brine*FAST* S4™

for Avio 500 ICP

Improve Detection Limits for Alkaline Earth and Transition Metals In High Purity Brines

SC2 DX brine*FAST* S4 system for PerkinElmer Avio 500

The brine*FAST* is a fully-automated, online preconcentration and matrix removal system that improves detection limits for Ca, Mg, Fe, Ba, Sr, Mn and other elements in undiluted brines by more than an order of magnitude making trace impurity analysis possible with ICP.

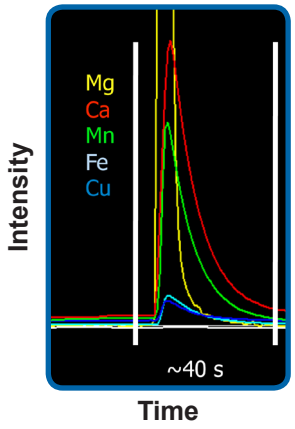
Early detection of low and sub-ppb alkaline earth and transition metals in high-purity brines improves chlor-alkali plant process control and prevents costly damage to fluoropolymer membrane cells. Undiluted 30% brines may be sampled and analyzed directly, eliminating sample preparation and reducing contamination.

Features:

- Fully automated, inline preconcentration and matrix removal
- Direct mode with up to 50x fixed inline dilution
- Syringe-driven reagents
  - Consistent chemistry
  - Maximum throughput
  - Cleanliness
- No daily maintenance
- Detection limits in brine up to 400x better than traditional sample introduction

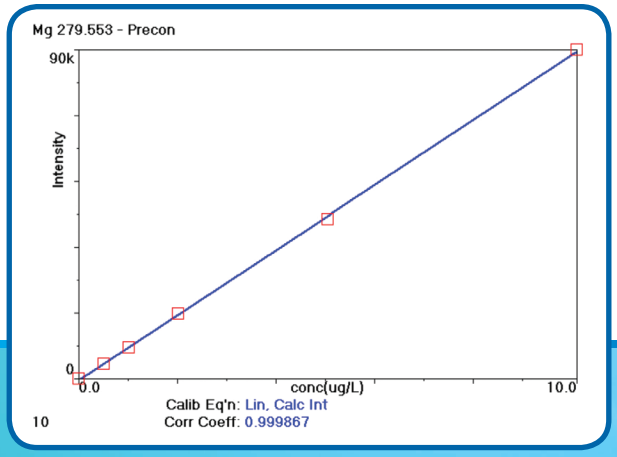
Applications:

- Preconcentration mode for determination of low and sub-ppb Ca, Mg, and other metals in 30% brine
- Chlor-alkali plant product monitoring for caustic soda and bleach
- Determination of alkali earth metals and many transition metals in any high-matrix sample
- High throughput *FAST* analysis with inline dilution in direct mode

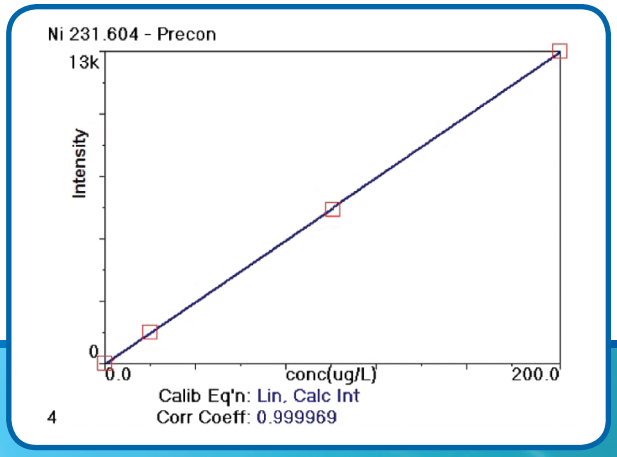


Elution Profiles

Simultaneous elution profiles for preconcentration elements allows simple quantification after matrix removal.



Typical calibration for 50% caustic soda (10x diluted) demonstrating linearity at higher concentrations. If needed, higher level calibrations at the ppm level are also linear.

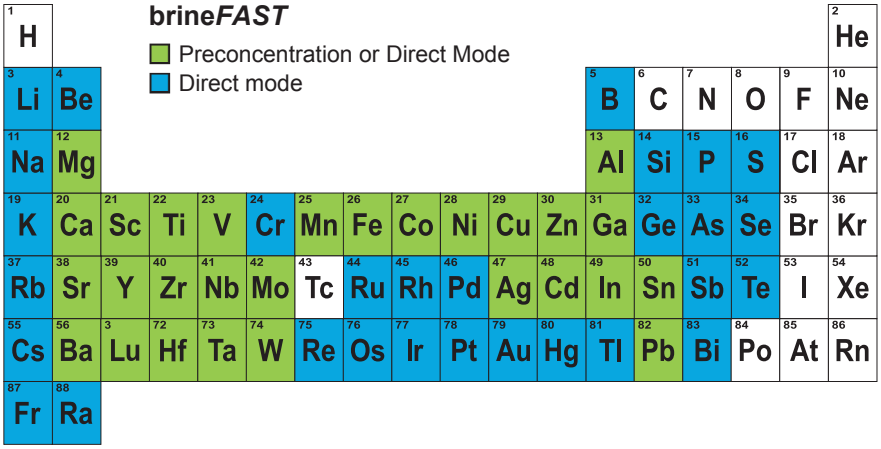


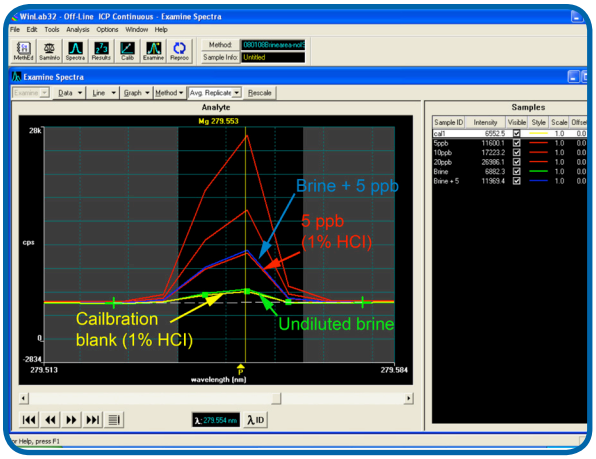
Typical calibration for ultra-pure brine, <10 ppb.

brine*FAST* S4 - Fully Automated, Inline Preconcentration and Matrix Removal

All brine*FAST* S4 Systems Include:

- DX *FAST* autosampler
- S400V syringe pump module
- *FAST* DXi dual valve module and all connections
- brine*FAST* S4 concentrator column
- brine*FAST* S4 cleanup column
- Mobile autosampler station





Spectral data shows equal response for a Mg spike in a 1% HCl standard and 30% brine.

Spike recovery in 50% caustic soda (10x diluted)	
Analyte	**% Recovery**
Fe	99
Ni	99
Cu	99
Pb	101

Spike recoveries in 50% caustic soda (10x diluted) show excellent recovery against a calibration prepared in diluted nitric acid. Spike level is 50 ppb (500 ppb for Fe).

Percent Spike Recovery Comparison in 30% Brine		
Analyte	Traditional Introduction (spiked at 100 ppb)	brine*FAST* S4 (spiked at 5 ppb)
Ca	132	103
Mg	64	96
Fe	104	95
Ba	106	99
Sr	75	99
Mn	111	99

Comparison of spike recoveries for traditional analysis and the brine*FAST* S4 preconcentration technique. Note that the spike levels are 20x lower with the brine*FAST* S4 than with the original introduction system.

Method Detection Limits Comparison in 30% Brine			
Analyte	Traditional (ppb)	brine*FAST* S4 (ppb)	Improvement Factor
Ca	8.0	0.02	410
Mg	1.7	0.01	190
Fe	6.3	0.2	28
Ba	1.4	0.2	7
Sr	1.1	0.01	150
Mn	1.2	0.02	57

brine*FAST* S4 System	
Description	**Part Number**
SC2 DX brine*FAST* S4 system for Avio 500	2BF-S4-37C
Spare brine preconcentration column	CF-IDA
Spare trace metals cleanup column	CF-M-0600

Elemental Scientific
ICP | ICPMS | AA

Phone: 402-991-7800
esi@icpms.com
www.icpms.com