

Long-term Analysis of High Matrix Samples with SC-FAST Series Autosamplers

Introduction

The analysis of samples with high dissolved solids contents proves difficult with ICP-MS instrumentation, due to salting effects on cones and injector clogging. Dilution of samples to overcome these issues negates the high sensitivity offered by ICP-MS. The SC-FAST reduces the amount of matrix reaching the plasma by 30-50% and ensures a more effective rinsing between samples, reducing signal drift and dramatically improving long-term analysis.

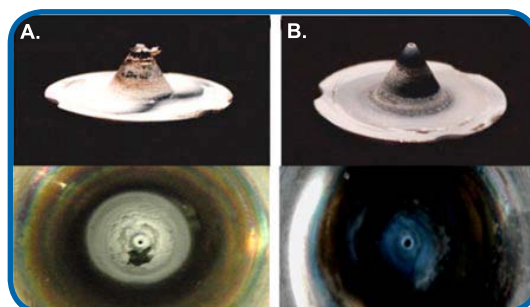


Instrumentation and Sample Introduction

- Element2
- SC-FAST
- PFA-ST MicroFlow nebulizer
- Cyclonic spray chamber

SC-FAST

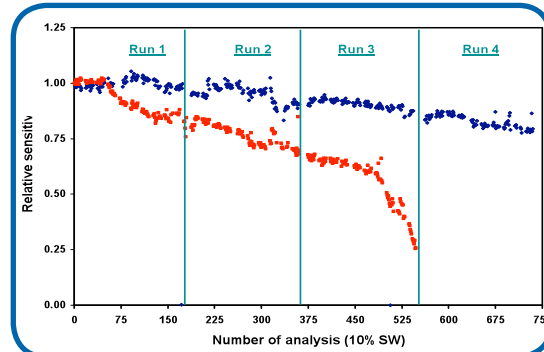
The SC-2 autosampler is combined with a 6 port valve and controlled via SC autosampler software. Samples are alternately vacuum loaded into the loop (0.5 mL/sec) and pump injected (160 µL/min) into a cyclonic spray chamber via a PFA-ST nebulizer.



Cones after (A) standard introduction and (B) SC-FAST introduction of 10% seawater.

Operating Parameters

The SC-FAST, controlled by independent software, is easily integrated with most ICPs. A typical 10% seawater method includes 60s uptake, 120s acquire and 60s wash; totaling 240s. Rapid rinsing of uptake tubing during injection, followed by rapid loading of loop reduces wash and load time to 10 sec (500 µL loop). Matching the timing of the SC-FAST with the Element2 reduces the method to 130s.



Cone Salting

Switching the valve after the sample has been analyzed, reduces the amount of matrix reaching the cones by 30–50%. This dramatically reduces the amount of salting on the cones.

Sample Stability and Wash-Out

Reducing cone salting, greatly extends the operating time of the instrument by reducing drift. Sample throughput is improved further as calibration standards do not need to be run as frequently and cones do not need to be maintained.

Accuracy and Precision

Reducing the cone deposition improves the quality of the data obtained, ensuring improved accuracy and precision.

