

Supporting information

Rapid and selective detection of Hg(II) in water using AuNPs in-situ modified filter paper by head-space solid phase extraction Zeeman atomic absorption spectroscopy method

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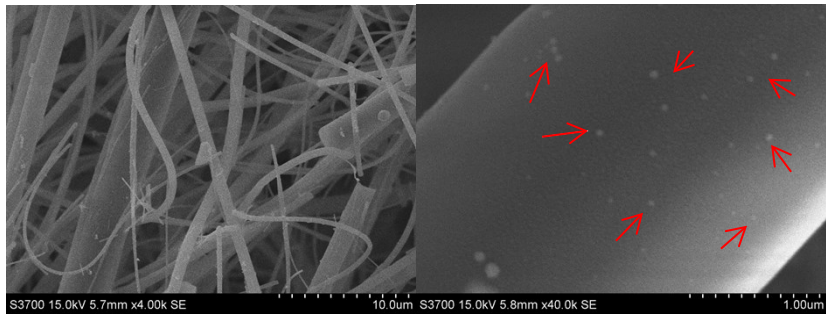


Figure S1 the microstructure of AuNPs modified filter paper fibre

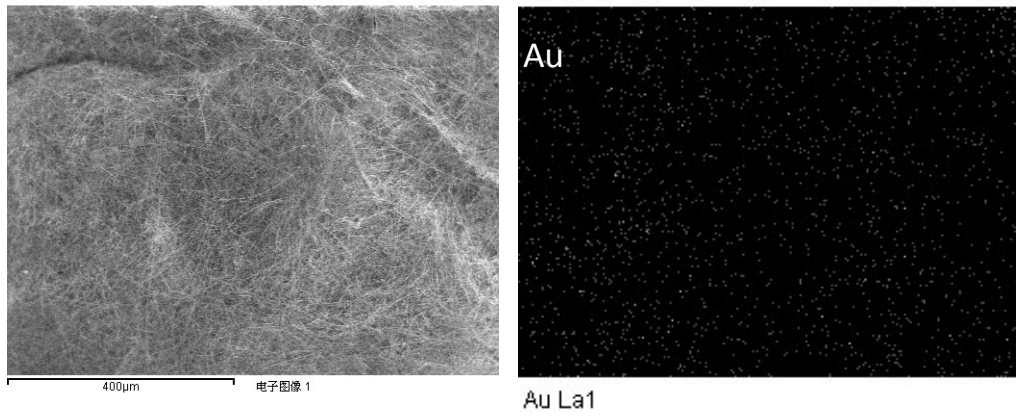


Figure S2 the SEM image and the elements maps of Au

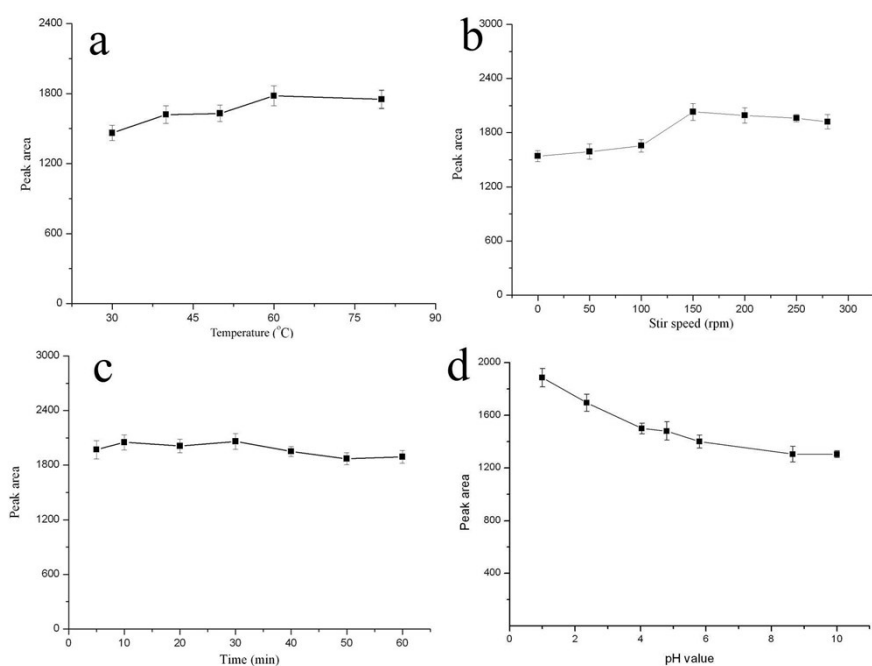


Figure S3. The detection results of $5 \mu\text{g}\cdot\text{L}^{-1}$ Hg with different conditions of the: a) extraction temperature; b) stir speed; c) extraction time; d) pH value.

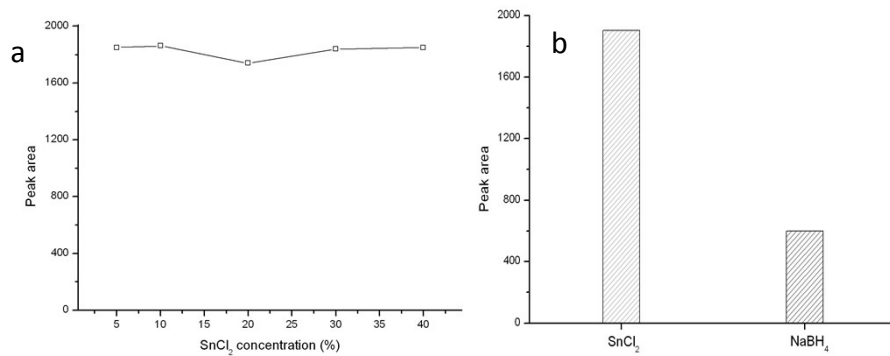


Figure S4 (a) the Hg detection peak area on ZAAS with different concentration of SnCl₂ (b) the different reductant of SnCl₂ and NaBH₄ for the Hg reduction during the HS-SPE, the spiked concentration of Hg is 5 ug·L⁻¹ and 1 mL SnCl₂ and NaBH₄ are added, respectively.

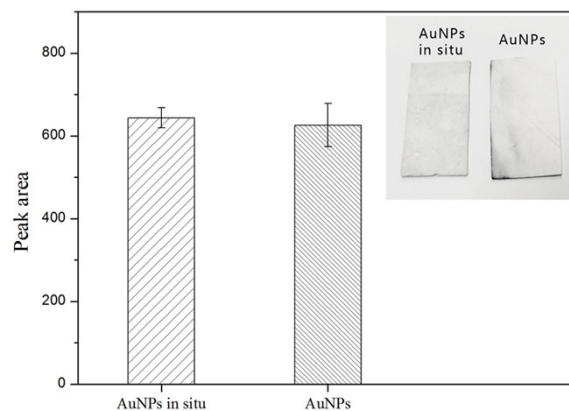


Figure S5. The mercury detection results (Peak area) based on the AgNPs in situ and AuNPs loaded filter paper in SPE method with the corresponding photographs. (SPE condition: 1 mL, $1 \mu\text{g}\cdot\text{L}^{-1}\text{Hg}^{2+}$ standard solution, room temperature, stirring for 5 min)

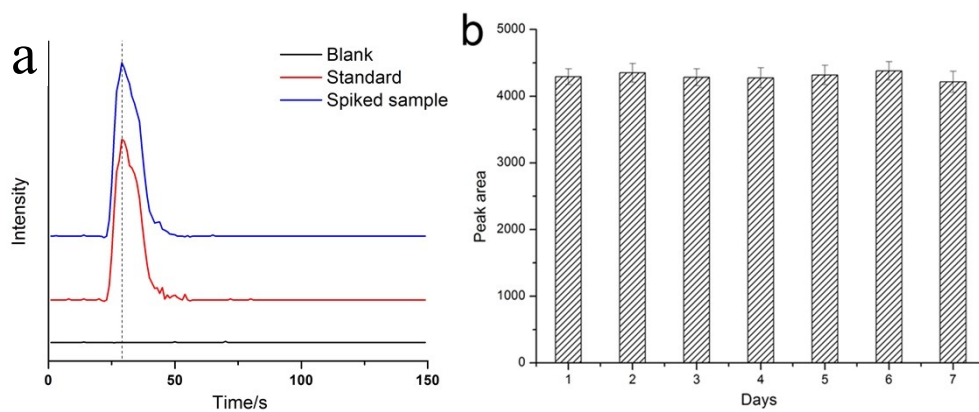


Figure S6 (a) the corresponding detect peak intensity of blank, standard and spiked sample on ZAAS. (b) The stability test results of AuNPs in-situ modified filter paper of the same batch in 7 consecutive days with Hg(II) standard concentration of $10 \mu\text{g}\cdot\text{L}^{-1}$

Table S1 the extraction efficiency for Hg standard samples with different concentration

Pre-extraction concentration µg/L	Post-extraction concentration µg/L	Extraction efficiency /%	Average extraction efficiency /%
0.5	0.079	84.2	88.12
	0.058	88.4	
	0.041	91.8	
	0.037	92.6	
	0.082	83.6	
1.0	0.099	90.10	91.66
	0.118	88.20	
	0.073	92.70	
	0.060	94.00	
	0.067	93.30	
5.0	0.108	97.84	98.16
	0.112	97.76	
	0.140	97.20	
	0.075	98.50	
	0.025	99.50	
10	0.045	99.55	99.53
	0.045	99.55	
	0.032	99.68	
	0.060	99.40	
	0.054	99.46	

Table S2. The compared detection Recoveries and RSDs with ICP-MS for the real water samples with different spiked level from 0.5 to 10 $\mu\text{g}\cdot\text{L}^{-1}$.

Samples	Spiked($\mu\text{g}\cdot\text{L}^{-1}$) Hg^{2+}	ICP-MS		This method	
		Recovery(%)	RSD(%)	Recovery(%)	RSD(%)
Tap water	0.50	97.2	1.12	87.8	4.97
	1.00	103	6.66	99.2	4.26
	5.00	97.8	1.41	102	6.28
	10.0	101	2.05	106	5.74
River water	0.50	92.4	0.86	85.7	4.50
	1.00	109	1.58	105	5.50
	5.00	91.2	2.04	98.0	4.07
	10.0	85.4	2.05	105	3.75
Waste water	0.50	107	1.14	89.2	6.19
	1.00	107	5.06	111	3.87
	5.00	109	2.74	82.6	2.42
	10.0	108	2.36	101	6.57