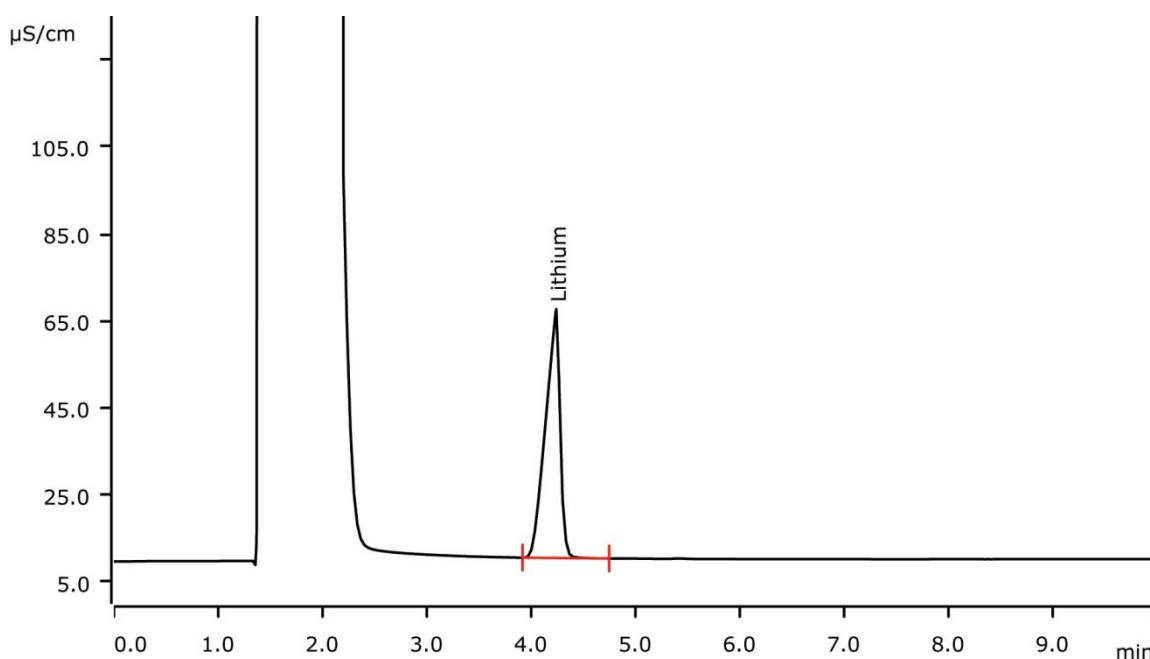


Lithium in borated water of a pressurized water reactor (PWR)



In pressurized water reactors (PWRs), light water is used as coolant in the primary side. Boron (as boric acid) is added to the coolant to absorb neutrons thus controlling reactivity. Lithium hydroxide assures a pH value greater than 7 to prevent corrosion. This application allows to measure lithium content besides high boric acid concentrations. AN-C-138 shows the respective trace metal determination on the same system setup.

Results

Cation	Concentration [mg/L]	RSD [%] n = 6
Lithium	5.0	0.78

Sample

Artificial PWR primary cycle water (3 g/L boron, 5 mg/L lithium)

Sample preparation

Inline Preconcentration with Matrix Elimination (MiPCT-ME)

Columns

Metrosep C 4 - 250/2.0	6.1050.230
Metrosep C 4 Guard/2.0	6.1050.600
Metrosep C PCC 1 HC/4.0	6.1010.310

Solutions

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

Analyses

Direct conductivity detection

Parameters

Flow rate	0.4 mL/min
Injection volume	20 µL
P _{max}	25 MPa
Recording time	10 min
Column temperature	32 °C

Calibration MiPCT-ME

Calibration range	Factor of 50
Standard solution:	
All cations	10 mg/L

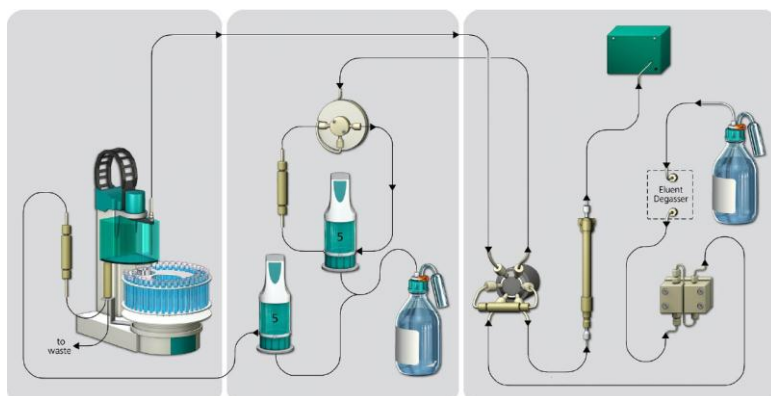
1. Level	4 µL = 0.2 mg/L
2. Level	10 µL = 0.5 mg/L
3. Level	20 µL = 1.0 mg/L
4. Level	40 µL = 2.0 mg/L
5. Level	100 µL = 5.0 mg/L
6. Level	200 µL = 10 mg/L

Instrumentation

850 Professional IC Cation	2.850.1010
IC Conductivity Detector	2.850.9010
858 Professional Sample Processor	2.858.0010
2 x 800 Dosino (liquid handling)	2.800.0010
849 Level Control for Inline Eluent Preparation	2.849.1030



Flow chart



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