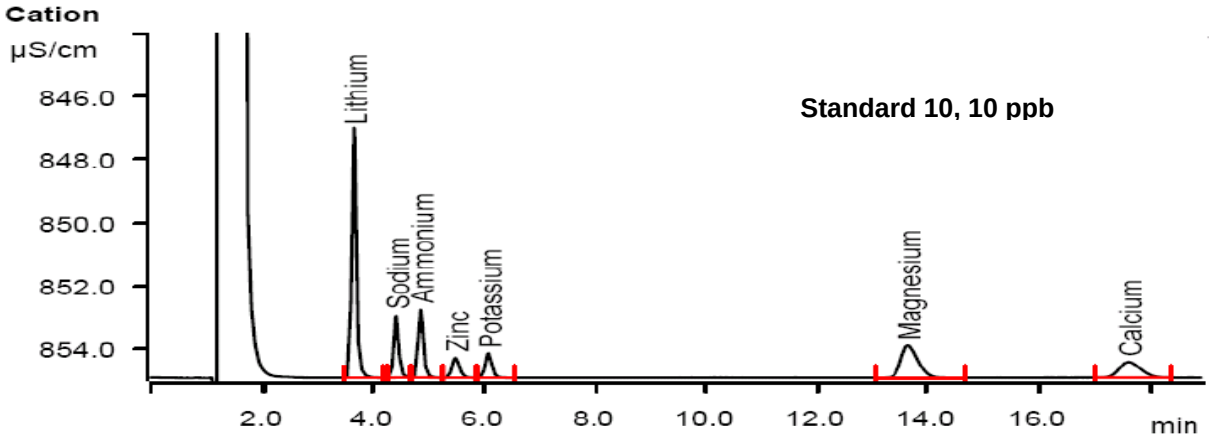
IC Application Note No. C-117

Title:	**MiPT – Metrohm intelligent Partial Loop Technique**

***Summary*:**	Calibration of lithium, sodium, ammonium, zinc, potassium, magnesium and calcium applying partial loop technique using cation chromatography with direct conductivity detection. 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 e.g. 2 µL of a 10 mg/L solution corresponds to the highest calibration level (100 µg/L) while 200 µL of a 1 µg/L solution corresponds to the lowest calibration level.

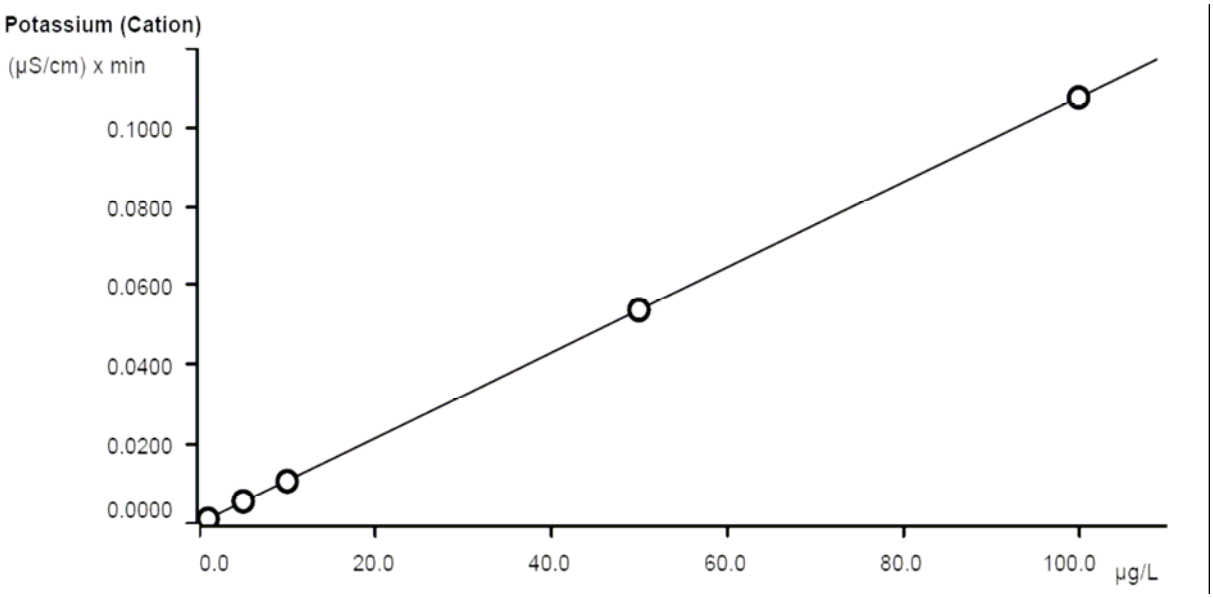
Sample:	100 µg/L multi-cation standard solution
Sample Preparation:	–

Column:	6.1050.420 Metrosep C 4 – 150
Eluent:	2.5 mmol/L oxalic acid
Flow:	1.0 mL/min
Injection Volume:	250 µL loop; variable volumes 2…200 µL



Calibration: 1…100 µg/L; 2…200 µL	Li^+	Na^+	NH_4^+	Zn^{2+}	K^+	Mg^{2+}	Ca^{2+}
Correlation coefficient	**0.99999**	**0.99999**	**0.99999**	**0.99994**	**0.99999**	**0.99999**	**0.99990**
Percentage standard deviation (%RSD)	**0.41**	**0.42**	**0.45**	**1.58**	**0.30**	**0.58**	**2.04**

Example calibration curve:



Function: . . . . . *A = 4.68855E-5 + 5.37919E-6× Q*

Relative standard deviation . . . . . *0.296085 %*

Correlation coefficient *0.999998*

Carryover test:

200 µL	**Sample µg/L**	**Blank (ultrapure water) µg/L**	**Carryover %**
Lithium	**10'000**	**0.1**	**0.001**

Carryover was evaluated by injection of a blank (ultrapure water) immediately after injection of a 10'000 µg/L-Lithium standard.

Precision:

Lithium	**Volume injected µL**	**RSD (n=6) %**
500 µg/L	**2**	**1.38**
500 µg/L	**10**	**0.51**
500 µg/L	**20**	**0.16**
500 µg/L	**400**	**0.30**
500 µg/L	**200**	**0.02**

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