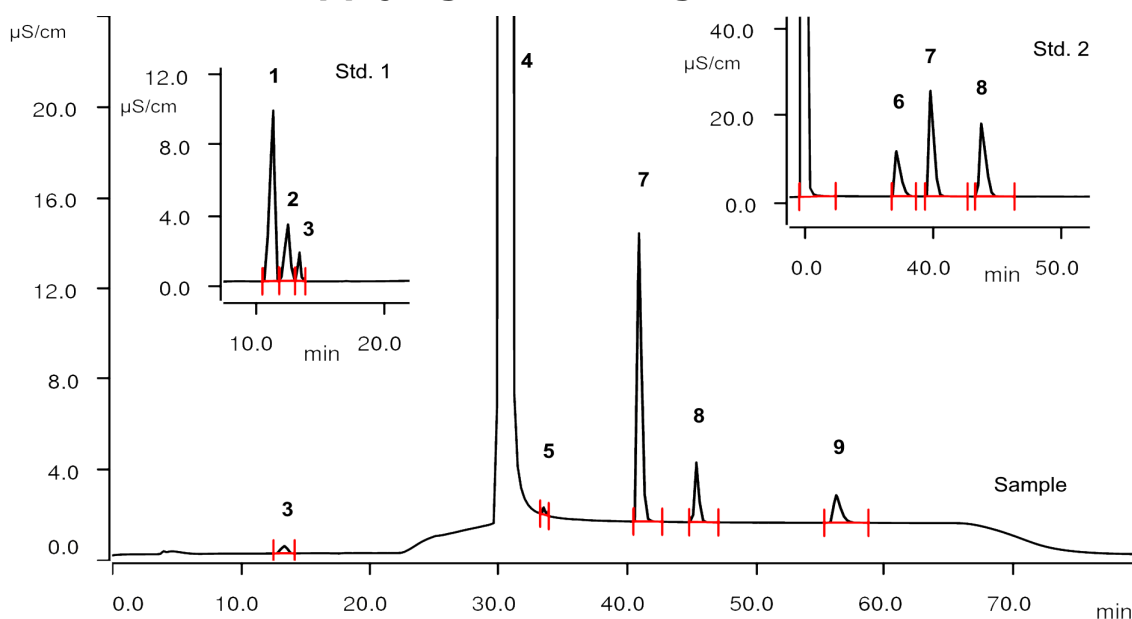


Sulfur species besides standard anions in process water

Amidosulfonate, thiosulfate, thiocyanate, dithionate, and imidodisulfonate in process water from flue gas desulfurization applying a Dose-in gradient.



Chromatograms of a process water sample (diluted 1:100) as well as reference standards; Std. 1 inset: Separation of fluoride, acetate, and amidosulfonate, Std. 2 inset: Separation of thiocyanate, dithionate, and imidodisulfonate.

Process water from flue gas desulfurization mainly contains sulfite and sulfate. Besides these two main components, other sulfur species may be formed in the process. This application describes the determination of such late-eluting sulfur species with ion chromatography applying a Dose-in gradient. The applied gradient profile enables the resolution of amidosulfonate, dithionate, and imidodisulfonate besides thiosulfate, thiocyanate, major anions, and acetate.

Results

Anion	Concentration [g/L]	RSD [%; N = 4]
7 Dithionate	6.20	1.5
8 Imidodisulfonate	1.64	1.5
Not quantified:		
1 Fluoride	3 Amidosulfonate	5 Thiosulfate
2 Acetate	4 Sulfate	6 Thiocyanate

Peak 9: unknown. Amidosulfonate coelutes with formate.

Sample

Process water from a flue gas desulfurization plant.

Sample preparation

The sample is diluted 1:100 with ultrapure water.

Columns

Metrosep A Supp 5 - 250/4.6	6.1006.530
Metrosep A Supp 5 Guard/4.0	6.1006.500

Solutions

Eluent A	0.5 mmol/L sodium carbonate 5% acetone
Eluent B	20% mmol/L sodium carbonate 5% acetone
Regenerant	500 mmol/L sulfuric acid
Suppressor rinsing	STREAM

Instrumentation

940 Professional IC Vario One/SeS/PP/HPG	2.940.1500
IC Conductivity Detector	2.850.9010
889 IC Sample Center – cool	2.889.0020
800 Dosino (Dose-in gradient)	2.800.0010
MSM-HC Rotor A	6.2842.000

Parameters

Flow rate	0.8 mL/min
Injection volume	20 µL
P _{max}	15 MPa
Column temperature	40 °C
Recording time	80 min

Analysis

Conductivity after sequential suppression



Gradient

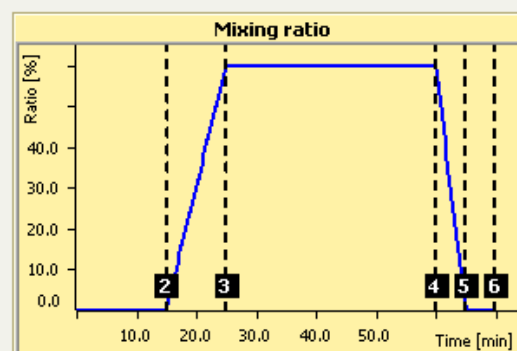
Dosino gradient

Flow 0.8 mL/min

	Time [min]	Ratio [%]	Curve
▶ 1	Start	0.0	
2	15.0	0.0	Linear
3	25.0	60.0	Linear
4	60.0	60.0	Step
5	65.0	0.0	Linear
6	70.0	0.0	Linear
7			

Edit

Total volume 20,400 mL



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