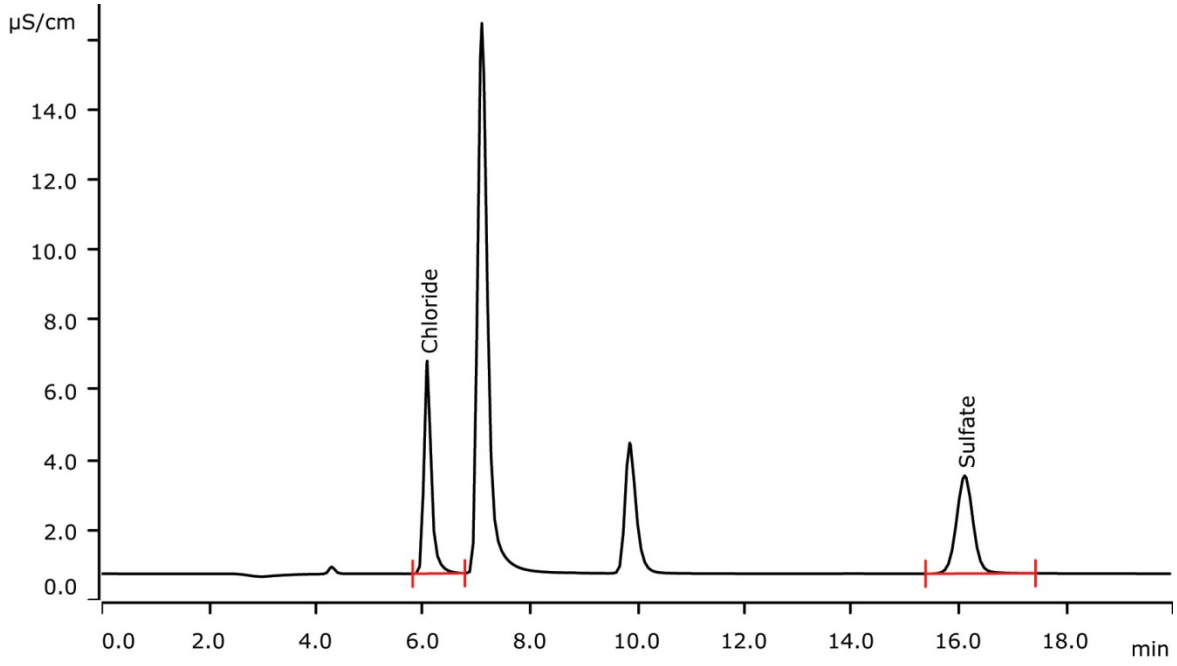
IC Application Note CIC–011

# Analysis of an ion exchanger applying Metrohm Combustion IC




The production of ultrapure water for the pharmaceutical or semiconductor industry requires high-quality ion exchangers. Metrohm Combustion IC is an invaluable tool for testing the purity of anion-exchanger materials. The initial sample was wet and had been dried at 105 °C in a special oven with waste air removal.

## Results

| | Mean [g/kg] (n = 3) | RSD [%] (n = 3) |
|---|---|---|
| Chloride | 90.6 | 3.5 |
| Sulfur | 57.3 | 0.7 |

Nitrite and nitrate peaks cannot be used for nitrogen quantification, for which reason they are not integrated.

Metrohm

## Sample

Polystyrene/divinylbenzene-based anion exchanger

## Sample preparation

Dried sample was analyzed by Combustion IC with flame sensor technology and intelligent Partial-Loop Injection with Inline Matrix Elimination

## Columns

| | |
|---|---|
| Metrosep A Supp 5 - 150/4.0 | 6.1006.520 |
| Metrosep A Supp 4/5 Guard/4.0 | 6.1006.500 |
| Metrosep A PCC 1 HC/4.0 | 6.1006.310 |

## Solutions

| | |
|---|---|
| Eluent | 3.2 mmol/L sodium carbonate<br>1.0 mmol/L sodium hydrogen carbonate |
| Suppressor regenerant | 100 mmol/L sulfuric acid |
| Rinsing solution | Detector outlet |
| Absorber solution | 100 mg/L hydrogen peroxide |

## Parameters

| | |
|---|---|
| Flow rate | 0.7 mL/min |
| Injection volume | 100 µL |
| $P_{max}$ | 15 MPa |
| Recording time | 20 min |
| Column temperature | 30 °C |

## Combustion parameters

| | |
|---|---|
| Argon | 100 mL/min |
| Oxygen | 300 mL/min |
| Oven temperature | 1050 °C |
| Post-combustion time | 120 s |
| Initial volume of absorption solution | 2.0 mL |
| Water inlet | 0.1 mL/min |

## Analysis

Conductivity after sequential suppression

## Instrumentation

| | |
|---|---|
| 881 Compact IC pro – Anion – MCS | 2.881.0030* |
| IC Conductivity Detector | 2.850.9010* |
| 920 Absorber Module | 2.920.0010* |
| Combustion Module | 2.136.0700* |
| Autosampler MMS 5000 | 2.136.0800 |
| Kit for solid samples | 6.7302.000 |

* available as 881 Metrohm Combustion IC (2.881.3030)

## Calibration MiPT

| | |
|---|---|
| Calibration range | Factor of 50 |
| | |
| Standard solution | |
| Chloride, sulfate | 3.0 mg/L |
| | |
| 1. Level | 0.06 mg /L = 4 µL |
| 2. Level | 0.12 mg /L = 8 µL |
| 3. Level | 0.3 mg /L = 20 µL |
| 4. Level | 0.6 mg /L = 40 µL |
| 5. Level | 1.5 mg /L = 100 µL |
| 6. Level | 3.0 mg /L = 200 µL |