# IC Application Note Q–7

# Online analysis of chloride and sulfate in supercritical water-steam circuits



A combination of the 850 Professional IC and the 872 Extension Module Liquid Handling opens the field of Metrohm's online monitoring by IC. In this application, Inline Preconcentration is coupled to Matrix Elimination (MiPCT-ME). By removing excess matix components, corrosive anions can be sensitively determined. Additionally, this technique allows automated calibration using a single multi-ion standard solution. Online trace analysis for chloride and sulfate is possible for several different sample lines.

# Results

	Concentration [µg/L]	RSD [%] n = 8
Chloride	1.01	0.13
Phosphate	n.q.	
Sulfate	1.46	0.32



# Sample

Artificial boiler water

## Sample preparation

Inline Ultrafiltration, Inline Preconcentration and Inline Matrix Elimination

#### Columns

Metrosep A Supp 10 - 100/2.0	6.1020.210
Metrosep A Supp 10 Guard/2.0	6.1020.600
Metrosep A PCC 1 HC/4.0	6.1006.310

#### Solutions

Eluent (inline eluent preparation)	5.0 mmol/L sodium carbonate 5.0 mmol/L sodium hydrogen carbonate
Suppressor regenerant	100 mmol/L sulfuric acid
Rinsing solutions	Detector outlet

## Analysis

Conductivity after sequential suppression

## Parameters

Flow rate	0.25 mL/min
Injection volume	4000 µL
P <sub>max</sub>	15 MPa
Recording time	20 min
Column temperature	45 °C

#### Instrumentation

850 Professional IC Anion – MCS	2.850.2030
IC Conductivity Detector	2.850.9010
872 Extension Module Liquid Handling	2.872.0060
800 Dosino (liquid handling)	2.800.0010
849 Level Control for Inline Eluent Preparation	2.849.1030

# Calibration MiPCT-ME

Calibration range	Factor of 20
Standard solution:	
Chloride, sulfate	50 µg/L
1. Level	0.5 μg/L = 40 μL
2. Level	1.0 μg/L = 80 μL
3. Level	2.0 μg/L = 160 μL
4. Level	5.0 µg/L = 400 µL
5. Level	10.0 µg/L = 800 µL



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Flow chart



This system setup monitors up to five sample streams. Each stream may be equipped with Inline Ultrafiltration to prevent clogging and to reduce sample pressure. One additional sampling port is for collecting grab samples. Two sampling ports are used for calibration standard and check standard solutions, respectively. The 2-mm-column reduces eluent consumption to  $\approx$  10 L/month.

Max. measuring range	0.51000 µg/L
Repeatability	± 2%
Detection limit	< 0.05 µg/L
Circuit time	30 min
Sample flow rate	> 0.5 L/h

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