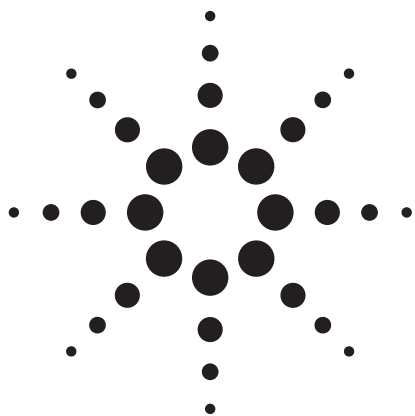




Forensic Anion Solution Kit for the Agilent 7100 CE System

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 performance of the Agilent 7100 CE system with the Agilent Forensic Anion Solution Kit. This kit includes the supplies necessary for the separation of inorganic anions. The kit facilitates the analysis of anions in indirect UV detection mode. The buffer and all other reagents provided in this kit are ready-to-use. A complete anion analysis CE method including data on migration time reproducibility is described.



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Experimental

Inorganic anion analysis was performed using the Agilent 7100 CE system equipped with DAD detection using a 104-cm effective length capillary. The method is based on the Agilent Forensic Anion Solution Kit (p/n 5064-8208).

- The buffer should be replaced every ten runs when using 2 mL glass vials or every five to six runs when using 1 mL polypropylene vials, since the buffer used for indirect UV detection has limited buffering capacity.
- The basic anion buffer should be stored at room temperature (some buffer components may crystallize at lower temperatures) and be protected from CO₂ to prevent pH changes
- The Inorganic Anion Test Mixture stock should be stored at 4 °C. Prior to use, the test mixture should be diluted 1:10 with CE grade water.
- Prior to first use, a new capillary should be conditioned with run buffer (15 min).
- Between analyses, it is recommended that the capillary is flushed for 2 minutes with run buffer from the outlet home vial then for 2 minutes with run buffer from the inlet home vials.

Forensic Anions Solution Kit (Part No.: 5064-8208)

Inorganic Anion Test Mixture (Includes 1000 ppm each of fluoride, chloride, bromide, nitrite, sulfate and 2000 ppm phosphate)	10 mL	5062-8524
Basic anion buffer	500 mL	5064-8209
Ultra pure CE water	500 mL	5062-8578
Bare fused-silica capillary (50 mm id, l _{eff} =104 cm, L=112.5 cm)	2/pk	G1600-64211
Product literature	1	5968-9049E

Parts required (not included in the kit)

CE buffer vials (2 mL, glass)	100/pk	5182-9697
CE sample vials (100 mL, polypropylene)	1000/pk	9301-0978
CE vial caps (polypropylene)	100/pk	5181-1512

Instrument set-up

Vial contents	Carousel location
Wash vial (CE water)	1
Inlet home vial (basic anion buffer)	10
Outlet home vial (basic anion buffer)	11

Note: The default Forensic Anion method is available in Agilent CE-ChemStation software method folder as: "forensic.m"

Method Summary

Instrument: Agilent 7100 Capillary Electrophoresis System

Mode: Capillary Zone Electrophoresis (CZE)

Forensic anion separation with the Agilent Forensic Anion Solution Kit (p/n 5064-8208)

DAD settings

Signal A	Wavelength 350 [nm]	Bandwidth 20 [nm]	Reference 275 [nm]	Bandwidth 10 [nm]
Peak width	> 0.1 min (2.0 sec response time) (2.5 Hz)			
Stoptime	15:00 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 10				
Outlet home	Vial 11	Note: Vial locations are exemplary only			
Cassette temperature	30 °C				
High voltage	Enabled				
Voltage	-30 KV (ramp: in 0.3 min to -30 KV)				
Current	150 µA (typical current during run: ~40 µA)				
Power	6 W				
Low current alarm	2 µA				
Stoptime	15:00 min				
Posttime	Off				
Replenishment system	Not used				
Preconditioning					
Flush	120 sec	Inlet: outlet vial	Outlet: 1		
Flush	120 sec	Inlet: inlet vial	Outlet: 1		
Postconditioning					
Not used					
Injection					
Apply pressure	50 mbar	6 sec	from	to	
Apply pressure	50 mbar	4 sec	Inject vial	Outlet vial	
			Inlet vial	Outlet vial	
Time table	Not used				

Analysis of Inorganic Anion Test Mixture

To identify anionic toxins a quick and accurate analysis is required. The Forensic Anion Solutions kit is ideally suited for the analysis of such anions. The electropherogram in figure 1 shows the separation of the Inorganic Anion Test Mixture (1:10 dilution), demonstrating the performance of the Agilent 7100 CE system. The seven anions of the test mixture were well resolved within 9 minutes.

Migration time and peak area reproducibility is highly dependent on use of fresh buffers and also capillary conditioning. The Agilent 7100 CE software allows to easily program and reuse conditioning methods to customize and automate any required procedures. Figure 2 provides data on observable differences in CV of migration times for changed run temperatures. Differences in run temperature ($\pm 1^\circ\text{C}$) were analyzed to see the variation in migration time. The coefficients of variations of migration time were all less than 0.36 %. The results are comparable to those using the earlier Agilent 1600 CE system.

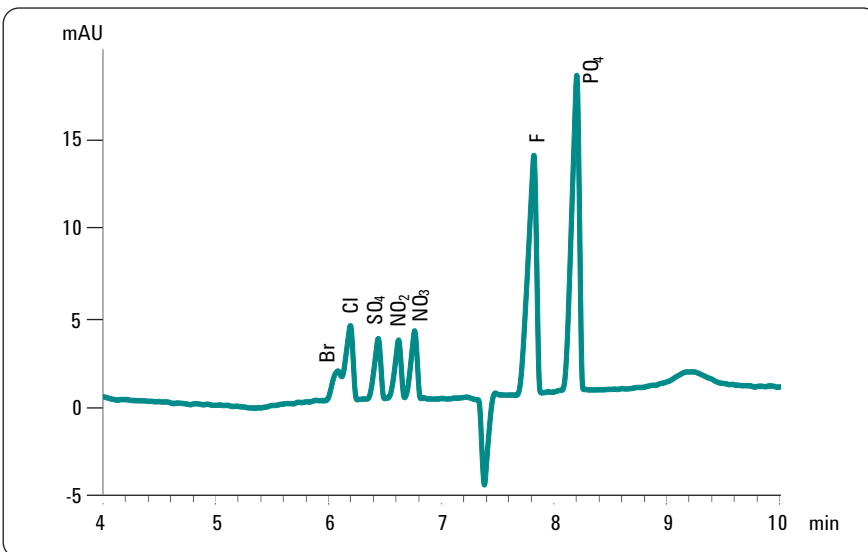


Figure 1
Electropherogram of 1:10 diluted Inorganic Anion Standard (phosphate 200 ppm, others 100 ppm each).

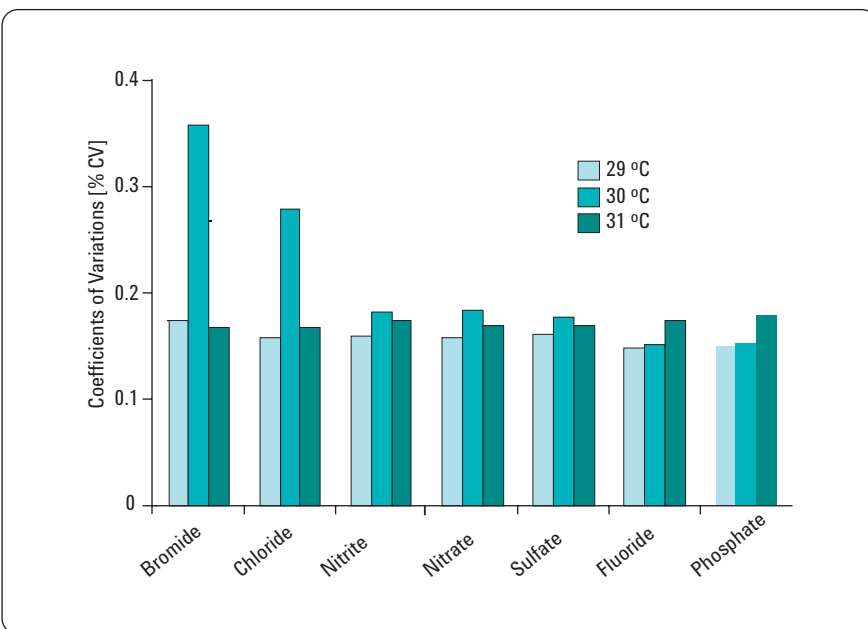


Figure 2
Effect of temperature on migration time reproducibility (n=5).

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

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