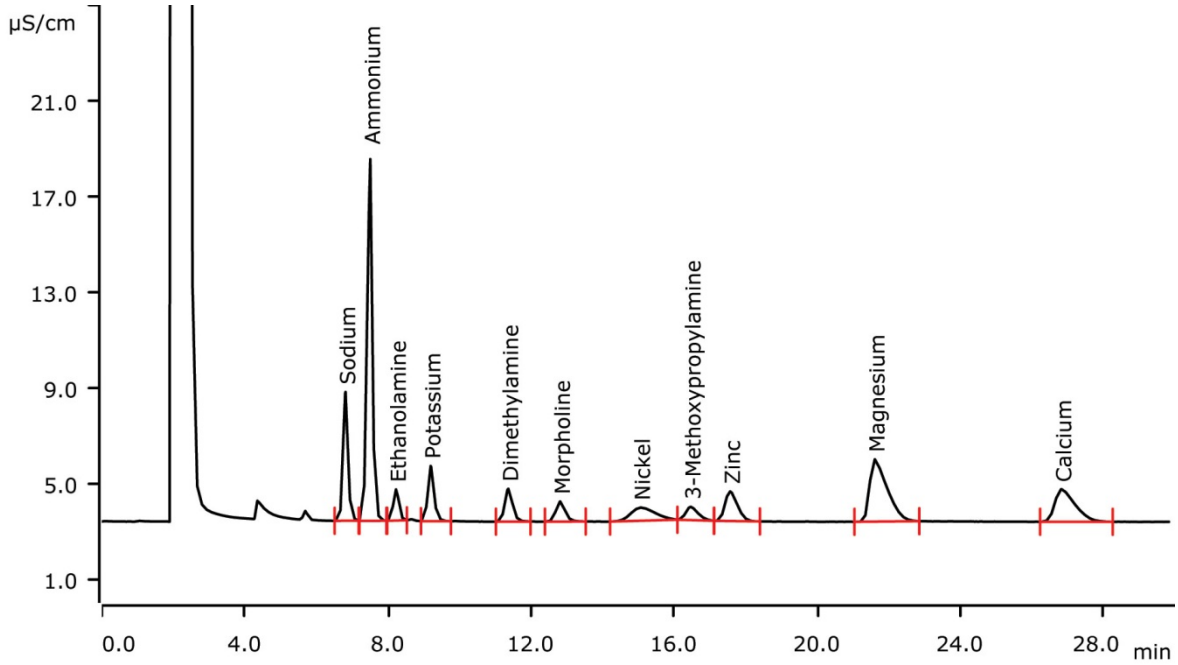
IC Application Note C–139

# Cations and amines in the water-steam circuit




Water in steel-based cooling systems requires a pH value slightly above 7 to prevent corrosion. Often ammonium or organic amines are applied for pH adjustement. This application shows the separation of typical amines besides inorganic cations. Sample preconcentration applies combined Inline Preconcentration and Matrix Elimination (MiPCT-ME).

## Results

| | Concentration [mg/L] | | Concentration [mg/L] |
|---|---|---|---|
| Sodium | 1.0 | Nickel | 1.0 |
| Ammonium | 1.0 | 3-methoxypropylamine | 1.0 |
| Ethanolamine | 1.0 | Zinc | 1.0 |
| Potassium | 1.0 | Magnesium | 1.0 |
| Dimethylamine | 1.0 | Calcium | 1.0 |
| Morpholine | 1.0 | | |

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## Sample

Spiked water-steam circuit water

## Sample preparation

None

## Columns

| | |
|---|---|
| Metrosep C 4 - 250/4.0 | 6.1050.430 |
| Metrosep C 4 Guard/4.0 | 6.1050.500 |
| Metrosep C PCC 1 HC/4.0 | 6.1010.310 |

## Solutions

| | |
|---|---|
| Eluent (inline eluent preparation) | 2.5 mmol/L nitric acid<br>0.5 mmol/l oxalic acid |
| Liquid handling | Ultrapure water |

## Parameters

| | |
|---|---|
| Flow rate | 0.9 mL/min |
| Injection volume | 100 µL |
| $P_{max}$ | 20 MPa |
| Recording time | 30 min |
| Column temperature | 32 °C |

## Analysis

Direct conductivity detection

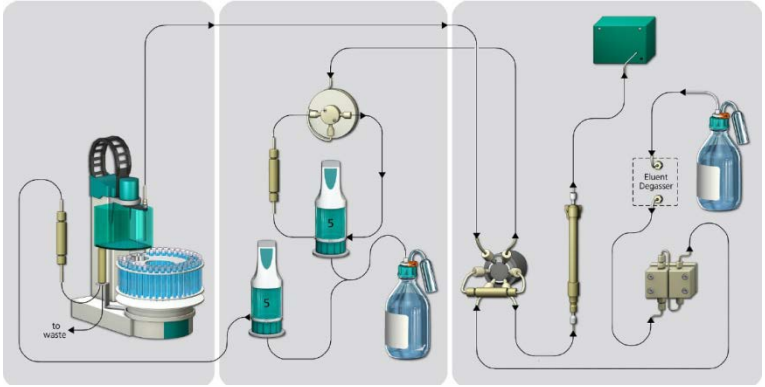
## Instrumentation

| | |
|---|---|
| 850 Professional IC – Cation | 2.850.1010 |
| IC Conductivity Detector | 2.850.9010 |
| 858 Professional Sample Processor | 2.858.0010 |
| 2 × 800 Dosino | 2.800.0010 |
| 849 Level Control for Inline Eluent Preparation | 2.849.1030 |

## Calibration MiPCT-ME

| | |
|---|---|
| Calibration range | Factor of 100 |
| Standard solution: | |
| All cations | 10 mg/L |
| | |
| 1. Level | 5 µL = 0.1 mg/L |
| 2. Level | 10 µL = 0.2 mg/L |
| 3. Level | 25 µL = 0.5 mg/L |
| 4. Level | 50 µL = 1.0 mg/L |
| 5. Level | 100 µL = 2.0 mg/L |
| 6. Level | 250 µL = 5.0 mg/L |
| 7. Level | 500 µL = 10.0 mg/L |

## Flow chart

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