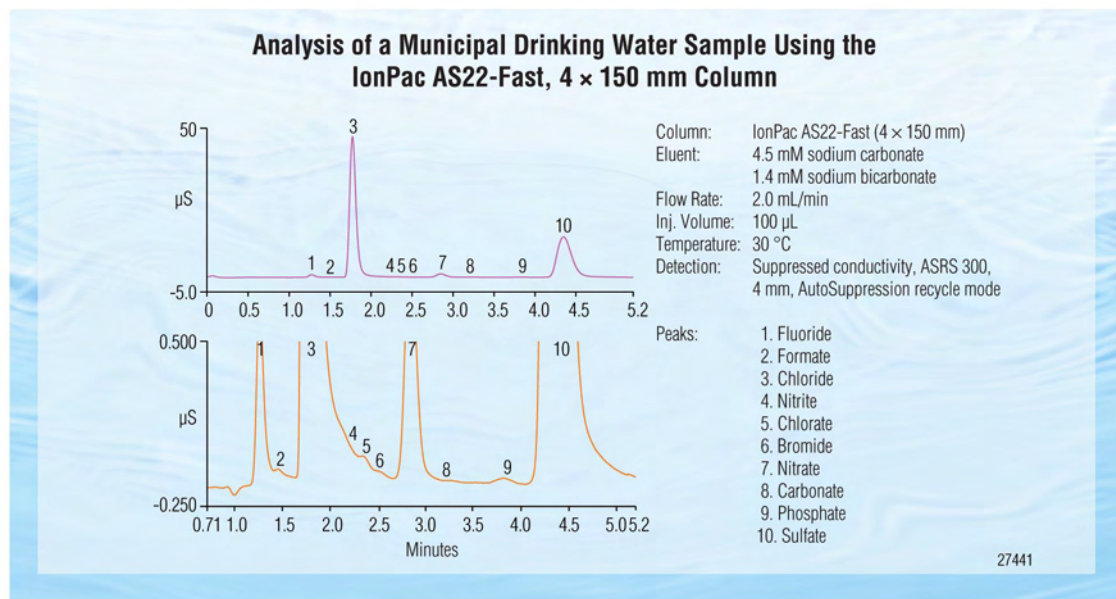


IonPac AS22 Anion-Exchange Column



The IonPac® AS22 is a carbonate based anion-exchange column designed for the determination of inorganic anions and low-molecular-weight organic acids including fluoride, acetate, chloride, nitrite, bromide, nitrate, phosphate, and sulfate. The AS22 column is used with isocratic carbonate/bicarbonate eluents and suppressed conductivity detection. The AS22 column can be used in combination with Dionex Eluent Generators and the Electrolytic pH Modifier (EPM), which automatically produce potassium carbonate/bicarbonate eluents from water. The IonPac AS22-Fast column is ideal for fast IC using eluent generation or eluent regeneration.

Column Performance

The IonPac AS22 column meets the performance requirements specified in U.S. Environmental Protection Agency (EPA) Method 300.0 (A). The common inorganic anions are easily separated in a variety of sample matrices, including drinking water, wastewater, process streams, and scrubber solutions. The AS22 selectivity provides excellent retention of fluoride from the water dip and resolution of fluoride, acetate, and formate. Solvent compatibility permits easy column cleanup after the analysis of samples with hydrophobic components.

Fast IC

The IonPac AS22-Fast is ideal for Fast IC as it is designed to have sufficient capacity to maintain resolution even in a short column format. Fast separations are achieved on any Dionex system at higher flow rates. In a short column format, backpressures produced at higher flow rates are reduced while allowing overall shorter run times. This allows for the determination of anions with high resolution even in drinking, surface, groundwater, and wastewater matrices in under 5 min. Laboratories can achieve higher productivity and increased throughput.

Now sold under the
Thermo Scientific brand

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SCIENTIFIC

 **DIONEX**

Passion. Power. Productivity.

Analyze Inorganic Anions in Diverse Sample Matrices

- Source water and drinking water
- Municipal and industrial wastewater
- Industrial cooling water
- Hazardous waste extracts and dump site leachates
- Acid rain
- Foods and beverages
- Anionic counterions in pharmaceutical preparations and synthetic peptides
- Polymers such as polyols and polysulfonates
- Scrubber solutions

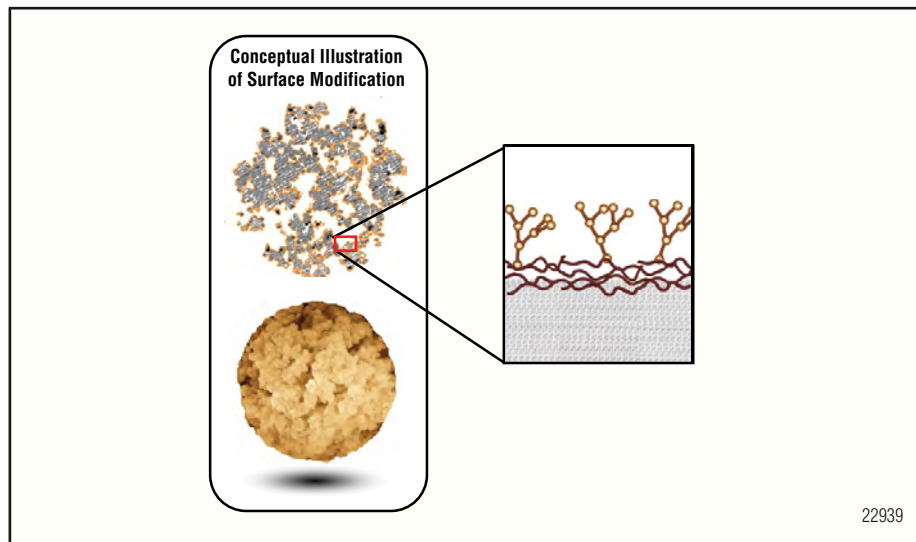


Figure 1. Structure of an IonPac AS22 column particle.

Superior Chromatographic Performance

- Fast isocratic separation of the common inorganic anions in simple sample matrices in 8 min.
- Isocratic separation of common inorganic anions in complex sample matrices in 12 min.
- High speed separation of the common inorganic anions in less than 5 min using the AS22-Fast Column.
- Carbonate peak well resolved from common inorganic anions.
- Meets performance requirements specified in EPA Method 300.0 (A).
- Ideal alternative for IonPac AS4A-SC, AS12A, AS14, and AS14A inorganic anion applications.
- Simplified Reagent-Free™ ion chromatography (RFIC™) System operation provided by Dionex Eluent Generators and EPM, which require only a deionized water source to produce potassium carbonate/bicarbonate eluent.
- Ideal column for use with Dionex Eluent Regeneration, enabling simple, non-stop operation for up to 28 days.
- Simple, accurate eluent preparation with the AS22 Eluent Concentrate—just dilute in deionized water and start operation.
- Eluent suppression using the ASRS 300 or AAES technology provides Reagent-Free IC operation with low backgrounds and enhanced analyte sensitivity.

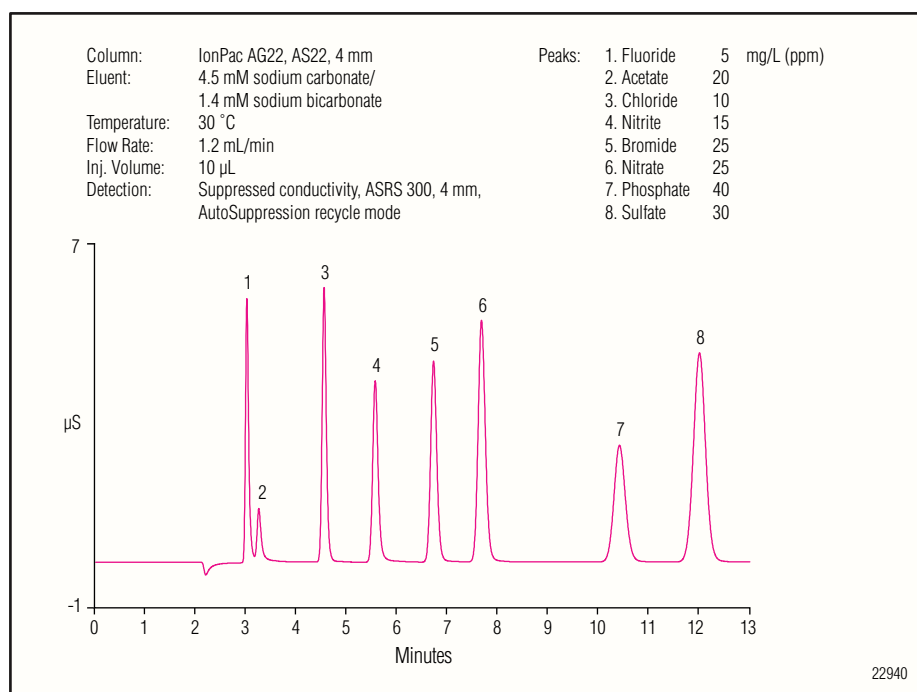


Figure 2. Separation of common inorganic anions plus acetate on an IonPac AS22 column using a 4.5 mM carbonate/1.4 mM bicarbonate eluent.

- High capacity: 210 µeq/col. (4 × 250 mm column).
- Operate at ambient or elevated temperatures. Column selectivity is optimized for a 30 °C operating temperature to ensure reproducible retention times.
- Compatible with organic solvents to enhance analyte solubility, modify column selectivity, or for effective column cleanup.

High Efficiency Particle Structure

The IonPac AS22 column was developed using a unique polymer bonding technology. The stationary phase consists of a novel hyper-branched anion-exchange condensation polymer, electrostatically attached to the surface of a wide-pore polymeric substrate. The substrate is surface-sulfonated in exactly the same manner as is common in Dionex latex coated anion-exchange materials. However, in this anion-exchange resin, alternating treatments of epoxy monomer and amines produce a coating which is grown directly off the substrate surface as illustrated in Figure 1. Resin capacity is controlled through the number of alternating coating cycles. The AS22 4 mm uses a high-capacity resin (210 $\mu\text{eq}/\text{column}$) with optimized selectivity for the common inorganic anions in a variety of sample matrices.

Isocratic Separation of Common Inorganic Anions

The AS22 provides excellent separation of fluoride, chloride, nitrite, bromide, nitrate, phosphate and sulfate using an isocratic carbonate/bicarbonate eluent and suppressed conductivity detection. Using a 4.5 mM carbonate/1.4 mM bicarbonate eluent, the common inorganic anions plus acetate can be resolved in approximately 12 min as shown in Figure 2.

Inorganic Anions in Drinking Water

The IonPac AS22 is ideal for compliance monitoring of drinking water and wastewater. The column meets or exceeds the performance requirements of U.S EPA Method 300.0 (A). Common inorganic anions are separated in approximately 12 min in drinking water as shown in Figure 3.

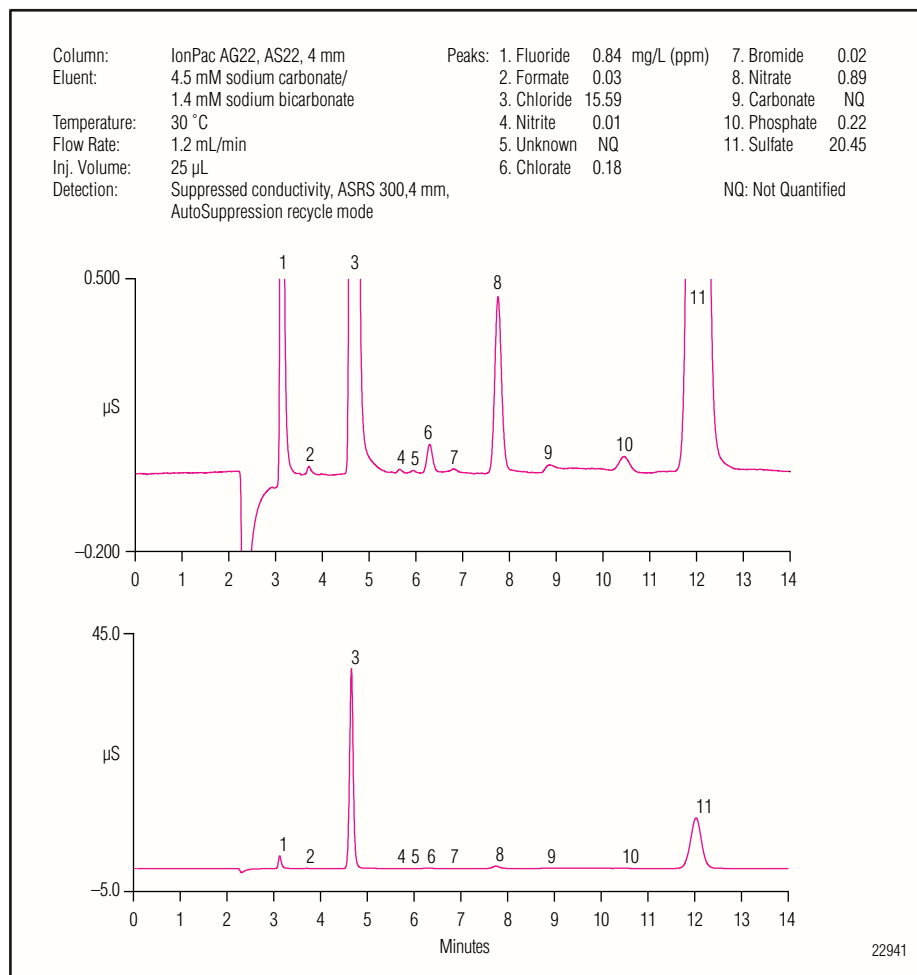


Figure 3. Determination of inorganic anions in a municipal drinking water sample on an IonPac AS22 column.

Fast IC

The IonPac AS22-Fast column is suitable for separations requiring higher flow rates for the fast analysis of inorganic anions in simple sample matrices as shown in Figure 4. The IonPac AS22-Fast column (4 × 150 mm) was operated with the same eluent at 1.2 and 2.0 mL/min. Using a higher flow rate in a shorter column format, the overall run time was reduced to 4.5 min with optimal resolution of the common inorganic anions.

The use of an AS22-Fast 2 × 150 mm column format allows greater linear velocities and reduced eluent consumption compared to a 4 mm format. Figure 5 shows the excellent resolution for the common inorganic anions in less than 4 min.

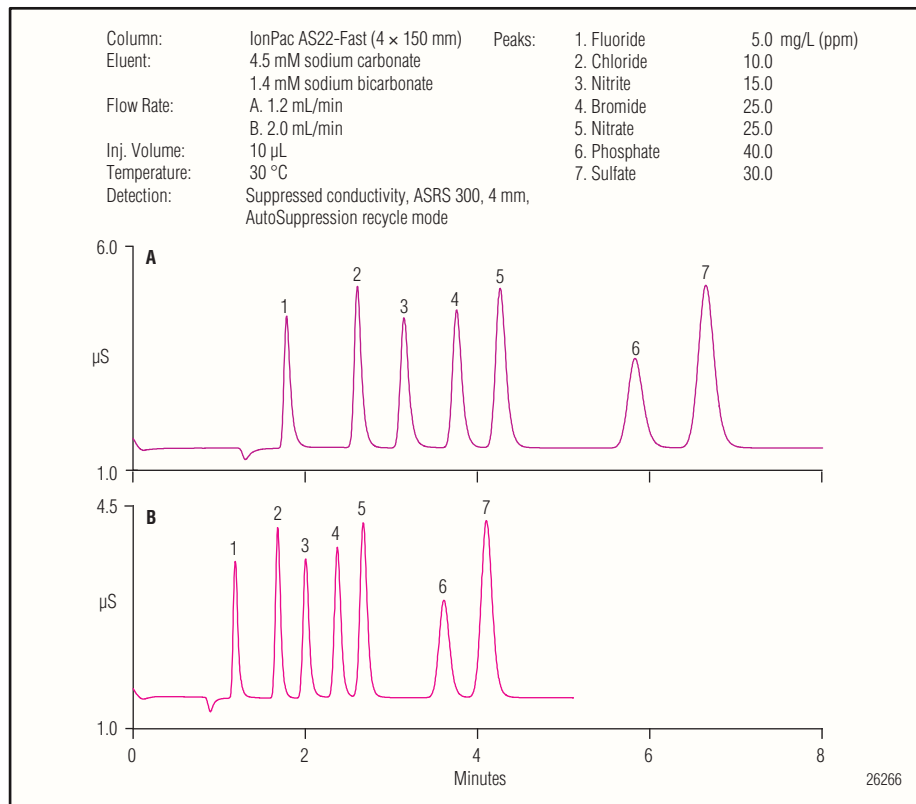


Figure 4. Separation of common inorganic anions using the IonPac AS22-Fast 4 × 150 mm column.

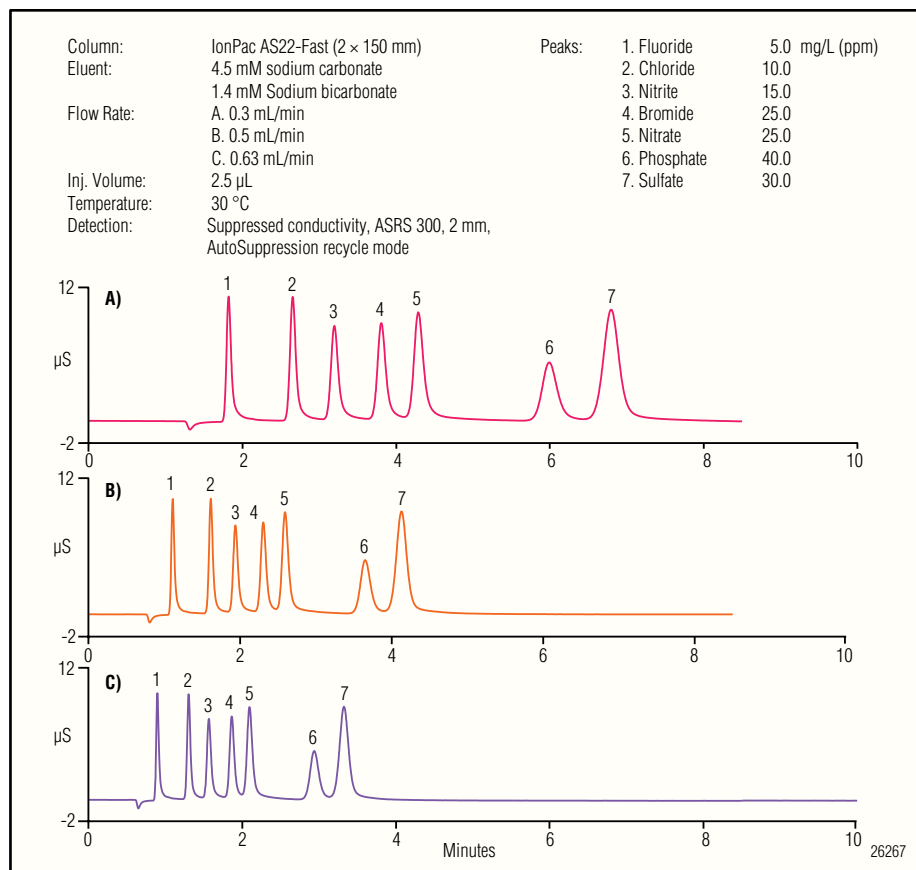


Figure 5. Separation of common inorganic anions using the IonPac AS22-Fast 2 × 150 mm column.

Figure 6 illustrates the analysis of a municipal drinking water sample using the AS22-Fast (4 × 150 mm). At 2.0 mL/min, the anions can be separated in less than 5 min. The bottom trace shows an enlarged image of the separation. The anions are well resolved even in the presence of disparate anion concentrations including fluoride/formate and chloride/nitrite.

Extended Application Capabilities

The unique selectivity and high capacity of the AS22 column makes it ideal for methods development of specialized anion applications. Figure 7 shows the separation of a variety of environmental anions including inorganic anions, oxyhalides, oxyanions, and organic acids using an isocratic carbonate/bicarbonate eluent. These 18 analytes are easily separated in less than 30 min.

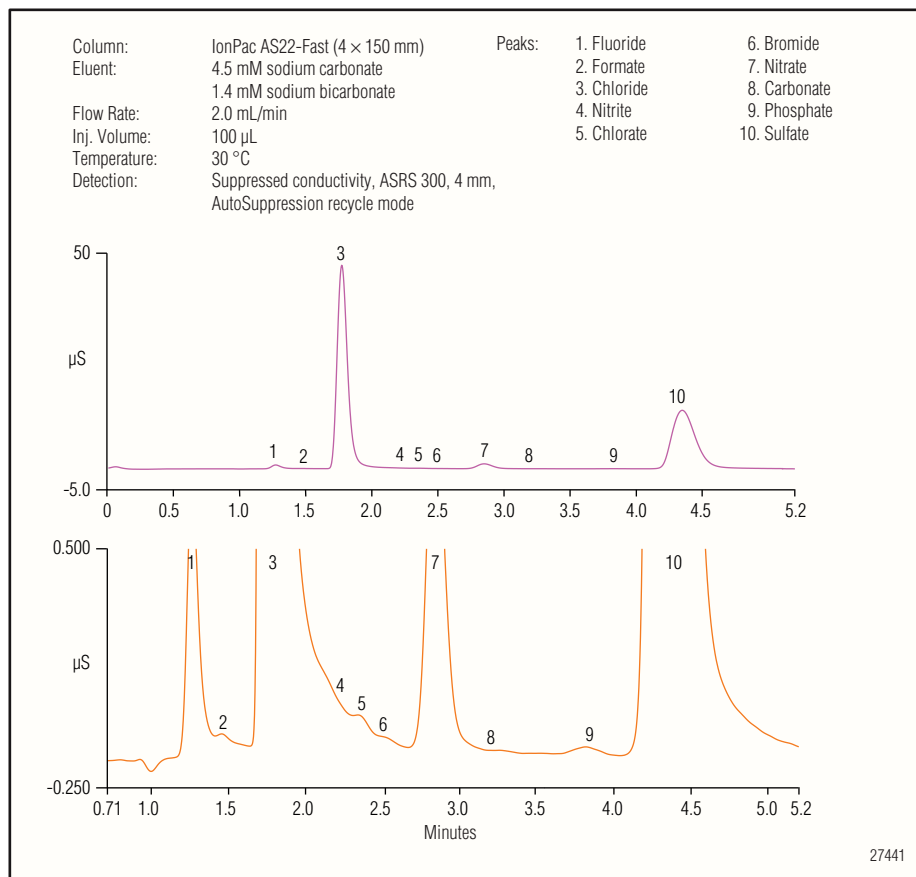


Figure 6. Analysis of a municipal drinking water sample using the IonPac AS22-Fast 4 × 150 mm column.

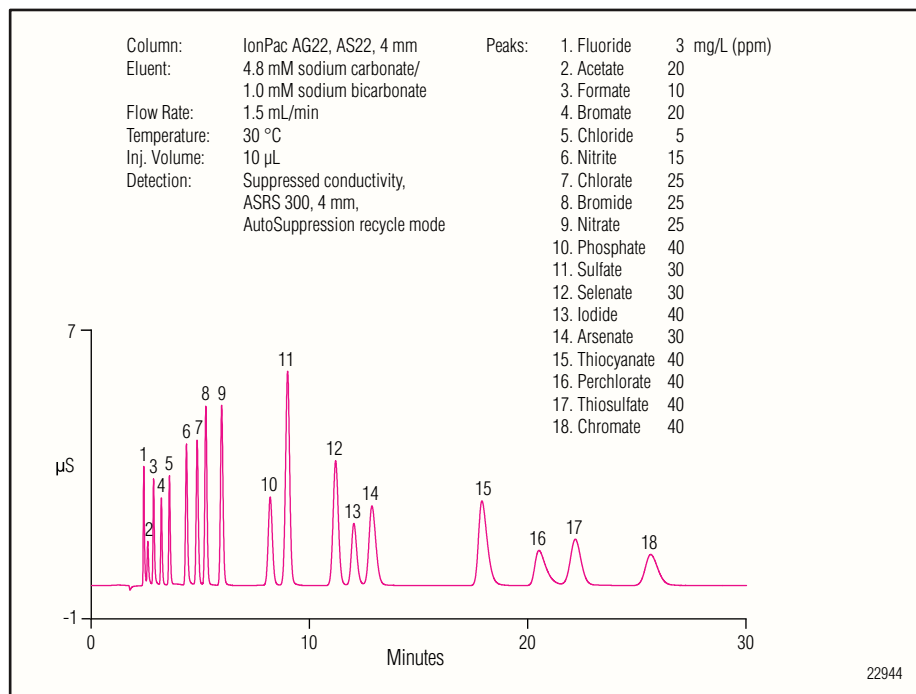


Figure 7. Anion separation including inorganic anions, organic acids, oxyanions, and oxyhalides on an IonPac AS22 column.

The IonPac AS22 column is also ideal for the determination of anions in food and beverage samples containing high concentrations of carbonate. Carbonated bottled water contains up to 500 mg/L (ppm) of carbonate. The unique selectivity of the AS22 column positions carbonate well away from the common inorganic anions and does not interfere with quantification of the analytes of interest. Figure 8 shows the determination of inorganic anions in carbonated water using the AS22 column.

The AS22 column can be used to evaluate the mass balance of drugs and synthetic peptide preparations. Figure 9 illustrates the use of the AS22 column to determine the anionic counterion amount and type. The common inorganic anions plus trifluoroacetate can be determined in less than 14 min.

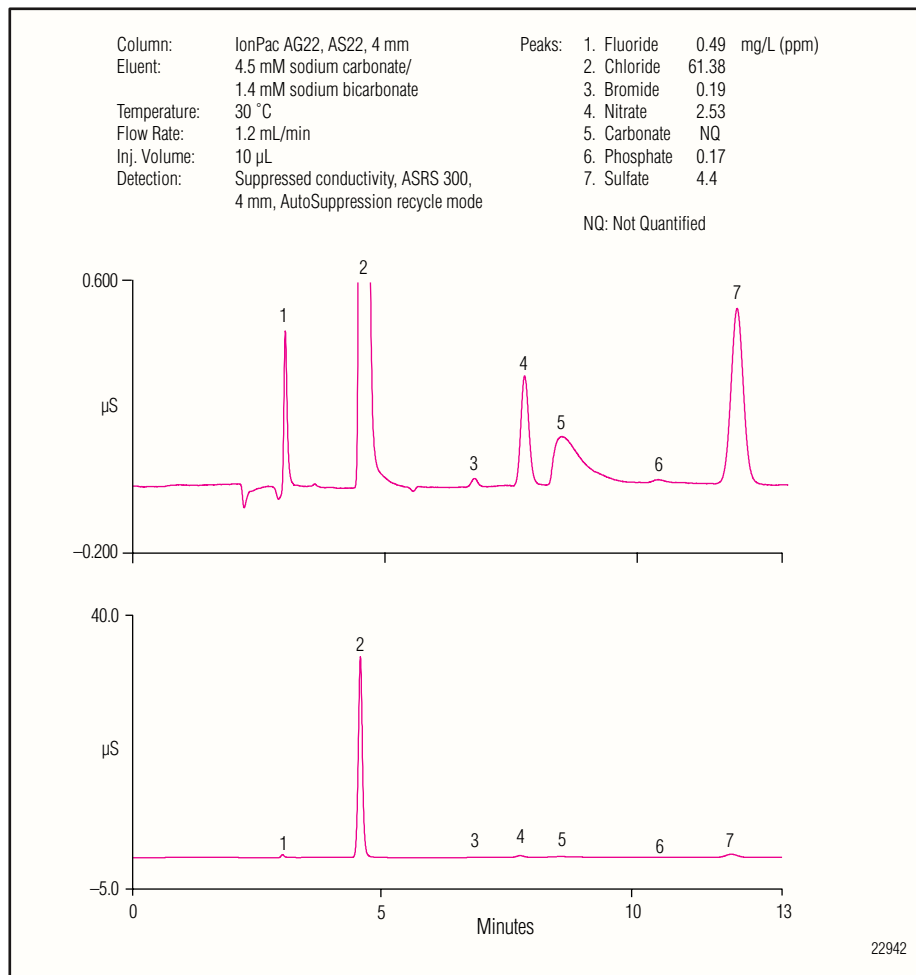


Figure 8. Determination of inorganic anions in carbonated water on an IonPac AS22 column.

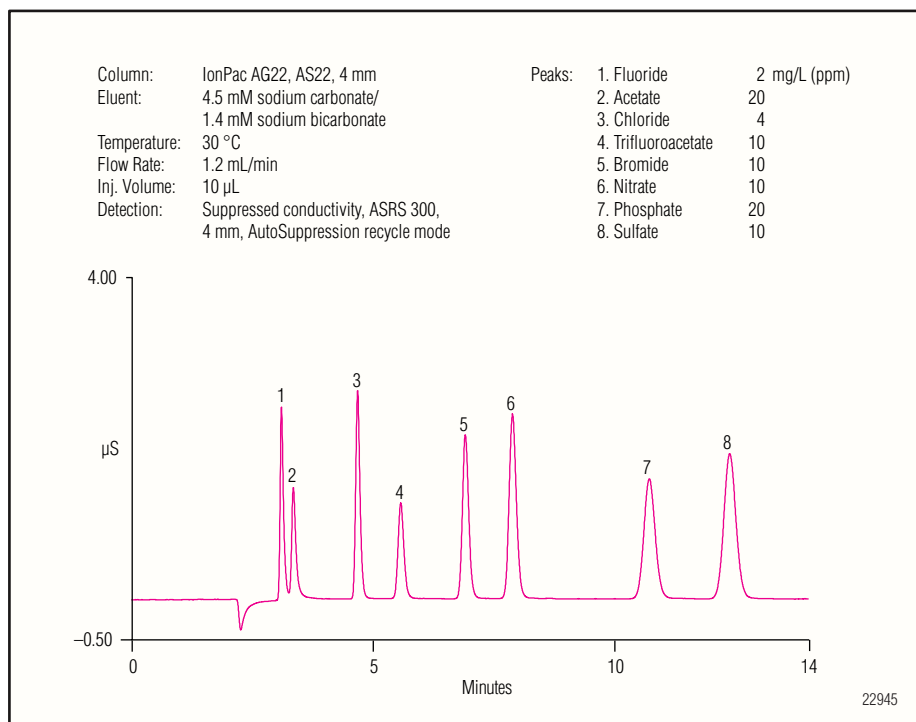


Figure 9. Analysis of the common inorganic anions and TFA using the IonPac AS22 column.

SPECIFICATIONS

Dimensions:

IonPac AS22 Analytical Column:
2 × 250 mm, 4 × 250 mm
IonPac AS22-Fast Analytical Column:
2 × 150 mm, 4 × 150 mm
IonPac AG22 Guard Column:
2 × 50 mm, 4 × 50 mm
IonPac AG22-Fast Guard Column:
2 × 30 mm, 4 × 30 mm

Maximum Operating Pressure:

3000 psi

Mobile Phase Compatibility:

pH 0–14; 0–100% HPLC solvents

Substrate Characteristics:

Analytical Column:
Supermacroporous resin
Bead Diameter (μm): 6.5 μm
Pore Size: 2000 Å
Crosslinking (%DVB): 55%
Guard Column:
Microporous resin
Bead Diameter (μm): 11 μm
Pore Size: <1 Å
Crosslinking (%DVB): 55%

Ion-Exchange Group:

Functional Group: Alkanol
quaternary ammonium ion

Functional Group Characteristics:

Hydrophobicity: Ultralow hydrophobic

Capacity:

52.5 μeq (2 × 250 mm column)
1.5 μeq (2 × 50 mm column)
210 μeq (4 × 250 mm column)
6 μeq (4 × 50 mm column)
126 μeq (4 × 150 mm column)
4.0 μeq (4 × 30 mm column)
31.5 μeq (2 × 150 mm column)
1.0 μeq (2 × 30 mm column)

Column Construction:

PEEK™ with 10–32 threaded
ferrule style end fittings.
All components are nonmetallic.

ORDERING INFORMATION

System Requirements for EGC-K₂CO₃/KHCO₃ Eluent Generation

For K₂CO₃/KHCO₃ eluents generated using the EGC-K₂CO₃ cartridge and the EPM, use with ICS-2100 or ICS-5000 IC systems equipped with an Eluent Generator. The Eluent Generator and EPM are used to automatically produce potassium carbonate/bicarbonate eluents from deionized water. The EGC-K₂CO₃ cartridge can only be controlled using Chromeleon® 6.6 and subsequent Chromeleon releases.

Suppressor Recommendations

For optimum ease-of-use and economy, the IonPac AS22 column should be used with the ASRS Anion Self-Regenerating Suppressor, ASRS 300 or the Anion Atlas® Electrolytic Suppressor, AAES. It is recommended to operate the IonPac AS22 column at an elevated temperature (30 °C) to ensure reproducible retention times.

Concentrator Columns

For concentrator work, use the IonPac AG22 guard column, UTAC-LP1, UTAC-ULP1, UTAC-XLP1, UTAC-LP2, UTAC-ULP2, or UTAC-XLP2, Ultra Trace Anion Concentrator Columns, TAC-LP1 or TAC-ULP1 Trace Anion Concentrator Column, TAC-2 Trace Anion Concentrator Column, or AMC-1 Anion Microconcentrator when a single-piston pump such as the AXP-1 pump (pulse damper required) is used for sample delivery. Use the UTAC-LP1, UTAC-LP2, Ultra Trace Anion Concentrator Column or TAC-LP1 Trace Anion Concentrator Column when the sample is delivered with a syringe or with a low-pressure autosampler such as the AS-DV.

Product Description	Part Number
IonPac AS22 Analytical Column..... (4 × 250 mm)	064141
IonPac AG22 Guard Column..... (4 × 50 mm)	064139
IonPac AS22 Analytical Column..... (2 × 250 mm)	064137
IonPac AG22 Guard Column..... (2 × 50 mm)	064135
IonPac AS22-Fast Analytical Column..... (4 × 150 mm)	079936
IonPac AG22-Fast Guard Column..... (4 × 30 mm)	072784
IonPac AS22-Fast Analytical Column..... (2 × 150 mm)	079937
IonPac AG22-Fast Guard Column..... (2 × 30 mm)	072785
AMC-1 Anion MicroConcentrator..... (2 × 15 mm)	051760
TAC-2 Trace Anion Concentrator..... (3 × 35 mm)	043101
TAC-LP1 Low Pressure Trace Anion Concentrator..... (4 × 35 mm)	046026
TAC-ULP1 Ultra Low Pressure Trace Anion Concentrator..... (5 × 23 mm)	061400
UTAC-LP1 Ultra Trace Anion Concentrator–Low Pressure..... (4 × 35 mm)	063079
UTAC-ULP1 Ultra Trace Anion Concentrator–Ultra Low Pressure..... (5 × 23 mm)	063475
UTAC-XLP1 Ultra Trace Anion Concentrator–Extremely Low Pressure..... (6 × 16 mm)	063459
UTAC-LP2 Ultra Trace Anion Concentrator- Low Pressure..... (4 × 35 mm)	079917
UTAC-ULP2 Ultra Trace Anion Concentrator- Ultra Low Pressure..... (5 × 23 mm)	079918
UTAC-XLP2 Ultra Trace Anion Concentrator- Extremely Low Pressure..... (6 × 16 mm)	072781
AS22 Sodium Carbonate/Bicarbonate Eluent Concentrate..... (250 mL of 100X concentrate)	063965

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