accessories

PC10 Postcolumn Delivery System

The PC10 Postcolumn Delivery System is a simple pneumatic reagent delivery system that ensures a constant pulseless flow of reagent. Postcolumn reagent chemistries often can be used to extend the detection limits of various ions that would exhibit limited sensitivity by molecules that require postcolumn derivatization for sensitive detection. The PC10 system assures optimal flow by applying constant pressure, eliminating the need for a pump and its associated moving parts, labor, and expense.

Superior Design

- Simple and compact system for adding postcolumn reagent.
- Specifically designed to fit neatly into the ICS-3000 stacking pattern.
- Lined reagent chamber in the Postcolumn Reagent Organizer contains spills and leaks.
- Chemically inert for maximum sensitivity.
- Eliminates contamination problems associated with metallic hardware.

Optimal Delivery

- Provides pulseless reagent delivery, which is essential for high sensitivity determinations.
- Programmable on/off flow control using Chromeleon® software.
- Major applications include determination of transition metals, silica, amino acids, carbohydrates, and sequestering agents.
- Complete mixing of reagent/eluent with the mixing tee and knitted reaction coil.

DIONEX

PC10 Automation Kit (optional)

- Automates on/off flow control.
- Includes a pneumatically controlled, two-way valve that is activated by the pump.
- Easily programmed with Chromeleon software.

Components of the PC10 Postcolumn Delivery System

- Pressurizable chamber
- Reagent container
- Postcolumn pneumatic controller
- Knitted reaction coil (375 µL)
- Mixing tee
- Postcolumn reagent organizer

Applications

- Analysis of silica
- Determination of chelating agents
- Transition metals and lanthanide
- Aluminum
- Hexvalent chromium
- Polyphosphonate scale inhibitors

Analysis of Silica

Ultrapure water can be monitored for silica in the form of silicate as a high-level contaminant or as low-level early breakthrough product of a water purification system. In Figure 3, silica is monitored at very low concentrations as a breakthrough product.

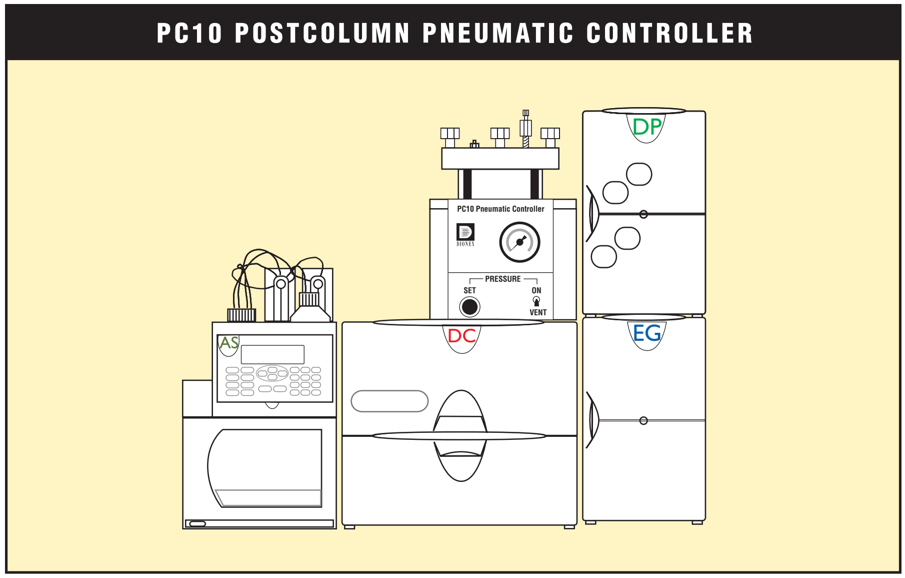

Figure 1. *The PC10 postcolumn pneumatic controller with the ICS-3000 system.*

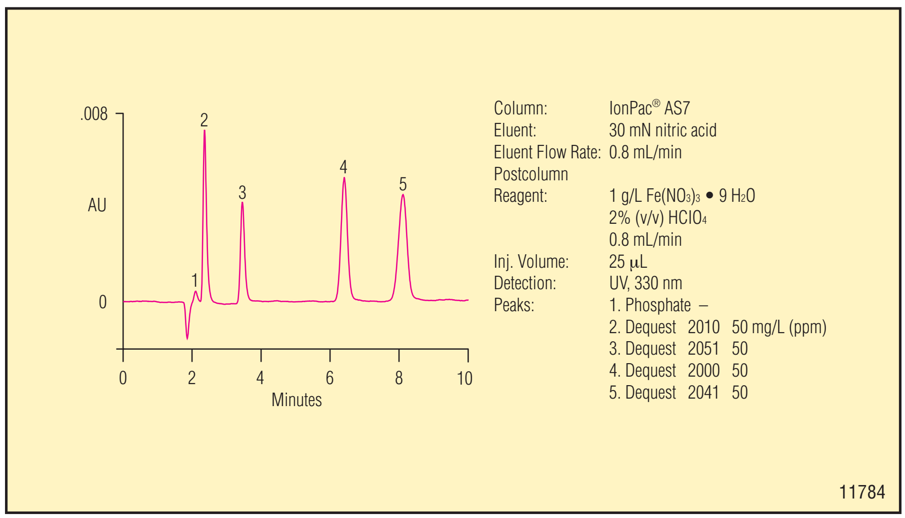

Figure 2. *Determination of silica.*

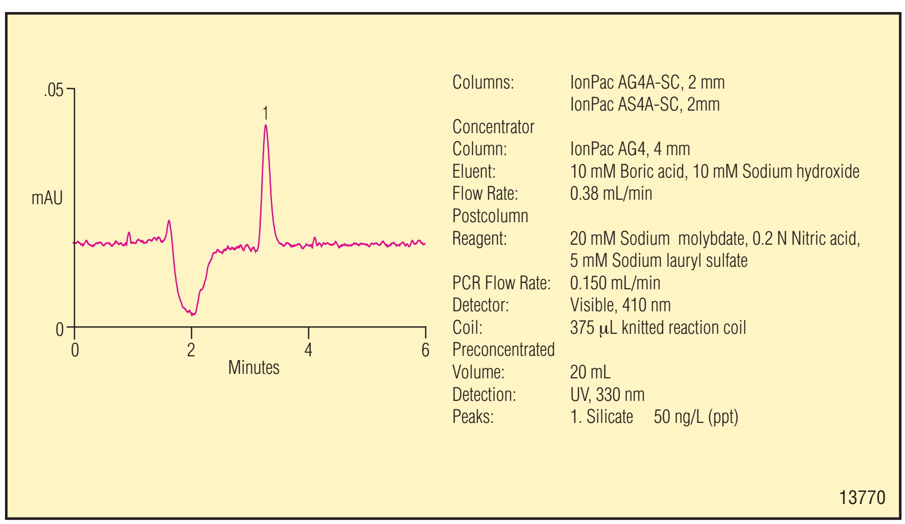

Figure 3. *Determination of silicate.*

Determination of Highly Charged Anions

The determination of highly charged anions such as ethylenediaminotetraacetic acid (EDTA), nitrilotriacetic acid (NTA), polyphosphates, and polyphosphonates is possible with the postcolumn addition of ferric nitrate and UV detection. This method can be used to determine polyphosphates in a variety of matrices, including pharmaceutical and detergent samples, waste waters, boiler waters, cooling waters, cleansers, and fertilizers.

Figure 4 illustrates the determination of chelating agents with the postcolumn addition of ferric nitrate and UV detection at 330 nm.

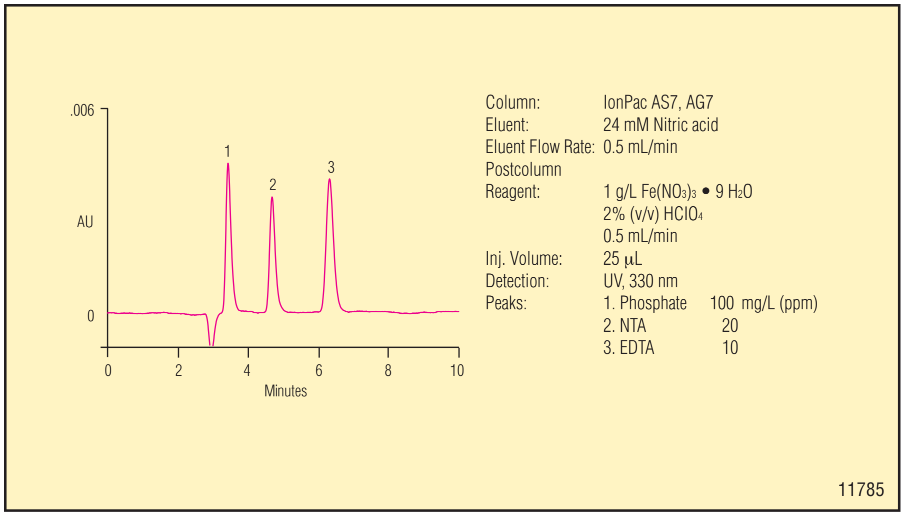

***Figure 4**. Determination of chelating agents with postcolumn addition of ferric nitrate coupled with UV detection.*

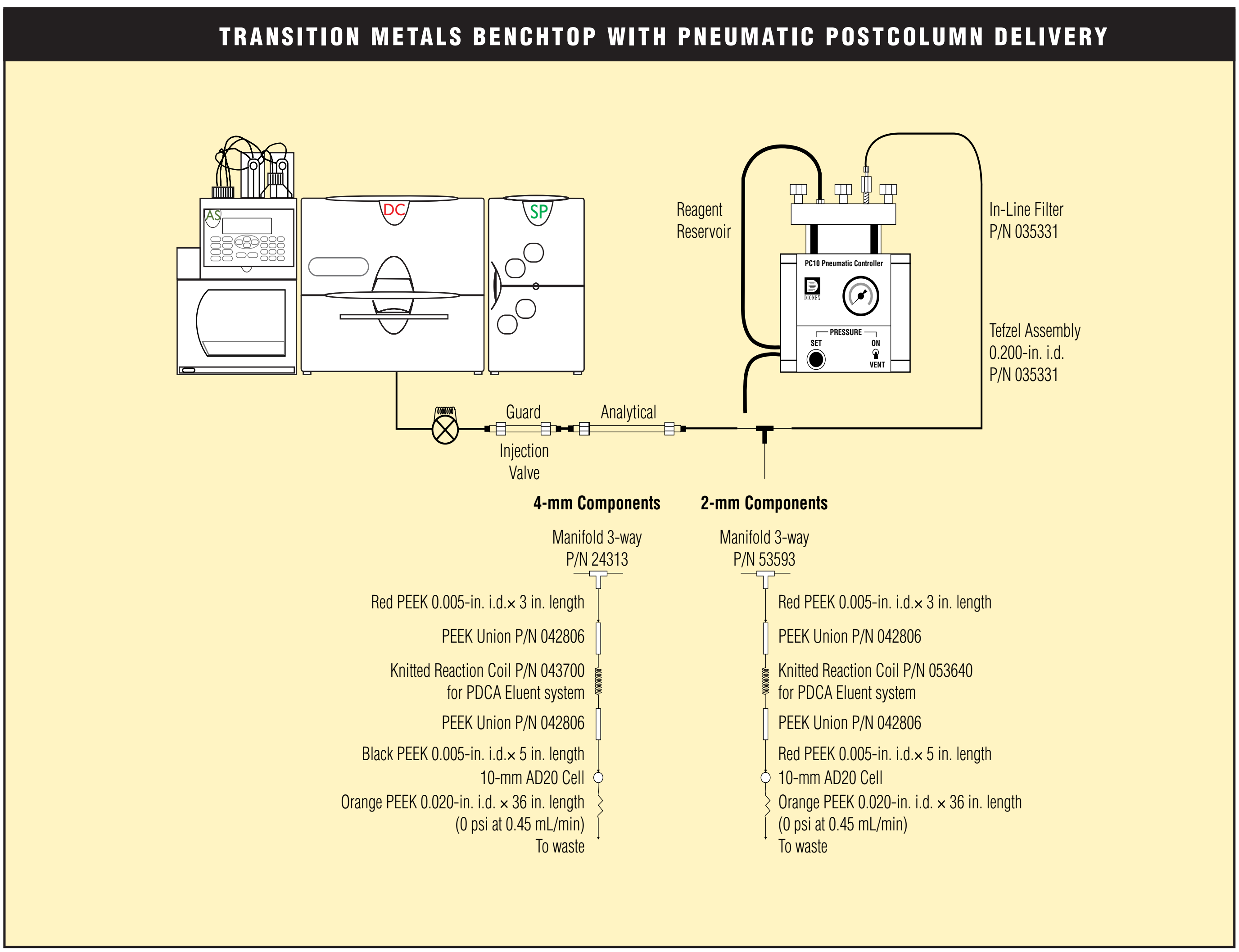

***Figure 5**. Transition metals benchtop system with pneumatic postcolumn delivery.*

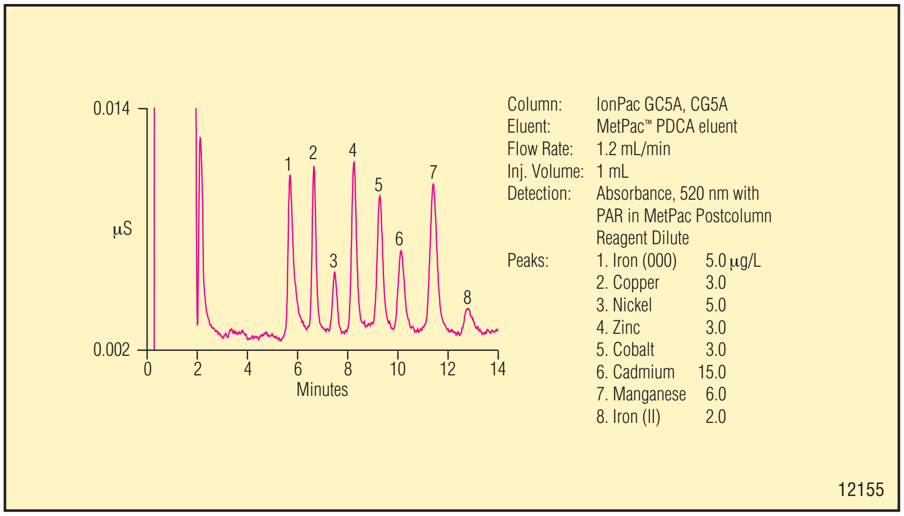

Figure 6. *Determination of trace transmission metals by direct injection.*

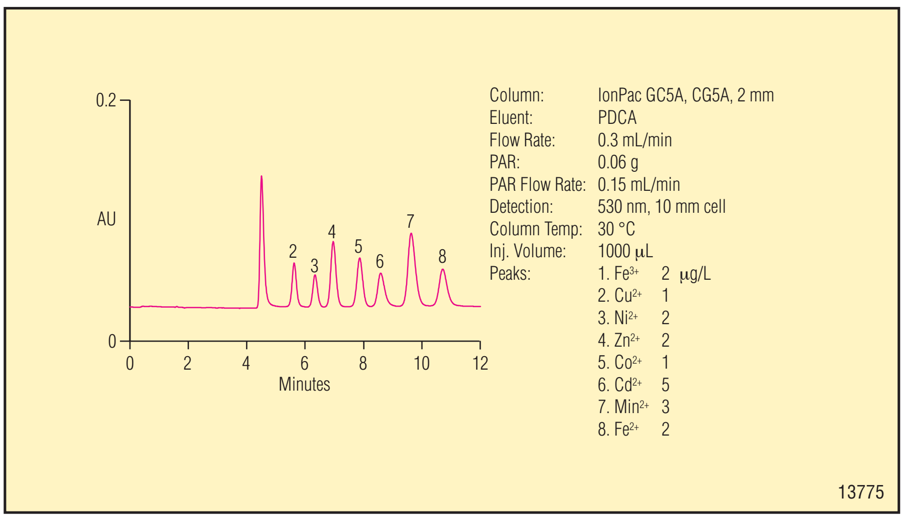

Figure 7. *Large sample loop injection of µg/L levels of transition metals using a 2-mm system with pneumatic postcolumn delivery.*

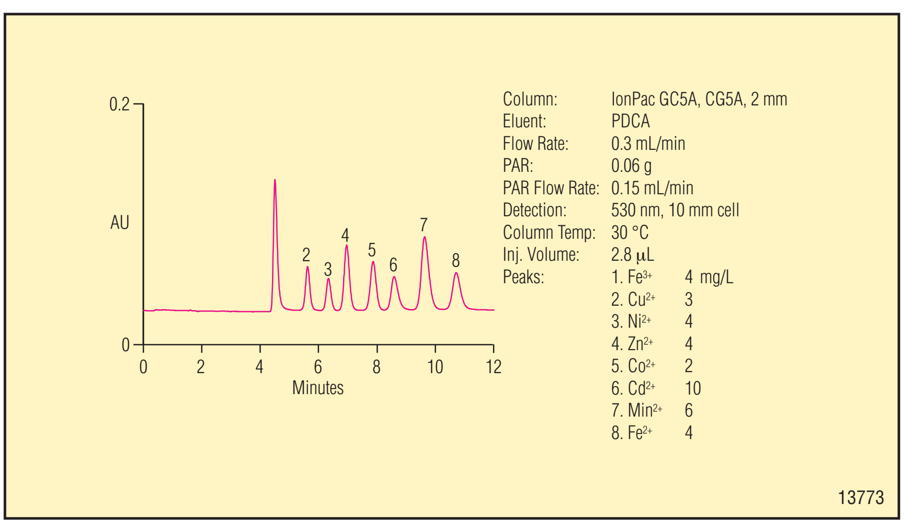

Figure 8. *Determination of mg/L levels of transition metals with a 2-mm system with pneumatic postcolumn delivery.*

Transition Metals and Lanthanide

After separation, a colorimetric indicator, 4-(2-pyridylazo)resorcinol (PAR), is added to the eluent stream with the PC10 (Figure 10). PAR forms a highly colored complex with the transition elements, which can be monitored with an absorbance detector. The advantages of using ion chromatography vs. atomic spectroscopy include the ability to speciate individual oxidation states of certain metals and perform on-line analysis and multi-element determinations at µg/L concentrations.

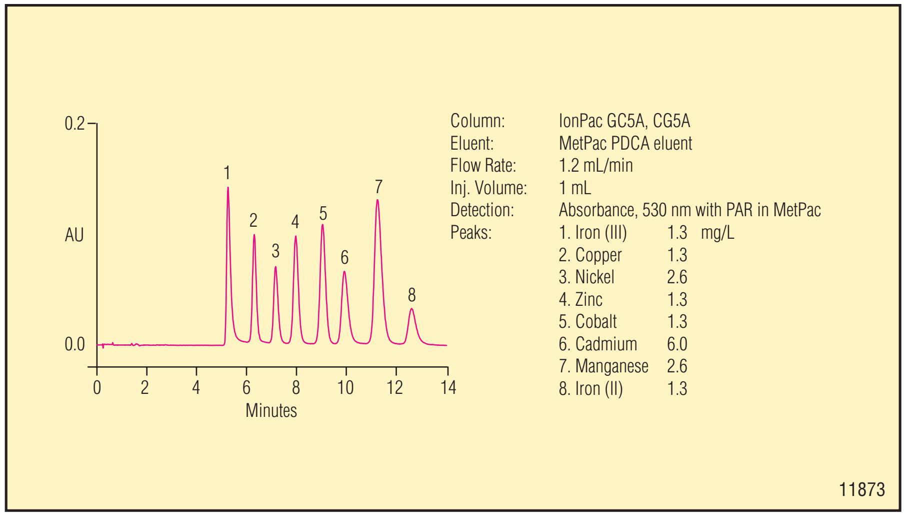

Figure 9. *Separation of transition metals by anion exchange using the MetPac PDCA Eluent Concentrate. The postcolumn reagent, 4-(2-pyridylazo)resorcinol, is delivered using the PC10 Postcolumn Delivery System.*

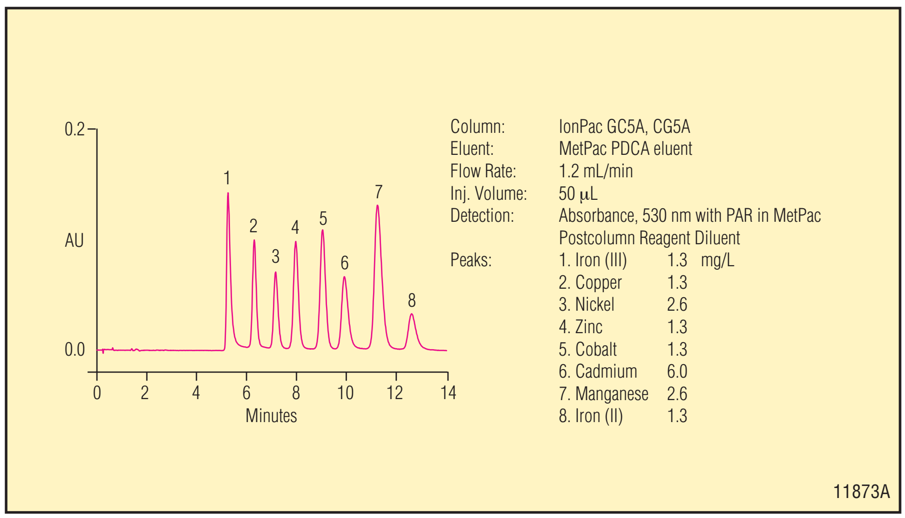

Figure 10. *Determination of transition metals by anion-exchange chromatography with the PC10 postcolumn delivery system.*

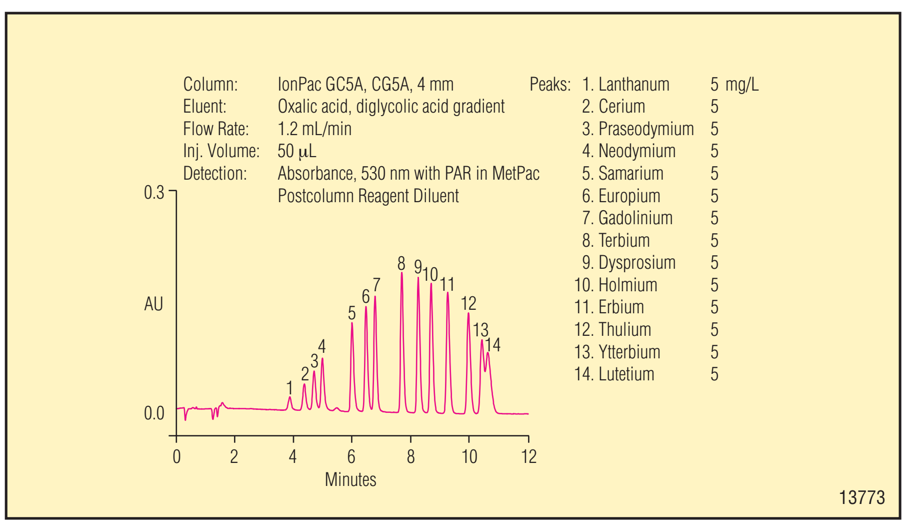

Figure 11. *Separation of lantahanide metals using oxalic acid/diglycolic acid as the complexing agent.*

Polyphosphonate Scale Inhibitors

Oilfield waters can be treated with chemicals to inhibit the formation of scale. Treatments include polyphosphates, polyacrylates, and polyphosphonates. Figure 12 demonstrates a method for the determination of several polyphosphonate scale inhibitors. The phosphonates are separated by anion exchange, and ferric nitrate is added postcolumn. The complexes formed between the phosphonates and ferric ion are detected by UV absorbance at 330 nm.

Separation of Hexavalent Chromium

Hexavalent chromium, a known carcinogen, is determined by anion-exchange separation followed by postcolumn reaction and visible detection. Hexavalent chromium can be monitored in various environmental matrices, including wastewater, drinking water, ambient air, hazardous waste dump site soils, and leachates.

Figure 13 shows the separation of hexavalent chromium using the AS7 column with the postcolumn addition of diphenylcarbazide (DPC) and detection at 530 nm. This method is very selective and sensitive for hexavalent chromium.

Determination of Aluminum

The determination of trace metals in complex matrices has traditionally been a difficult analytical challenge. High levels of interfacing species combined with the nonspecificity of concentration and detection schemes have led to severe compromises in the detection limits for many elements. As shown in Figure 14, chelation ion chromatography using the PC10 has been used successfully for the analytical determination of aluminum in complex matrices.

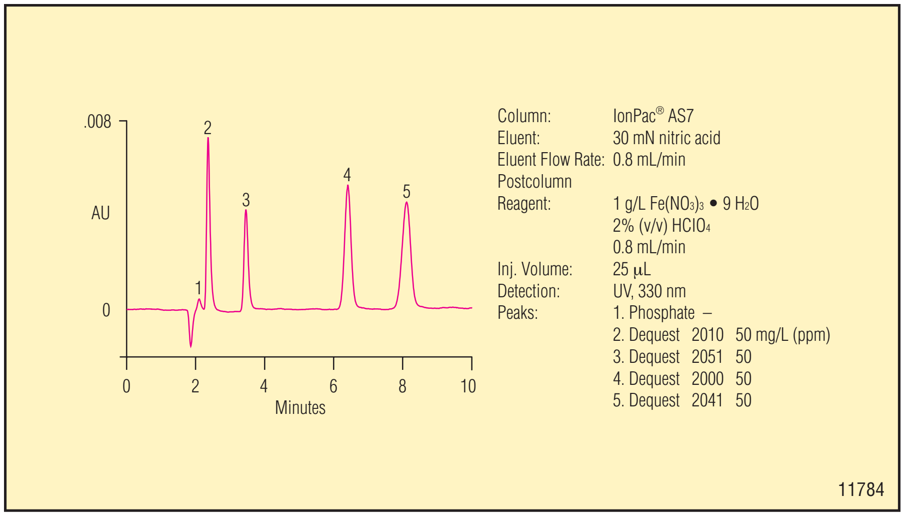

Figure 12. *Determination of polyphosphonate scale inhibitors.*

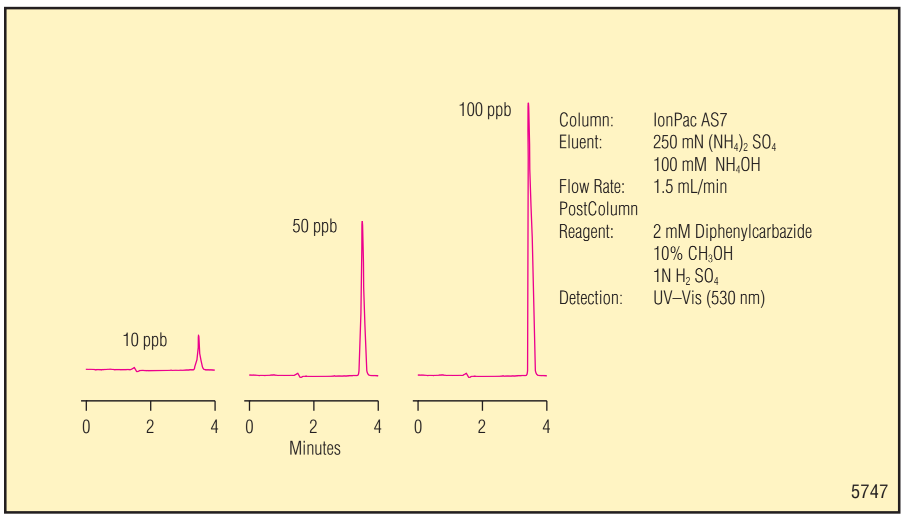

Figure 13. *Separation of hexavalent chromium with postcolumn addition of diphenylcarbazide (made possible by the PC10) coupled with visible detection.*

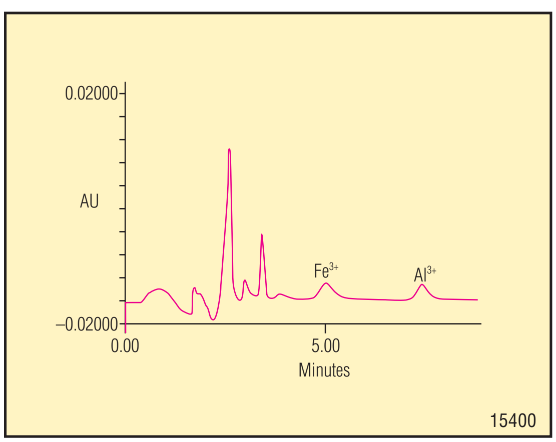

Figure 14. *Analysis of river water SLRS-1 (Canadian Standard Reference Material) 12 mL concentrated.*

Selective preconcentration of aluminum takes place on an iminodiacetate chelating resin (MetPac CC-1). At ph 5.5, this resin has high selectivity for aluminum relative to alkali and alkaline-earth metals. While alkaline-earth metals are concentrated, they are subsequently eluted to waste using 2.0 M ammonium acetate. Following the concentration of aluminum and selective elution of alkaline-earth metals, the MetPac CC-1 chelating column is switched in line with the analytical eluent (0.75 M HCI). At the very low pH of the analytical eluent, aluminum is eluted from the MetPac CC-1 and separated from other transition metals on an IonPac CS5 column.

SPECIFICATIONS

Reservoir Operating Pressure:
689 kPa (100 psi), maximum on/vent toggle valve

Reservoir Volumn:
1 L

Dimensions:
17 cm × 22.5 cm × 21 cm

Air Requirements:
689 kPa (100 psi) air supply; helium preferred when using oxidizable reagents

ORDERING INFORMATION

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:

Product Description	Part Number
PC10 Postcolumn Delivery Package	P/N 050601
PC10 Postcolumn Delivery Package, 2 mm	P/N 053591
PC10 Pneumatic Controller	P/N 043903
Pressurizable Chamber	P/N 037460
PC10 Reagent Organizer	P/N 050602
PC10 Automation Kit (ICS-2500 and older)*	P/N 050603
PC10 Automation Kit (ICS-3000)	P/N 063543

**Automated on/off valve permits TTL control of postcolumn reagent flow.*

Postcolumn Reaction Components

4-mm	
Knitted reaction coil, 374 µL, unpotted	P/N 043700
Manifold, three way	P/N 024313
2-mm	
Knitted reaction coil, 125 µL, unpotted	P/N 053640
Manifold, 3-way	P/N 053593

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* Designed, developed, and manufactured under an NSAI registered ISO 9001 Quality System.

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