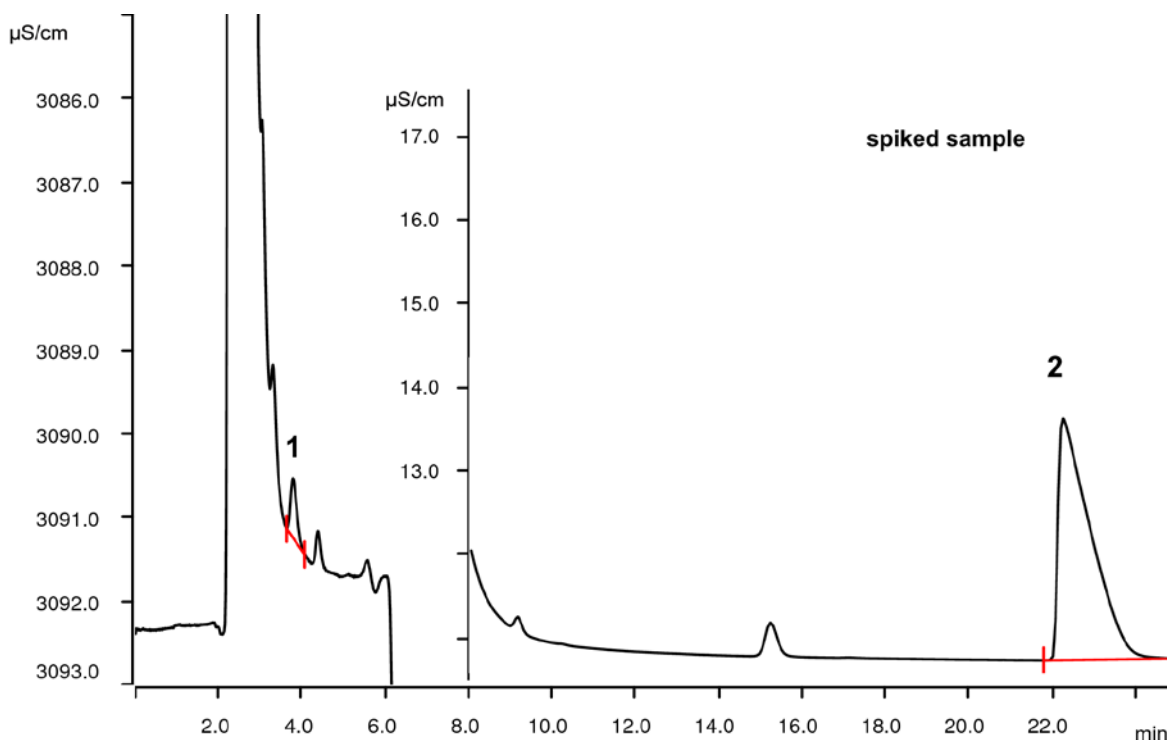


Arsenic speciation in dust applying high-low conductivity detection



Determination of arsenic in dust from a waste incineration plant is performed. This is required as the environmental risk depends on the degree of oxidation of the arsenic species. Due to the different pK_a of the respective anions, arsenite requires non-suppressed conductivity detection, while arsenate is determined best with suppression. The determination of both species is achieved by switching the suppressor in and out respectively.

Results

Anion	Conc. [%]	RSD [%, n = 3]	Conc. (spiked) [%]	RSD [%, n = 3]
1 Arsenite	n.d.	-	0.32	0.8
2 Arsenate	0.89	0.5	10.1	0.8

Concentration of the spike solution is unknown.

Sample

Dust sample (1 g/100 mL 1 mol/L NaOH)

Sample preparation

Dilution 1:100 with diluent, subsequent injection applying Metrohm intelligent Partial Loop Injection Technique (MiPT).

Columns

Metrosep A Supp 5 – 150/4.0	6.1006.520
Metrosep A Supp 5 Guard/4.0	6.1006.500

Solutions

Eluent	2.0 mmol/L sodium carbonate 10.0 mmol/L sodium hydroxide
Suppressor regenerant	500 mmol/L sulfuric acid
Rinsing solution	STREAM
Diluent	15 mmol/L sodium hydroxide

Parameters

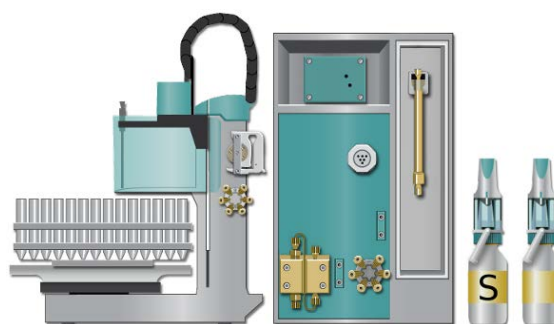
Flow rate	0.7 mL/min
Injection volume	100 µL
P _{max}	15 MPa
Recording time	25 min
Column temperature	45 °C
Polarity	- for arsenite, As(III) + for arsenate, As(V)

Analysis

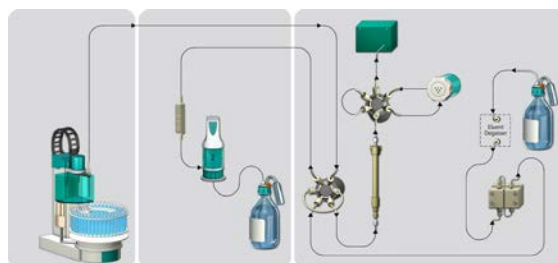
Direct conductivity detection or conductivity detection after chemical suppression respectively

Instrumentation

930 Compact IC Flex Oven/ChS/Deg	2.930.2260
IC Conductivity Detector	2.850.9010
858 Professional Sample Processor	2.858.0030
800 Dosino (regeneration)	2.800.0010
800 Dosino (MiPT)	2.800.0010
MSM Rotor A	6.2832.000
Adapter sleeve for Suppressor Vario	6.2842.020
IC equipment: Dosino Regeneration	6.5330.190



Setup scheme



Time line

Time [min]	Event
0.0	Injection (non-suppressed)
0.0	Start data acquisition: arsenite
6.5	Switch to MSM (suppressed)
8.5	Start data acquisition: Arsenate

Remarks

Dust samples (original and spiked) are delivered by the customer. The concentration of the spike is not known. Therefore no recovery calculation was possible.

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