

IC Application Note No. S-269

Title: MiPT – Metrohm intelligent Partial Loop Injection Technique

Summary: Calibration of fluoride, chloride, nitrite, bromide, nitrate, phosphate and sulfate applying intelligent partial loop injection technique using anion chromatography with conductivity detection after sequential suppression.

This technique allows a calibration range of 1:100 (e.g. 1 µg/L to 100 µg/L corresponding to 2 µL to 200 µL injected volume) out of 1 calibration solution. Applying the full range of partial loop injection to the samples one calibration covers a sample concentration range of 1 to 10'000.

Sample: 100 µg/L multi-anion standard solution

Sample Preparation: –

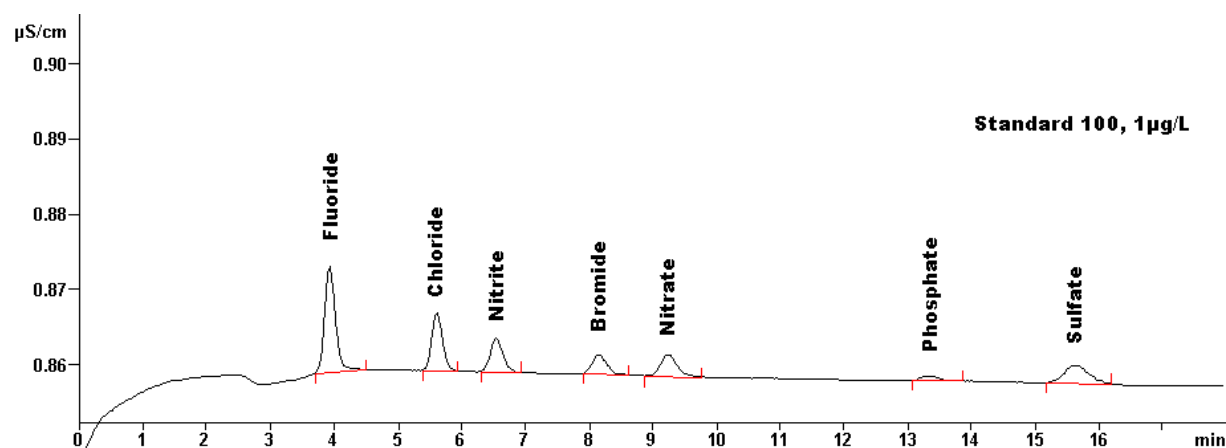
Column: 6.1006.520 Metrosep A Supp 5 – 150

Eluent: 3.2 mmol/L sodium carbonate
1.0 mmol/L sodium hydrogen carbonate

Suppressor: Sequential suppression (MSM: 50 mmol/L H₂SO₄)

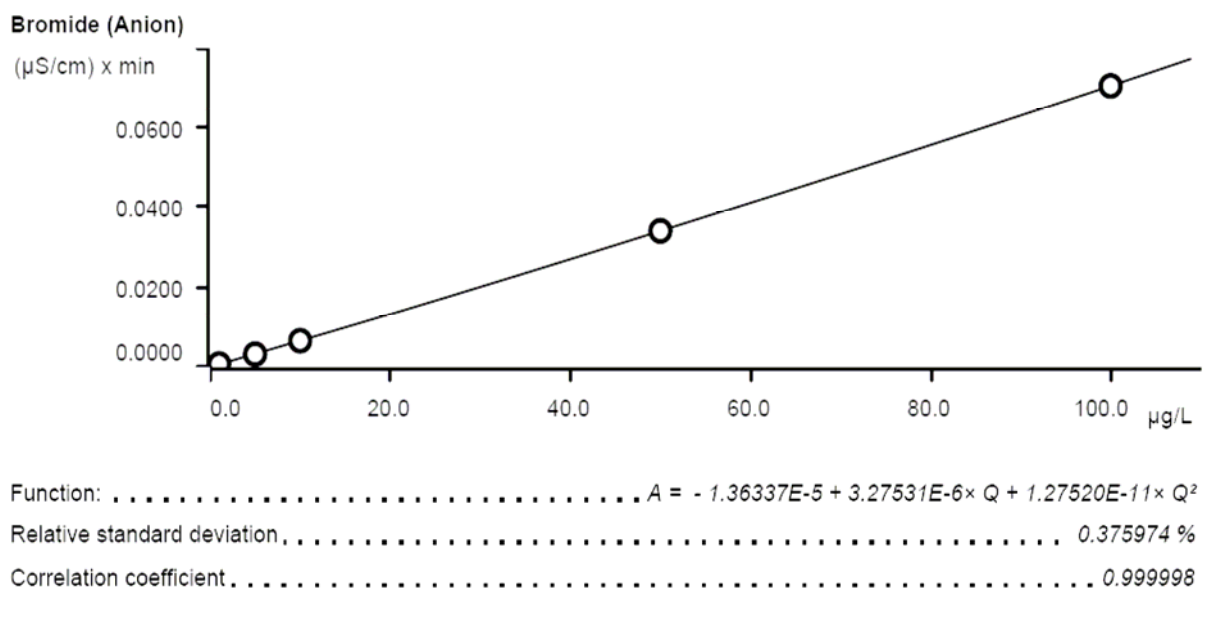
Flow: 0.8 mL/min

Injection Volume: 250 µL loop; variable volumes 2...200 µL



Calibration: 1...100 µg/L; 2...200 µL	F ⁻	Cl ⁻	NO ₂ ⁻	Br ⁻	NO ₃ ⁻	PO ₄ ³⁻	SO ₄ ²⁻
Correlation coefficient	0.999983	0.999998	0.999993	0.999998	0.999999	0.999946	0.999997
Percentage standard deviation (%RSD)	1.10	0.40	0.72	0.38	0.26	1.95	0.46

Example calibration curve:



Carryover test:

200 μL	Sample $\mu\text{g}/\text{L}$	Blank (ultrapure water) $\mu\text{g}/\text{L}$	Carryover %
all anions	5'000	0.0	< 0.001

Carryover was evaluated by injection of a blank (ultrapure water) immediately after injection of a 5'000 $\mu\text{g}/\text{L}$ -standard.

Precision and partial loop recovery:

Concentration: injected volume:	5 $\mu\text{g}/\text{L}$ 200 μL	RSD (n=6) %	Recovery (n=10) %
Fluoride		2.1	97.0
Chloride		0.5	100.0
Nitrite		1.4	102.2
Bromide		0.7	100.4
Nitrate		0.6	98.9
Phosphate		2.4	92.3
Sulfate		0.3	101.2

Principle of MiPT: Dosino and 2 mL-buffer tubing is required.

