Elemental Scientific

seaFAST Litre

High-volume Automated Seawater Analysis

sea*FAST* Litre

High-Volume, Ultrapure Preconcentration

The sea*FAST* Litre high-volume automated preconcentration system is designed to preconcentrate large volumes of seawater for ultratrace determination of elemental concentrations and isotope ratios. Bottles with high-volume samples up to 2 L each may be connected directly to the ultrapure valve system for contamination-free preconcentration and matrix removal. Smaller samples, standards, or blanks for routine analysis may be placed on the autosampler for direct sampling and preconcentration.

Automatic preconcentration and matrix removal enhances accuracy and precision, eliminates manual sample handling and the resulting contamination, and dramatically improves detection limits compared to direct analysis or manual sample preconcentration.

sea*FAST* Litre System

sea*FAST* Litre

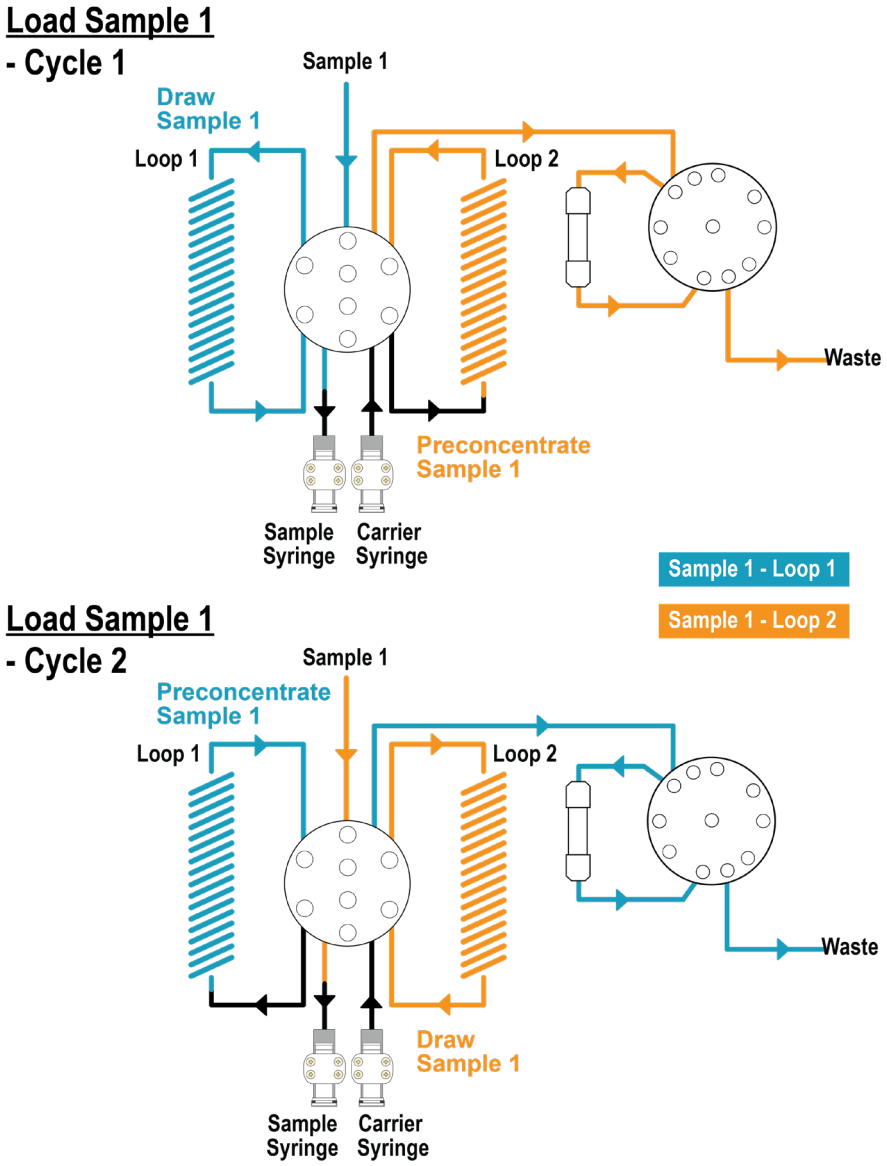
- New high-flow chelation column allows higher sample throughput
- Sample volumes from 10 mL to >1 L may be preconcentrated
- Automated preconcentration factors >1000 are possible
- Samples may be drawn from bottles or vials on the autosampler deck or from bottles connected directly to a stream selector valve
- Elute purified sample inline to an ICPMS or offline to a destination vial
- Enclosed, polypropylene cabinet with integrated ULPA filter maintains sample integrity
- Ultrapure DI water source connects directly to the system for the lowest blanks.
- Ultrapure, fluoropolymer flow path
- Eliminates contamination from manual sample handling

sea*FAST* Litre Column
CF-W-0200

Dual Loop Preconcentration

Maximize Throughput and Minimize Sample Waste

- Load 10 mL sample onto the column from one loop while sample is drawn into a second 10 mL loop
- When sample loading onto the column is completed, switch loops and immediately load the second loop onto the column and draw additional sample into the first loop
- Repeat as desired to increase preconcentration factor.
- After preconcentration and matrix removal, the chelated analytes are eluted into a destination vial using an eluent solution.



Preconcentration and Matrix Removal

Preconcentration and Matrix Removal

Step 1

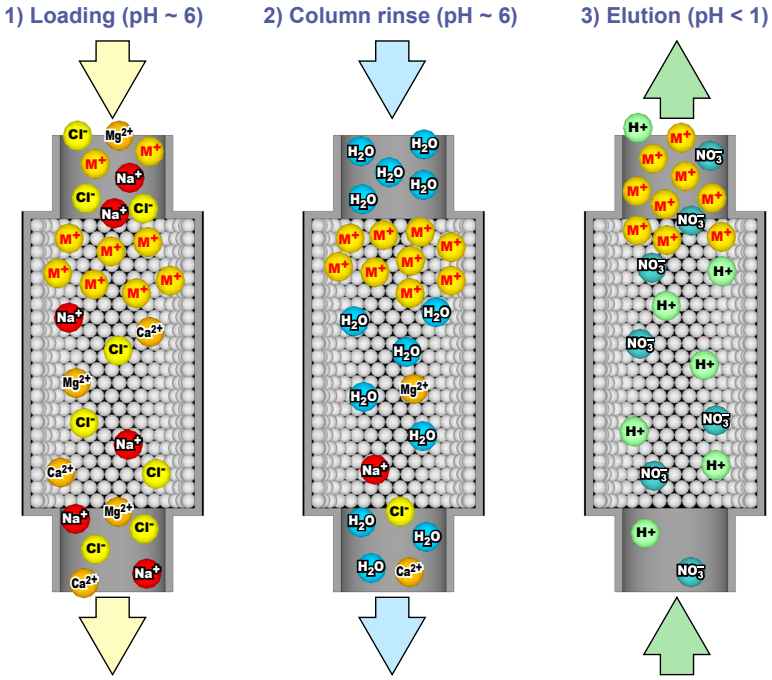
- Inline addition buffer to pH >6
- Matrix to waste
- Transition metals and rare earth elements are chelated

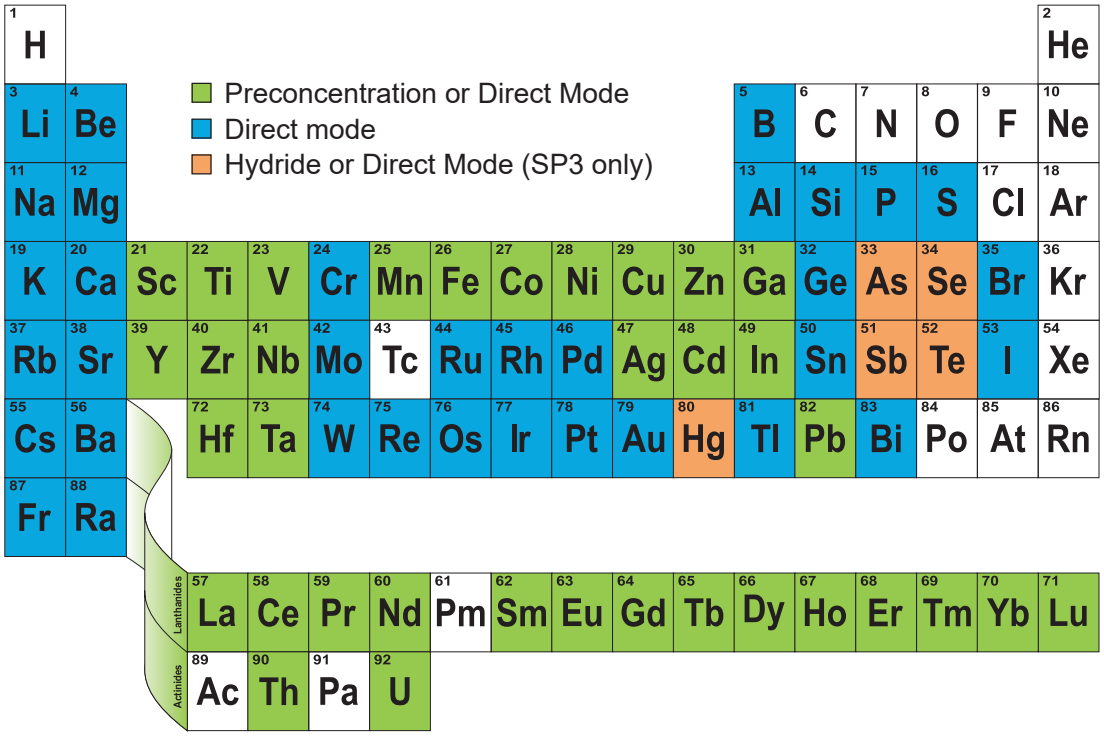
Step 2

- H_2O washes remaining matrix from column

Step 3

- Transition metals (M^+) are eluted into nebulizer with nitric acid (H^+ and NO_3^-)

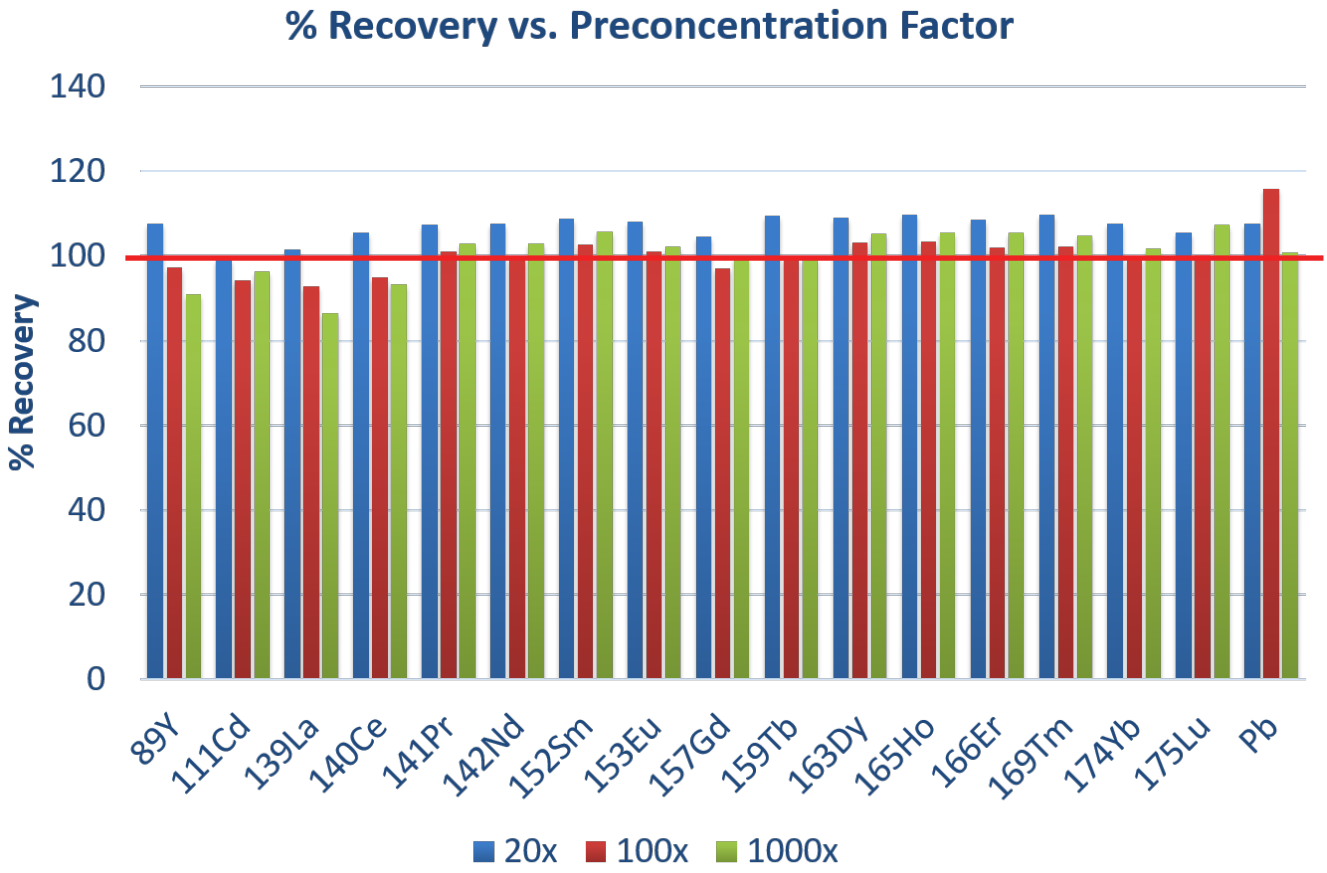




High-Efficiency Preconcentration

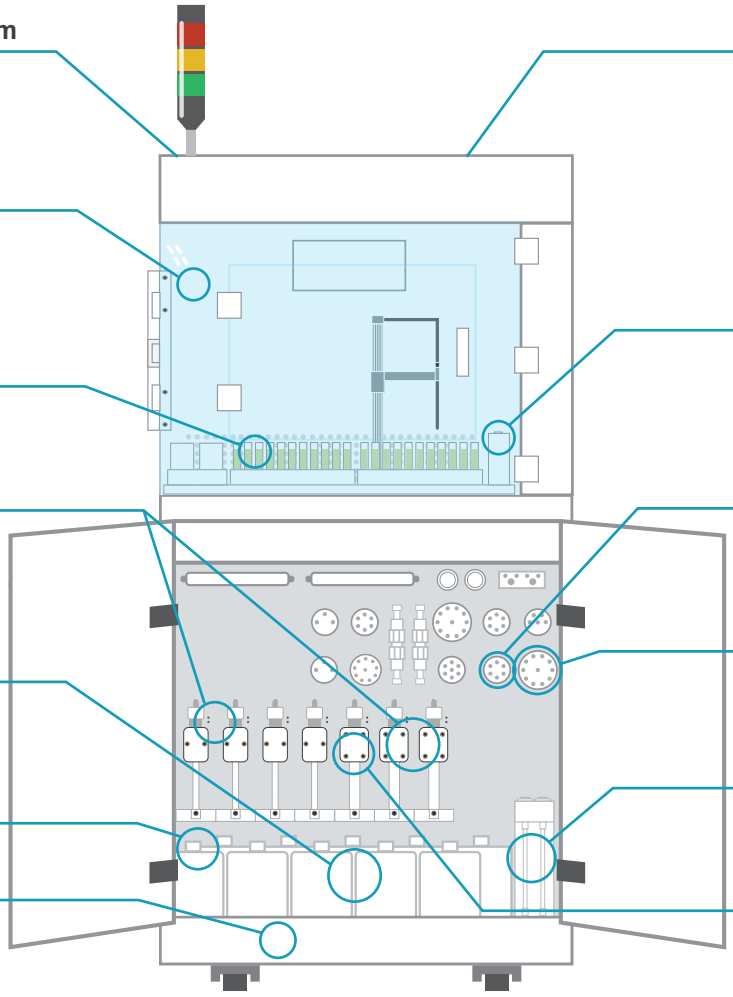
Performance is shown for various preconcentration factors of a 100 ppt multielement standard prepared in synthetic seawater. Recoveries and reproducibility with the new high-flow sea*FAST* column are suitable for both for large- or small-volume preconcentration applications.

Preconcentration Factor	Average % Recovery (100 ppt, all REEs, Cd, Pb)
20x	107.1
100x	100.2
1000x	100.3



Ultrapure Automation

seaFAST Litre



Electronics in Rear Plenum

Exhausted Enclosure

Built-in to provide maximum contamination control

Sample Containers

<1 mL up to 500 mL

Reciprocating Syringes

For continuous loading and buffering of sample for high-volume analysis

Large-Volume Sample Capacity

Up to seven 2 L sample bottles may connected at once to the valve system

Ultrapure Fluoropolymer Reagent Bottles

Leak Sensor

With auto water shut-off

Integrated ULPA Filter

Maintain sample cleanliness before and after preconcentration

Over-Flowing DI Water Dual Rinse Station

Ultrapure Water Valve

Controls DI water flow into and throughout the system to achieve the lowest blanks

Stream Selector Valve

Automatically load samples from large sample bottles or from the autosampler deck

Integrated Wash Station

Flowing rinse stations automatically clean sample bottle caps and lines to minimize contamination

Syringe-Loading

Precision sample loading to minimize wasted sample

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