Electronic supplementary information for

A novel ion imprinted SiO_2 microsphere for the specific and rapid extraction and pre-concentration of ultra-trace methyl mercury

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1. Reagents and Chemicals

Ultrapure water (18.2 MΩ/cm) obtained from a Milli-Q purification device (Millipore, USA) was used in the total experiment. Methacrylic acid (MAA), azodiisobutyronitrile (AIBN), trimethylolpropane trimethacrylate (TMPTM), 1-Pyrrolidinecarbodithioic acid (PDC), methylmercury chloride (CH_3HgCl), ethylmercury chloride (CH_3CH_2HgCl), methacryloxypropyltrimethoxyl silane (γ-MAPS), and thiourea were purchased from J&K Technology (Guangzhou, China). Nitric acid, hydrochloric acid, methanol, and ethanol were supplied by Sinopharm Chemical Reagent (Shanghai, China). Lead nitrate $Pb(NO_3)_2$, cadmium chloride, mercury chloride ($HgCl_2$) were obtained from Xilong Chemical (Guangzhou, China). The silica microspheres (2.0 μm) were purchased from Alfa Aesar Company (Tianjin, China).

A Tecnai F30 Field Emission Gun Transmission Electron Microscope (TEM, Philips-FEI, Netherlands) was used for TEM characterization. Fourier transform infrared (FT-IR) spectra were recorded by a Nicolet 6700 infrared spectrometer (Thermo Fisher, USA), and a Esca Lab 250 X-ray photoelectron spectroscopy (XPS, Thermo Fisher Scientific Company, US) was used for XPS characterization.

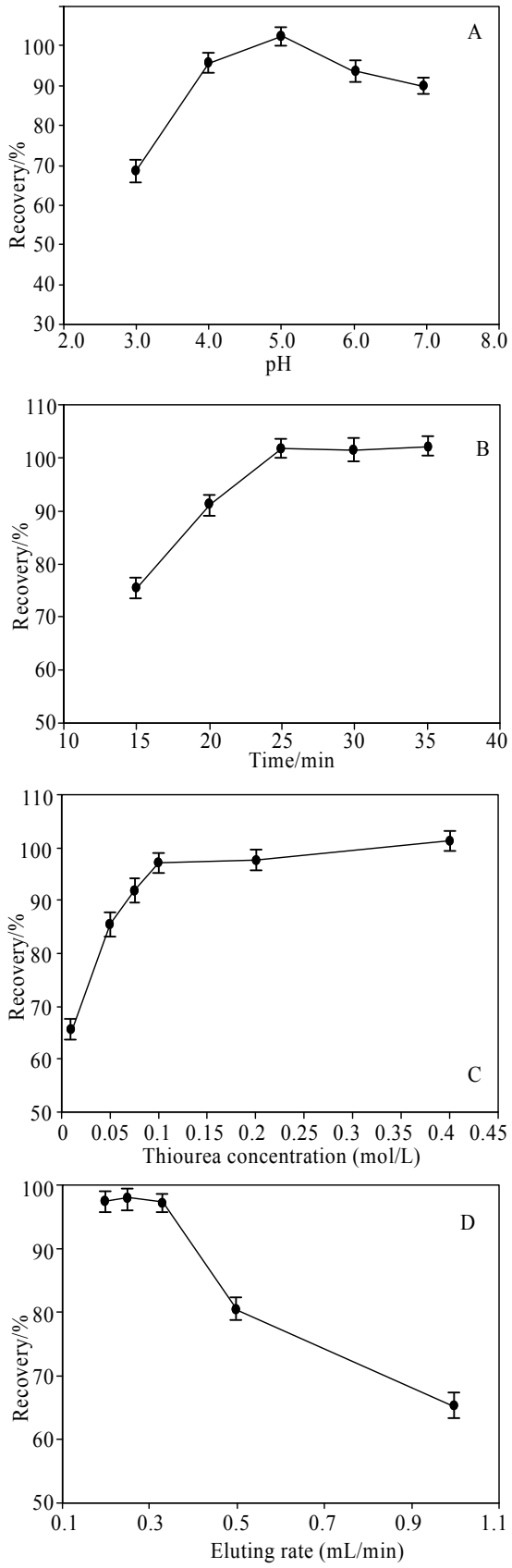

Figure S1: A: The effect of sample's pH on the pre-concentration/extraction of MeHg. Other conditions: MeHg IISM 30 mg, water sample 500 mL. B: The effect of stirring time on the pre-concentration/extraction of MeHg. Other conditions: MeHg IISM is

30 mg, water sample 500 mL, pH 5.0. C: The effect of thiourea concentration on the eluting of MeHg adsorbed on MeHg IISM. D: The effect of eluting rate on the eluting efficiency of MeHg, when 2 mL eluent was used to elute MeHg adsorbed on MeHg IISM.

Table S1: Running parameters of ICP-MS

Parameter	Value
RF power	1400 W
Cool gas flow	15 L/min
Auxiliary gas flow	0.90 L/min
Nebulizer gas flow	0.80 L/min
Makeup gas rate	0.20 L/min
Torch	Non-shield torch
Cones	Nickel
Dwell times	10 ms
Resolution	Standard
Oxide(CeO/Ce)	⩽2.0%
Doubly Charged (Ce^{2+}/Ce)	⩽2.0%
Monitored isotope(m/z)	^{201}Hg, ^{202}Hg
Nebulizer type	MCN (optimum flow is 50 - 200 μL/min)

Table 2S: Comparison of performance characteristics of different pre-concentration procedure

Reference	Loading Capacity	Pre-concentration Factor	Sample Consumption	Extraction Time	Reusability
This work	30 mg/g	250	30mg for 500mL water sample	Adsorbtion 25min; Desorption 15min	50
Anal. Chim. Acta 575 (2006) 159	170 μmol/g	no provided	20mg for 50mL solution	Adsorbtion 2h; Desorption 2h	20
J. Chromatogr. A 1391 (2015) 9	no provided	50	200mg for 200mL sea water sample	100min	no provided
Talanta 144 (2015) 636	20 μg/g	no provided	150mg for 0.2g The reference materials(fish)	no provided	5~10
Talanta 71 (2007) 699	92.4 mg/g	20	20mg for 50mL solution	Adsorbtion 50min; Desorption 2h	10