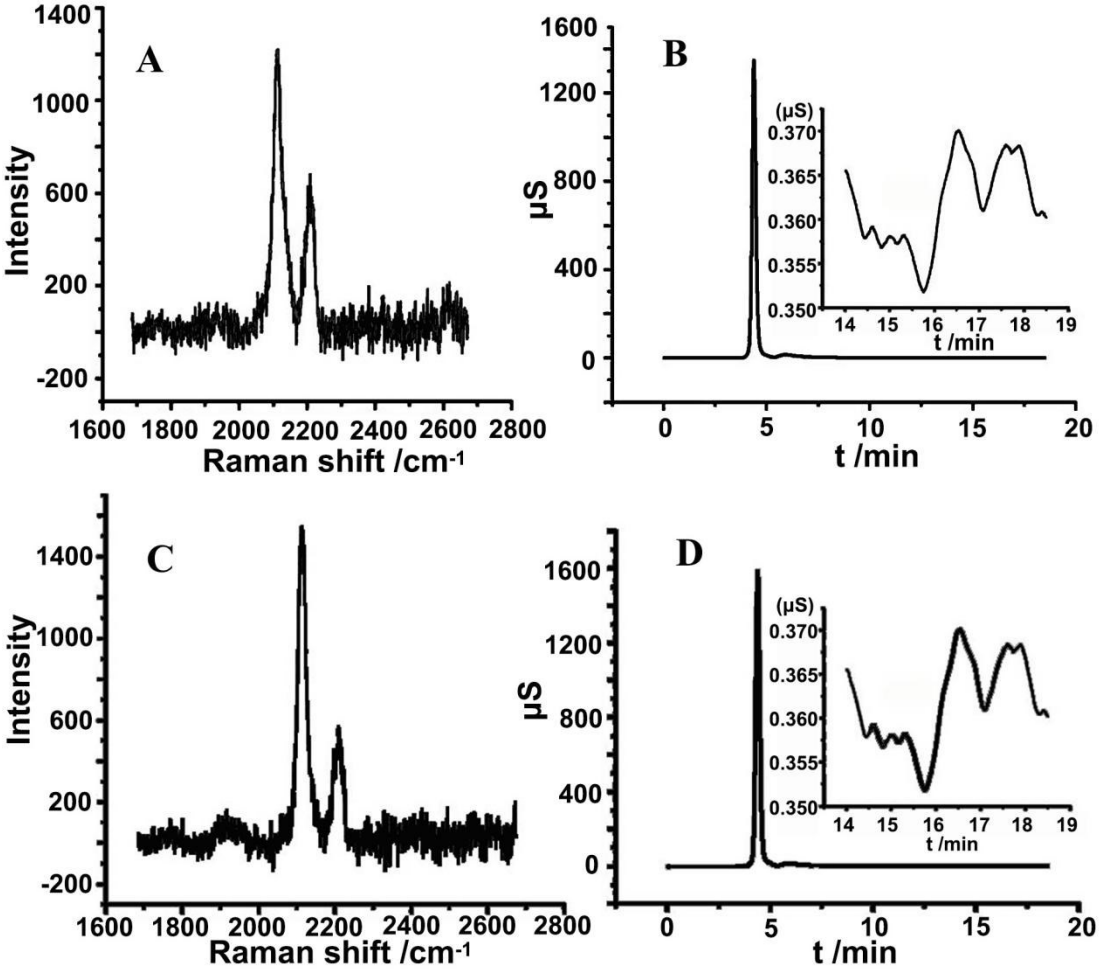

Figure S6. (A, B) Original SERS spectrum and ion chromatogram of SCN^- in nonsmokers' serum; (C, D) Original SERS spectrum and ion chromatogram of SCN^- in smokers' serum.

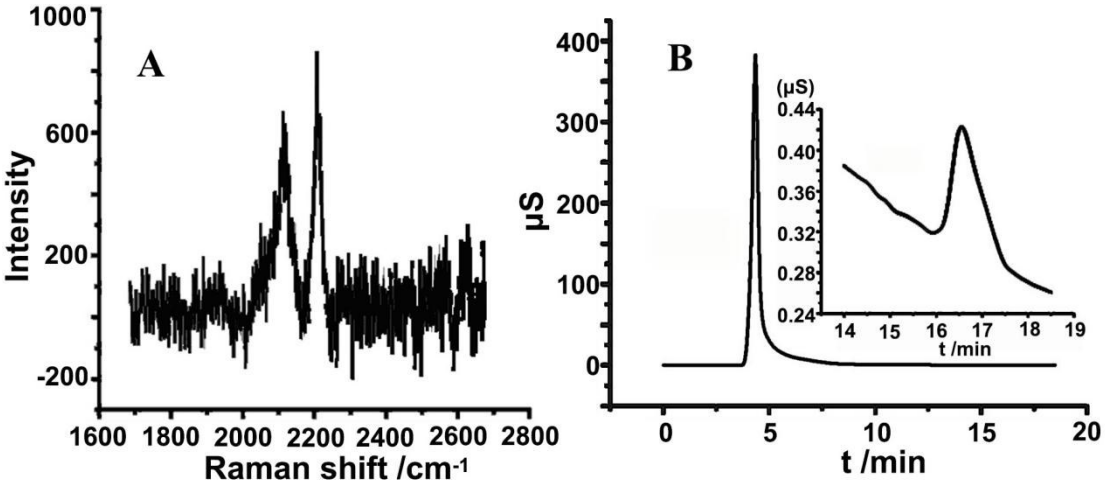

Figure S7. (A, B) Original SERS spectrum and ion chromatogram of SCN^- in milk power.

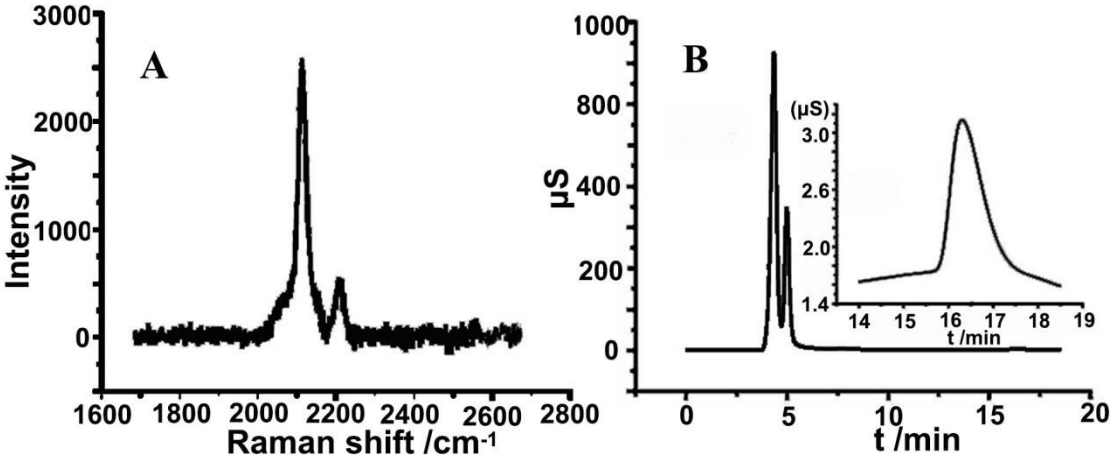

Figure S8. (A, B) Original SERS spectrum and ion chromatogram of SCN^- in brassica vegetables (Chinese cabbage).

Table S2. Comparison of SERS and ion chromatography detection results of SCN^- in saliva. (mg/L)

Nos.		1#	2#	3#	4#	5#	6#	7#	8#	9#	10#
Nonsmokers	SERS	6.03	22.95	31.96	21.23	34.62	30.48	44.10	81.03	8.69	15.69
	IC	5.90	23.14	30.58	19.86	36.79	29.81	45.62	79.62	9.54	15.36
Smokers	SERS	40.69	31.54	110.3	137.6	90.36	69.65	43.54	49.04	33.21	60.35
	IC	36.19	31.35	114.9	134.5	91.45	71.32	41.23	50.23	31.78	62.47

Table S3. Comparison of SERS and ion chromatography detection results of SCN^- in urine. (mg/L)

Nos.		1#	2#	3#	4#	5#	6#	7#	8#	9#
Nonsmokers	SERS	3.10	5.61	2.89	4.68	7.12	10.02	14.56	13.25	16.14
	IC	--	--	--	--	--	--	--	--	--
Smokers	SERS	5.94	2.39	6.78	5.48	8.16	11.27	10.04	15.86	19.47
	IC	--	--	--	--	--	--	--	--	--

Table S4. Comparison of SERS and ion chromatography detection results of SCN^- in serum. (mg/L)

Nos.		1#	2#	3#	4#	5#	6#	7#	8#	9#	10#
Nonsmokers	SERS	17.84	19.63	25.58	41.25	57.62	36.14	15.26	24.28	48.14	17.29
	IC	--	--	--	--	--	--	--	--	--	--
Smokers	SERS	59.62	21.83	23.40	37.42	69.45	24.17	65.91	18.52	50.60	70.10
	IC	--	--	--	--	--	--	--	--	--	--

Table S5. Comparison of SERS and ion chromatography detection results of SCN^- in milk power. (mg/kg)

Nos.	1#	2#	3#	4#	5#
SERS	28.84	17.56	5.21	15.24	12.47
IC	28.25	18.04	5.03	15.36	11.96

Table S6. Comparison of SERS and ion chromatography detection results of SCN^- in brassica vegetables. (mg/kg)

Nos.	**1#**	**2#**	**3#**	**4#**	**5#**
SERS	4.89	2.67	5.92	8.65	2.06
IC	4.56	2.93	6.13	8.31	1.93