Inorganic Anion Analysis Kit for the Agilent 7100 CE System

Technical Note

Introduction

The Agilent 7100 Capillary Electrophoresis (CE) system is a powerful separation tool for the analysis of anions. This Technical Note demonstrates the typical performance of the Agilent 7100 CE system using the Agilent Inorganic Anion Kit. With this kit inorganic anions in indirect UV detection mode can be analyzed. The electrophoresis is carried out in reverse polarity since the EOF is reversed. The anion buffer and all reagents provided in the kit are ready-to-use. A complete inorganic anion analysis CE method including data on migration time reproducibility is described.

Agilent Technologies

Experimental

Inorganic anion analysis was performed using the Agilent 7100 CE system equipped with DAD detection using a 72-cm effective length capillary. The method is based on the Agilent Inorganic Anion Analysis kit (p/n 5063-6511).

- The buffer should be replaced every five runs when using 2 mL glass vials, since the buffer used for indirect UV detection has limited buffering capacity.
- The buffer should be stored at 4 °C.
- The Inorganic Anion Test Mixture stock should be stored at 4 °C. Prior to use, the test mixture should be diluted 1:100 with CE grade water.
- Prior to first use, a new capillary should be conditioned with 1 N NaOH (10 min), CE grade water (10 min) and run buffer (30 min).
- Between analyses, it is recommended to flush the capillary with 0.1 N NaOH (3 min) and run buffer (5 min).

Inorganic Anion Analysis Kit (Part No.: 5063-6511)		
Inorganic Anion Test Mixture (Includes 1000 ppm each of fluoride, chloride, bromide, nitrite, sulfate and 2000 ppm phosphate)	10 mL	5062-8524
Inorganic anion buffer	250 mL	8500-6797
Ultra pure CE water	500 mL	5062-8578
1.0 N sodium hydroxide	250 mL	5062-8576
0.1 N sodium hydroxide	250 mL	5062-8575
Bare fused-silica capillary (50mm id, Ieff=72 cm, L=80.5 cm)	2/pk	G1600-62211
Product literature	1	5968-9050E

Parts required (not included in the kit)		
CE buffer vials (2 mL, glass)	100/pk	5181-3375
CE buffer vials (1 mL, polypropylene)	100/pk	5182-0567
CE sample vials (100 mL, polypropylene)	1000/pk	9301-0978
CE vial caps (polypropylene)	100/pk	5181-1512
Alignment interface for 50 mm id capillary (color code: green)	1	G7100-60210

Instrument set-up

Vial contents	**Carousel location**
Conditioning vial (1 N NaOH)	1
Conditioning vial (0.1 N NaOH)	2
Wash vial (CE water)	3
Flush vial (inorganic anion buffer)	4
Waste vial (1/4 full with water or buffer)	5
Inlet home vial (inorganic anion buffer)	6
Outlet home vial (inorganic anion buffer)	7

Note: The default anion method is available in the Agilent CE-ChemStation software method folder as: " inorg_an.m"

Method Summary

Instrument : Agilent 7100 Capillary Electrophoresis System
Mode: Capillary Zone Electrophoresis (CZE)
Inorganic anion separation with the Agilent Inorganic Anion Kit (p/n 5063-6511)

DAD settings				
Signal A	Wavelength 350 [nm]	Bandwidth 80 [nm]	Reference 245 [nm]	Bandwidth 10 [nm]
Peak width	> 0.0025 min (0.5 sec response time) (10 Hz)			
Stoptime	20:00 min (as CE)			
Posttime	Off			
Spectrum store	None			
Indirect UV	100 mAU (margin for negative absorbance)			
Autobalance				
Prerun	On			
Postrun	Off			
CE settings				
Inlet home	Vial 06			
Outlet home	Vial 07	*Note: Vial locations are exemplary only.*		
Cassette temperature	20 °C			
High voltage	Enabled			
Voltage	0 KV (ramp: in 0.3 min to -30 KV)			
Current	100 µA (typical current during run: ~6 µA)			
Power	6 W			
Low current alarm	2 µA			
Stoptime	20:00 min			
Posttime	Off			
Replenishment system	Not used			
Preconditioning				
Flush	180 sec	Inlet: 2	Outlet: 5	
Load Inlet vial	Vial 3			
Flush	300 sec	Inlet: 4	Outlet: 5	
Postconditioning	Not used			
Injection			from	to
Apply pressure	50 mbar	4 sec	Inject vial	Outlet vial

Analysis of Inorganic Anion Test Mixture

The electropherogram in figure 1 shows a typical separation of the Inorganic Anion Test Mixture, included in the kit. This demonstrates the typical performance of the Agilent 7100 CE system. The mixture of six anions was well resolved in 9 minutes.

Migration time and peak area reproducibility is highly dependent on the use of fresh buffer and also capillary conditioning. The Agilent 7100 CE software allows to easily program and reuse conditioning methods to customize and automate any required procedures. Differences in run temperature (± 1°C) did not show a significant effect on migration time values in figure 2 (n = 5). The coefficients of variations of migration time were less than 2.4 %. The results are comparable to those using the earlier Agilent 1600 CE system.

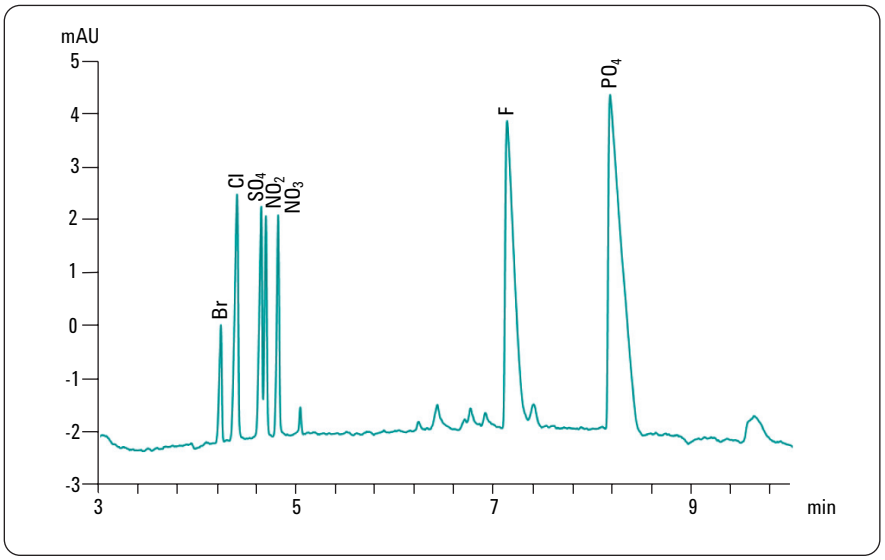

Figure 1
Electropherogram of Inorganic Anion Standard.

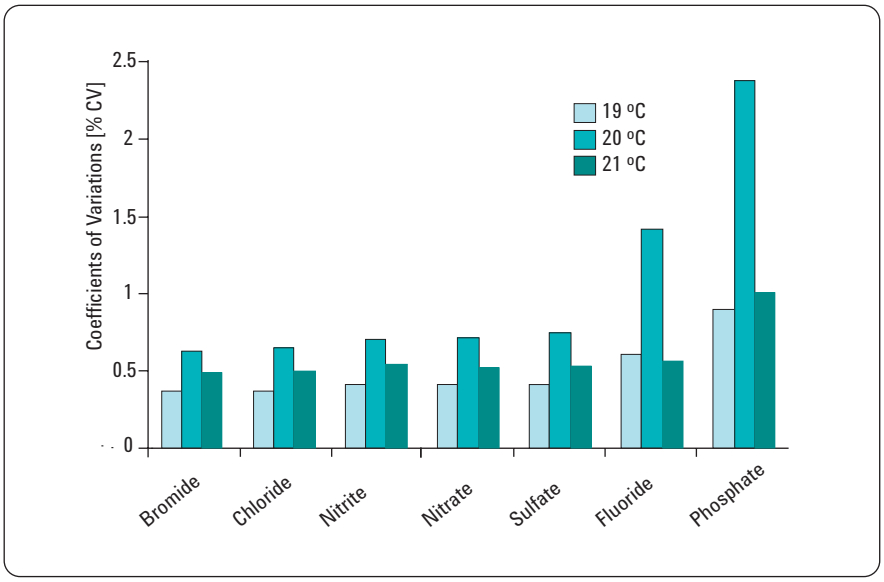

Figure 2
Effect of temperature on migration time reproducibility (n=5).

Raw data are used to plot the data. No internal standard is considered for calculations.

www.agilent.com/chem/CE

Published February 1, 2010
Publication Number 5990-5241EN

Agilent Technologies