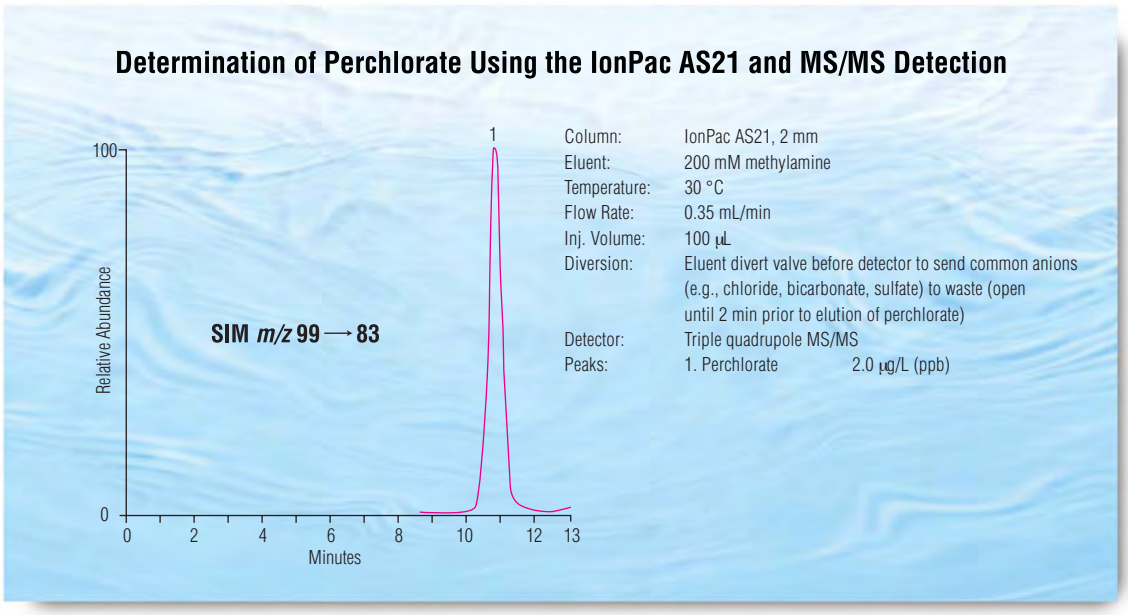
columns

IonPac® AS21 Anion-Exchange Column



The IonPac AS21 hydroxide-selective, anion-exchange column is designed for the fast separation of perchlorate in drinking water, groundwater, and other matrices prior to detection with MS or MS/MS. The AS21 2 × 250 mm column format was specifically developed for LC-MS or LC-MS/MS compatibility to allow use of volatile mobile phases such as methylamine. Also, the AS21 can be used with Reagent-Free™ Ion Chromatography (RFIC™) eluents in combination with suppressed conductivity detection prior to MS detection. The IonPac AS21 is the specified column in U.S. EPA Method 331.0. The AS21 is ideal for the separation of a variety of environmental anions including arsenate, tungstate, chromate, iodide, and perchlorate.

Superior Chromatographic Performance

- Recommended anion-exchange column for fast separation of perchlorate prior to MS or MS/MS detection
- Optimized for methylamine or hydroxide mobile phases
- Specified column for U.S. EPA Method 331.0
- Optimum capacity: 45 µeq per column (2 × 250 mm column)
- Operate at ambient or elevated temperatures; column selectivity optimized for a 30 °C operating temperature to ensure reproducible retention times
- Compatible with HPLC organic solvents that optimize the performance of the electrospray interface (ESI) to an MS or MS/MS detector, modify column selectivity, or that allow effective column cleanup

Now sold under the Thermo Scientific brand

Thermo SCIENTIFIC

DIONEX

IC | MS | HPLC | EXTRACTION | PROCESS | AUTOMATION

High-Efficiency Particle Structure

Dionex has developed the IonPac AS21 column using a new 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 other Dionex latex-coated, anion-exchange packing materials. However, in this anion-exchange resin, alternating treatments of epoxy monomer and amines produce a coating that grows directly off the surface of the substrate. Figure 1 illustrates a model of the resin structure. The resin capacity is controlled through the number of alternating coating cycles. The resulting polymer is extremely hydrophilic and therefore has excellent selectivity for both methylamine and hydroxide eluents, allowing the use of lower eluent concentrations. The IonPac AS21 column capacity (45 µeq/column) and selectivity were optimized to determine trace perchlorate in drinking water matrices.

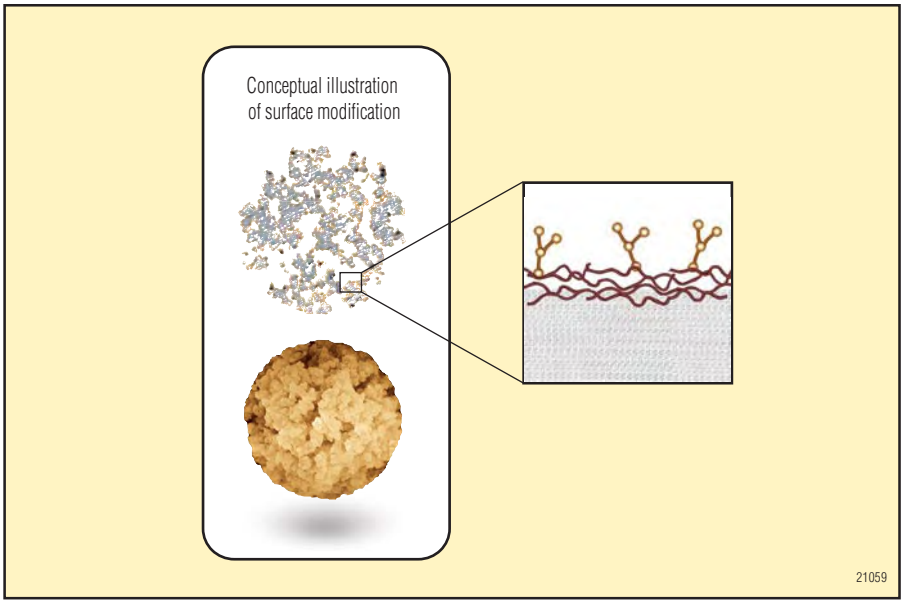


Figure 1. Structure of an IonPac AS21 packing particle.

Determination of Trace Perchlorate in Drinking Water Using LC-MS/MS

Perchlorate (originally as ammonium perchlorate), which is widely used in the manufacture of rocket propellants, has been found in drinking waters in areas where aerospace materials and munitions have been manufactured and tested. Perchlorate is a potential health concern because it interferes with the production of thyroid hormones. The IonPac AS21 column was designed for the fast analysis of low-level perchlorate prior to MS or MS/MS detection. The IonPac AS21 is the specified column in U.S. EPA Method 331.0 for the determination of trace perchlorate using LC-MS or LC-MS/MS. Figure 2 shows the determination of trace perchlorate in a

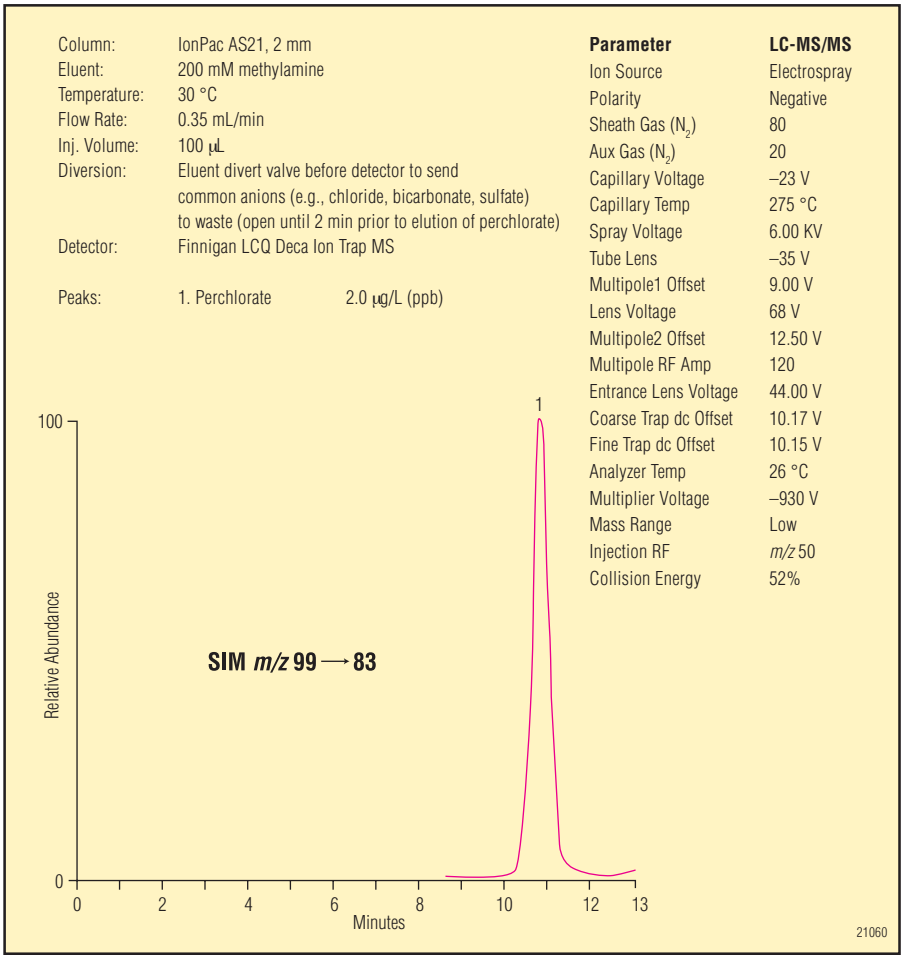


Figure 2. Determination of perchlorate using the IonPac AS21 and MS/MS detection.

drinking water sample using a 200 mM methylamine mobile phase. Sub-µg/L (ppb) concentrations of perchlorate are easily detected using MS/MS detection. Minimum reliable quantification levels of perchlorate using the AS21 and LC-MS/MS are typically less than 50 ng/L (ppt).

Determination of Trace Perchlorate Using IC-MS

The IonPac AS21 can also be used for the determination of trace perchlorate using IC-MS and IC-MS/MS with a potassium hydroxide mobile phase. This method combines RFIC with matrix diversion of common salts prior to MS detection. This method is very sensitive and selective when used for the determination of perchlorate isotopes (mass 99 and mass 101) as shown in Figure 3. Minimum reliable quantification limits for perchlorate using the AS21 in an IC separation mode with either MS or MS/MS detection are typically 50 ng/L (ppt) or less.

Determination of Environmental Anions Using Suppressed Conductivity Detection

The AS21 column can be used with suppressed conductivity detection for the determination of environmental anions, including the common inorganic anions plus arsenate, tungstate, chromate, and perchlorate. Using an isocratic potassium hydroxide eluent generated by the eluent generator, these analytes can be separated in approximately 16 min, as shown in Figure 4.

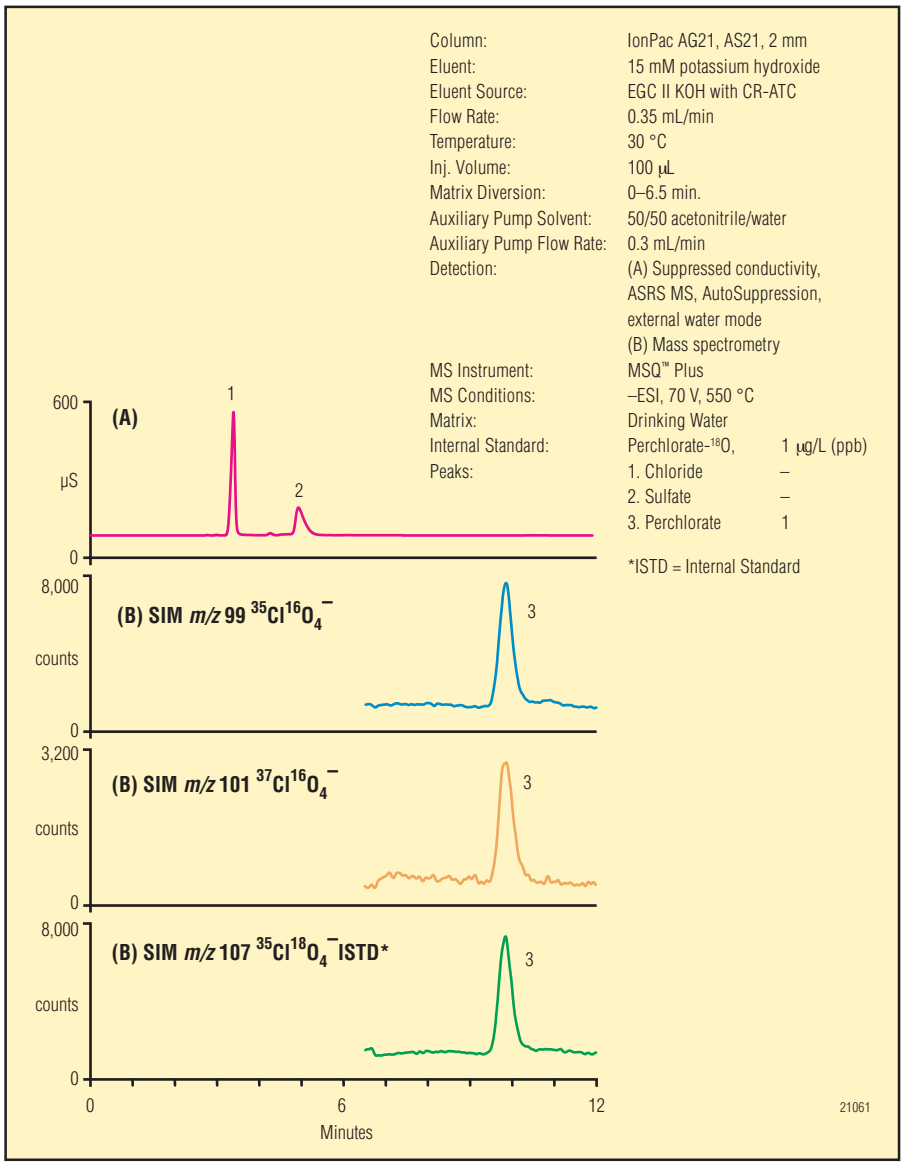


Figure 3. IC/MS determination of perchlorate in drinking water using the IonPac AS21 column.

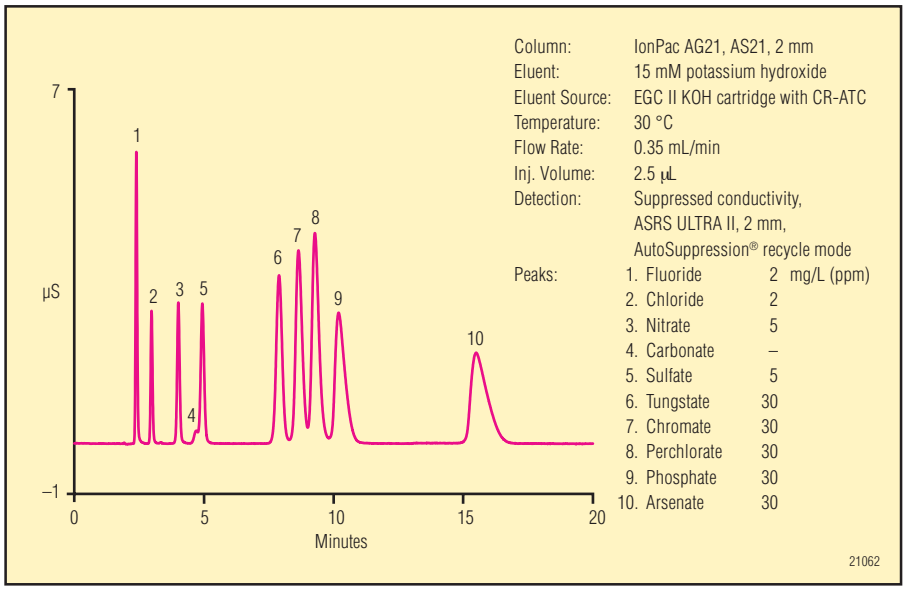


Figure 4. Analysis of environmental anions using the IonPac AS21 column.

SPECIFICATIONS

Dimensions:
IonPac AS21 Analytical Column:
2 × 250 mm

IonPac AG21 Guard Column:
2 × 50 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): 7
Pore Size: 2000 Å
Cross-Linking (%DVB): 55%
Guard Column:
Microporous resin
Bead Diameter (µm): 11
Pore Size: <1 Å
Cross-Linking (%DVB): 55%

Ion-Exchange Group:
Functional Group: Alkanol quaternary ammonium ion

Functional Group Characteristics:
Hydrophobicity: Ultralow

Capacity:
45 µeq (2 × 250 mm column)
1.5 µeq (2 × 50 mm column)

Column Construction:
PEEK with 10-32 threaded ferrule-style end fittings. All components are nonmetallic.

ORDERING INFORMATION

To order in the U.S., call 1-800-346-6390, or contact the Dionex Regional Office nearest you. Outside the U.S., order through your local Dionex office or distributor. Refer to the following part numbers.

Analytical and Guard Columns

IonPac AS21 Analytical Column (2 × 250 mm) ..... P/N 063009
IonPac AG21 Guard Column (2 × 50 mm) ..... P/N 063071

DIONEX

www.dionex.com ON THE WEB

D-store

Printed on recycled and recyclable paper.

Dionex Corporation
1228 Titan Way
P.O. Box 3603
Sunnyvale, CA
94088-3603
(408) 737-0700

Dionex Corporation
Salt Lake City Technical Center
1515 West 2200 South, Suite A
Salt Lake City, UT
84119-1484
(801) 972-9292

Dionex U.S. Regional Offices
Sunnyvale, CA (408) 737-8522
Westmont, IL (630) 789-3660
Houston, TX (281) 847-5652
Atlanta, GA (770) 432-8100
Marlton, NJ (856) 596-06009

Dionex International Subsidiaries
Australia 61 (2) 9420 5233 *Austria* (01) 616 51 25 *Belgium* (03) 3-353 42 94 *Canada* (905) 844-9650 *China* (852) 2428 3282
Denmark 36 36 90 90 *France* 01 39 30 01 10 *Germany* 06126-991-0 *Italy* (06) 66 51 50 52 *Japan* (06) 6885-1213 *Korea* 82 2 2653 2580
The Netherlands (0161) 43 43 03 *Switzerland* (062) 205 99 66 *United Kingdom* (01276) 691722
* Designed, developed, and manufactured under an NSAI registered ISO 9001 Quality System.

ISO 9001 REGISTERED*

LPN 1674 7M 1/05