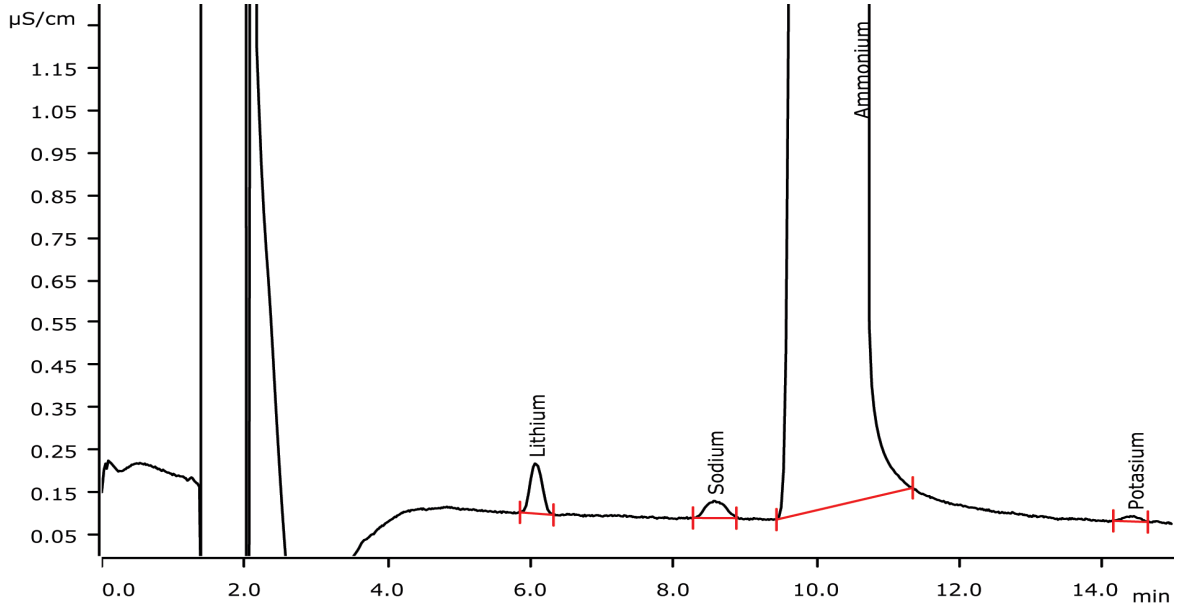
IC Application Note C–144

Variable Inline Preconcentration including Matrix Elimination for trace cation analysis (MiPCT-ME)



Metrohm Inline Preconcentration Technique with Matrix Elimination (MiPCT-ME) is a powerful tool that combines preconcentration, matrix elimination, and multilevel calibration. In this application, the methodology is applied to the determination of trace sodium besides 2 mg/L of ammonium. The Metrosep C 6 - 250/4.0 column is used for selectivity reasons.

Results

	Conc. [µg/L] (n = 9)	RSD [%]	MDL [ng/L]
Lithium	0.225	1.8	21
Sodium	0.385	2.0	12
Ammonium	2000	0.1	n.d.
Potassium	0.185	8.1	n.d.

MDL: method detection Limit

Metrohm

Sample

Standard solution

Sample preparation

Inline Preconcentration with Matrix Elimination (MiPCT-ME)

Columns

Metrosep C 6 - 250/4.0	6.1051.430
Metrosep C 4 Guard/4.0	6.1050.500
Metrosep C 4 - 50/4.0 (as PCC)	6.1050.450

Solutions

Eluent (inline eluent preparation)	2.5 mmol/L nitric acid 0.5 mmol/L oxalic acid
Rinsing solution	Ultrapure water

Analysis

Direct conductivity detection

Parameters

Flow rate	1.2 mL/min
Injection volume	40…4000 µL
P_{max}	20 MPa
Recording time	15 min
Column temperature	30 °C

Instrumentation

940 Professional IC Vario ONE	2.940.1100
IC Conductivity Detector	2.850.9010
858 Professional Sample Processor	2.858.0010
IC equipment: MiPCT-ME	6.5330.160
2 x 800 Dosino (liquid handling)	2.800.0010

Calibration MiPCT-ME

Calibration range	Factor of 100
Standard solution:	
Lithium, sodium, potassium	20 µg/L
Ammonium	2000 µg/L
1. Level	40 µL = 0.2 / 20 µg/L
2. Level	100 µL = 0.5 / 50 µg/L
3. Level	200 µL = 1.0 / 100 µg/L
4. Level	1000 µL = 5.0 / 500 µg/L
5. Level	2000 µL = 10 / 1000 µg/L
6. Level	4000 µL = 20 / 2000 µg/L