

Automated Low Pressure Mercury Speciation

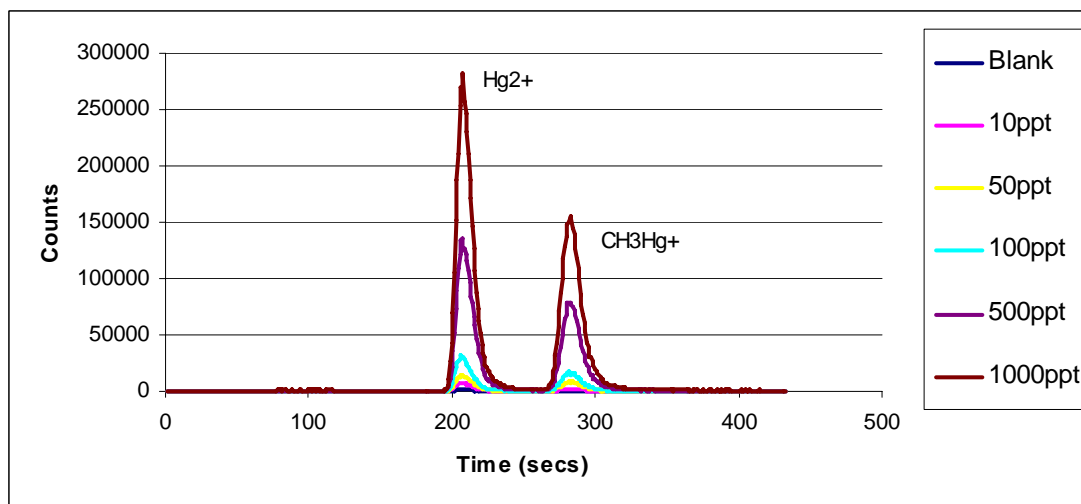
The poisonous nature of mercury has been well documented. Mercury exists in the atmosphere mainly in its elemental (Hg^0) form, in natural waters in its divalent chloride (Hg^{2+}) form and in fish as monomethylmercury (CH_3Hg^+). The need for an analytical method to differentiate these different species of mercury is important to understand the distribution and pathways of the highly toxic methylmercury into the bioenvironment.

The SC-FAST, is an ICPMS autosampler and injection valve normally used to improve sample throughput for total element determination. Combining the SC-FAST with the Hg-C column and driving the eluent using the standard peristaltic pump allows the ICPMS to be easily converted for mercury speciation analysis. The SC-FAST for Speciation can be utilized to perform a simple, but robust and fully automated separation of the two most commonly occurring mercury species in the environment, methylmercury and inorganic mercury and is supplied with peak integration software.



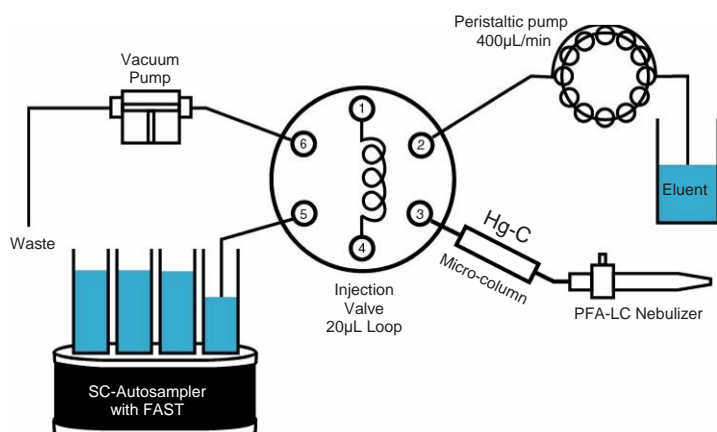
SC-FAST used in combination with Hg-C micro column and peristaltic pump to separate Hg species.

Low Pressure Separation of Hg^{2+} and CH_3Hg^+ monitoring ^{202}Hg 10 to 500 ng/L



Column	Hg-C C-18 micro column	ICP-MS	Element2
Flow Rate	400 $\mu\text{L}/\text{min}$	Resolution	Low
Injection Volume	20 μL	Nebulizer	PFA-LC
		Spray Chamber	Cyclonic

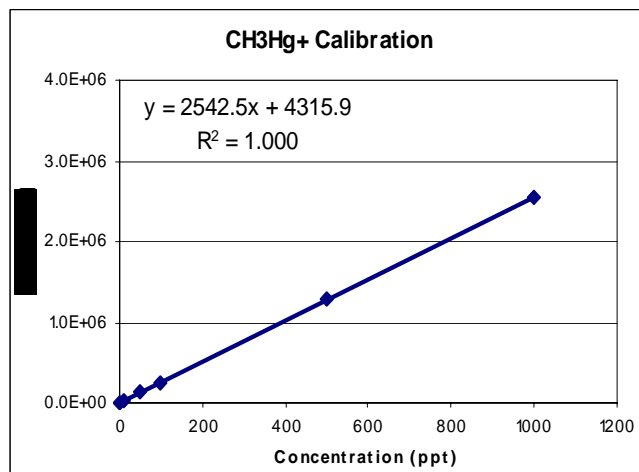
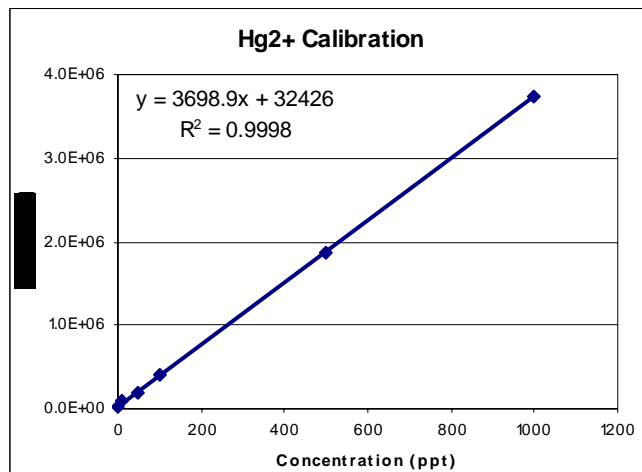
Schematic of set-up



Fully Automated Procedure:

1. Sample loaded into 20µL loop via Teflon vacuum pump
2. Valve switched to inject position
3. Hg species retained on Hg-C micro-column
4. Eluent flow at 400µL/min delivered via peristaltic pump selectively removes Hg species
5. Aerosol created by low internal volume PFA-LC nebulizer to reduce band broadening

Calibration Data



Species	Hg ²⁺	CH ₃ Hg ⁺
Detection Limit	0.1ng/L	0.03ng/L

0, 10, 50, 100, 500 and 1000ng/L HgCl₂ and CH₃HgCl standards used for calibration

Summary

- Simple, robust separation
- Fully automated
- Low pressure, low cost

Ordering Information

CF-KIT-Hg Mercury speciation kit for SC-FAST includes: Hg-C micro column, Hg standards and Hg Eluents, lines, fittings, and instruction manual.

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