

SIMULTANEOUS ANALYSIS OF ANIONS AND CATIONS BY TANDEM CHROMATOGRAPHY WITH CONDUCTIVITY DETECTION

Key words:

Dual system, Tandem system, Anions & Cations, Ion chromatography, Conductivity detection.

Introduction:

Today's busy quality control laboratories demand ever greater productivity from their analytical instruments. Tandem chromatography is emerging as a powerful technique to double the output of HPLC equipment by simultaneously carrying out two different analyses on the same sample.

The principle is straightforward: the sample is split in two at the injection port, and each aliquot is eluted on a different column and analysed by a different detector. PowerStream software controls the autosampler and pumps, monitors the oven, and collects and processes the signals from both detectors through independent channels. The result is two analyses being run at the same time.

This Application Note describes the implementation of this principle to the simultaneous analysis of anions and cations in water, by using "two isocratic ion chromatography systems" working in tandem mode.

Chromatographic method:

Anion system:

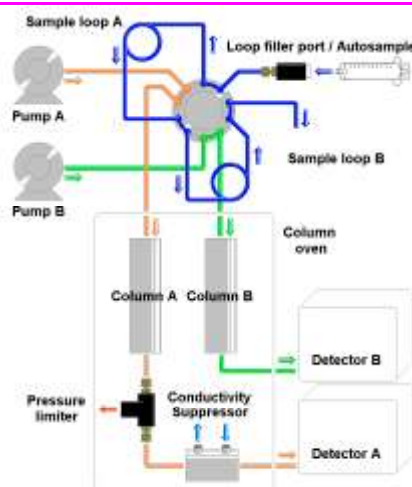
Mobile phase: 1.7mM NaHCO₃ / 1.8mM Na₂CO₃
 Flow rate: 1.2 mL/min
 Injection Volume: 100 µL
 Range: -1000 µScm⁻¹
 Offset: 2250 µScm⁻¹
 Time constant: 1 s
 Column: **4100 60 06** Alltech Allsep Anion 150x4.6mm

Cation system:

Mobile phase: 3mM Methanesulfonic Acid
 Flow rate: 1.0 mL/min
 Injection Volume: 50 µL
 Range: 1000 µScm⁻¹
 Offset: 0 µScm⁻¹
 Time constant: 1 s
 Column: **4100 60 09** Alltech Universal Cation 100x4.6mm

Oven temperature: 35°C

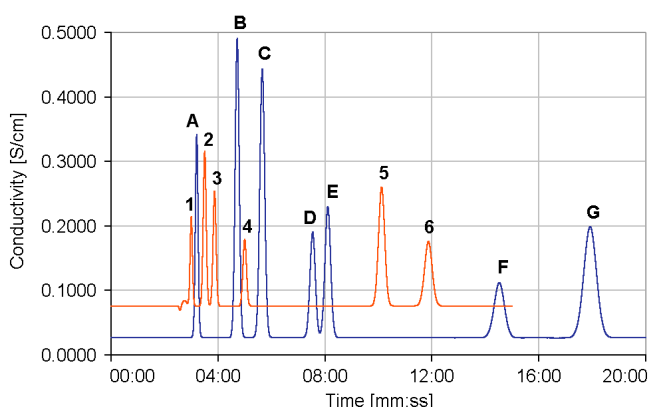
Instrumentation:



Adept System 8 IonQuest "Dual" consisting of:

- 2 CE 4100 HPLC Pumps.
- CE 4800 Automatic Sample Injector and Splitter Valve.
- CE 4661 Column Oven.
- CE 4715 Conductivity Suppressor.
- 2 CE 4710 Conductivity Detectors.

Typical chromatogram:



Analytes:

Anions		Concentration (mg/L)
A	Fluoride	2
B	Chloride	4
C	Nitrite	4
D	Bromide	4
E	Nitrate	4
F	Phosphate	6
G	Sulfate	6
Cations		Concentration (mg/L)
1	Lithium	2
2	Sodium	4
3	Ammonium	4
4	Potassium	4
5	Magnesium	4
6	Calcium	6

Ordering Information:

Adept System 8 IonQuest "Dual" with PowerStream.

We supply Analytical Columns and Guard Column kits upon request.

This Note acts purely as a guide to the method. Cecil Instruments Ltd takes no responsibility for the outcome of any analysis. May 2006 Rev 1.1

CECIL INSTRUMENTS LIMITED MILTON TECHNICAL CENTRE CAMBRIDGE CB4 6AZ ENGLAND

Telephone 01223 420821 Fax 01223 420475 Email info@cecilinstruments.com Website www.cecilinstruments.com

Registered Office : Byron House, Cowley Road, Cambridge, CB4 0WZ

Registered Number : 909536