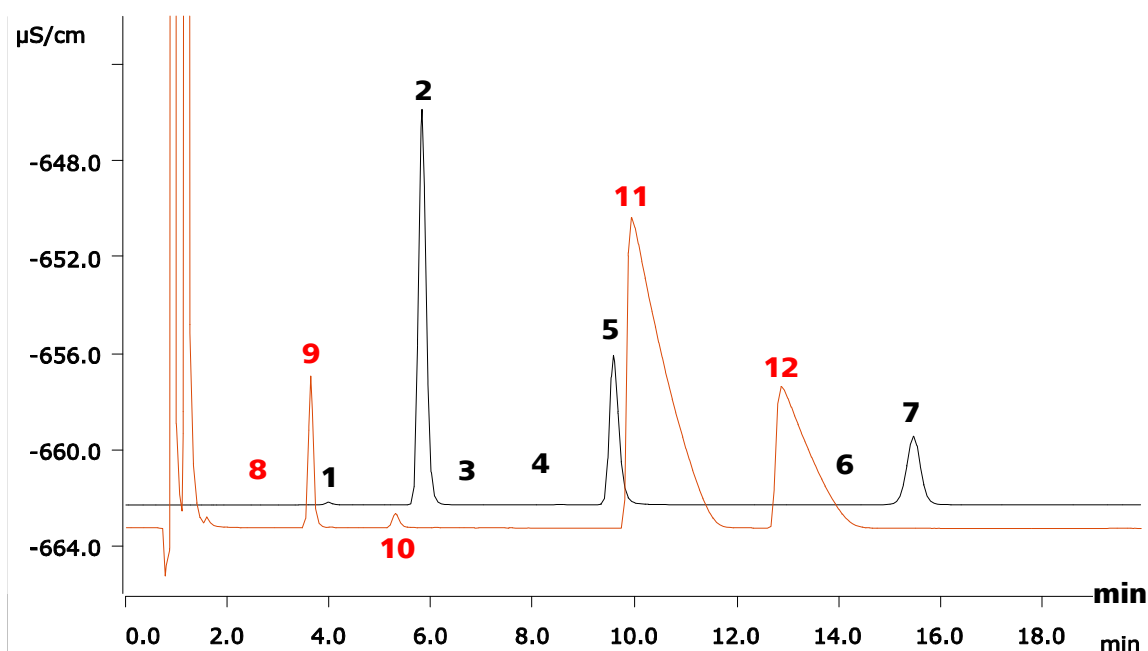


Comprehensive water analysis with VoltIC pro I



VoltIC pro I is the perfect combination of voltammetry and ion chromatography for the fully automated analysis of anions, cations, and heavy metals (e.g., Zn, Cd, Pb, Cu): comprehensive water analysis out of one hand.

Results

IC		IC / voltammetry	
1	Fluoride	9	Sodium
	0.055 mg/L		5.779 mg/L
2	Chloride	10	Potassium
	6.074 mg/L		1.653 mg/L
3	Nitrite	11	Calcium
	0.009 mg/L		106.18 mg/L
4	Bromide	12	Magnesium
	0.014 mg/L		21.09 mg/L
5	Nitrate		Zinc
	7.676 mg/L		94.0 µg/L
6	Phosphate		Cadmium
	0.014 mg/L		n.d.
7	Sulfate		Lead
	4.680 mg/L		0.6 µg/L
8	Lithium		Copper
	0.005 mg/L		6.3 µg/L

Method description

Sample

Tap water

Sample preparation

None

Columns

Metrosep A Supp 5 - 150/4.0	6.1006.520
Metrosep A Supp 4/5 Guard/4.0	6.1006.500
Metrosep C 4 - 100/4.0	6.1050.410
Metrosep C 4 Guard/4.0	6.1050.500

Solutions

Eluent anions	3.6 mmol/L sodium carbonate 1.0 mmol/L sodium hydrogen carbonate
Suppressor regenerant	100 mmol/L sulfuric acid
Rinsing solutions (IC)	Ultrapure water
Eluent cation	1.7 mmol/L nitric acid 0.7 mmol/L dipicolinic acid
Working electrolyte	Acetate buffer pH = 4.6
Rinsing solution (VA)	1.0 mL/L nitric acid in ultrapure water

Analyses

Suppressed conductivity (IC, anions)
Non-suppressed conductivity (IC, cations)
Differential pulse voltammetry (DPV)

Parameters

IC, anion:	
Flow rate	0.7 mL/min
Injection volume	20 µL
P _{max}	15.0 MPa
Recording time	20 min
Column temperature	30 °C

IC, cation:	
Flow rate	0.9 mL/min
Injection volume	10 µL
P _{max}	20.0 MPa
Recording time	20 min
Column temperature	30 °C

Voltammetry:	
Mode	DP (differential pulse)
Calibration	Standard addition
Addition	Automatic
Electrode	HMDE
Drop size	4
Stirrer	2000 rpm

Sweep	
Start potential	-1.15 V
End potential	0.15 V
Pulse amplitude	0.05 V
Pulse time	0.04 s
Voltage step	0.006 V

www.metrohm.com



Method description



Instrumentation IC

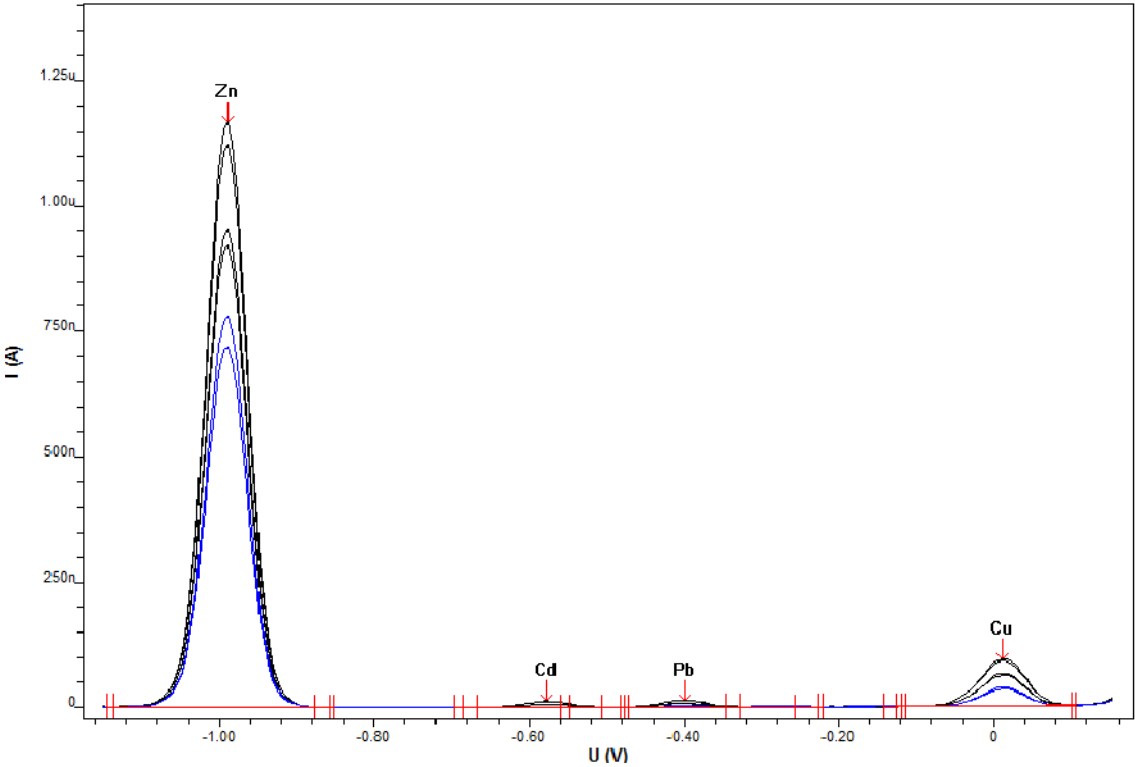
850 Professional IC AnCat – MSM – MCS	2.850.3040
2 x IC Conductivity Detector	2.850.9010
815 Robotic USB Sample Processor XL (2T/2P)	2.815.0110

Instrumentation Voltammetry

797 VA Computrace	2.797.0010
843 Pump Station	2.843.0140
2 x 800 Dosino	2.800.0010

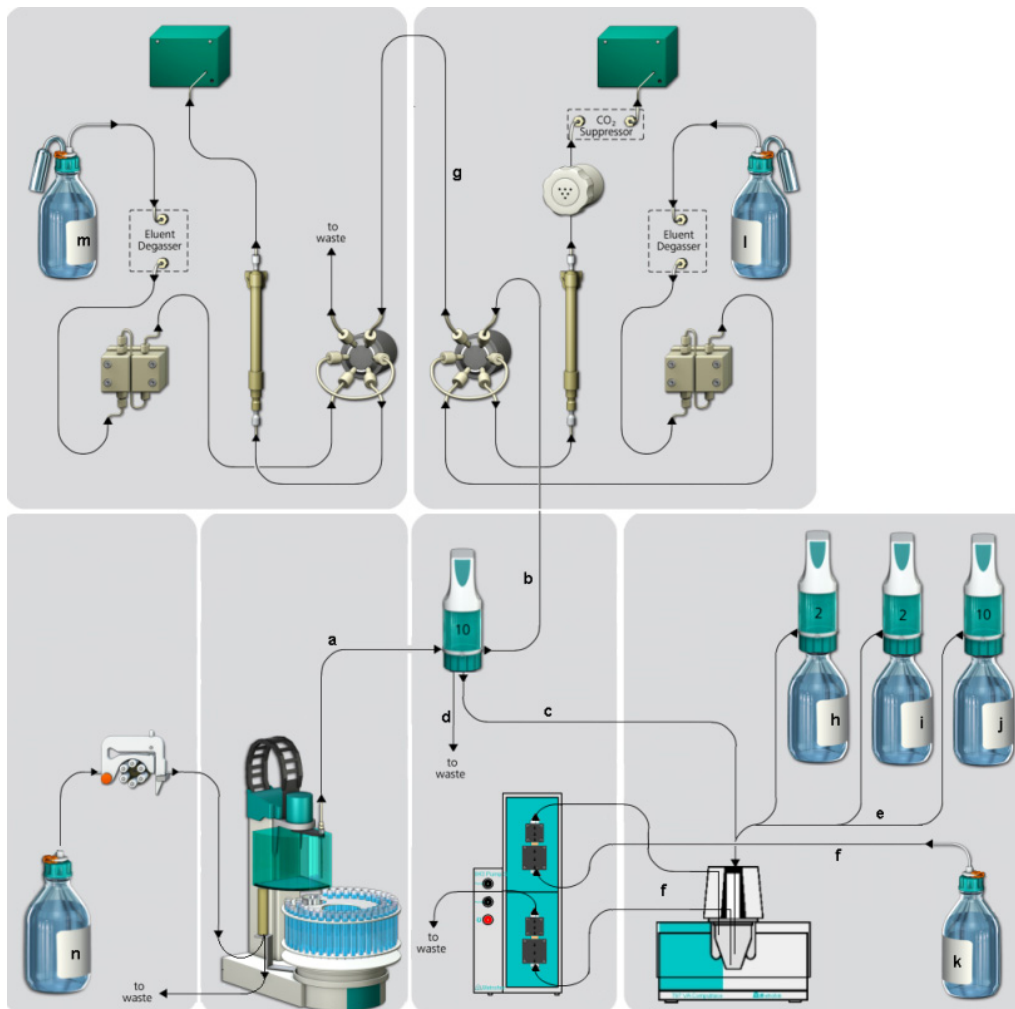
Voltammogram

Determination of Zinc, Cadmium, Lead, and Copper in tap water



Method description

Flow chart



The liquid-handling Dosino fills the loops of both ion chromatographs and transfers the sample to the VA measuring vessel.