



## Elemental Scientific Inc Technical Note-5

### Long term analysis of high matrix samples with SC-FAST series auto samplers

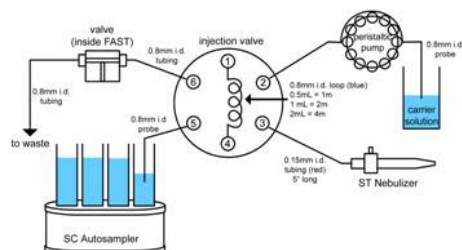
The analysis of samples with high dissolved solids contents proves difficult with ICP-MS instrumentation, due the salting effects on cones and injector clogging. Dilution of samples to overcome these issues negates the high sensitivity offered by ICP-MS. The SC-FAST reduces the amount of matrix reaching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

#### Instrumentation & sample intro

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

#### SC-FAST

The SC-2 auto sampler is combined with a 6 port valve controlled via the auto sampler



software. Samples are alternately vacuum loaded into the loop ( $0.5 \text{ mL sec}^{-1}$ ) and pump injected ( $160 \mu\text{L min}^{-1}$ ) into a cyclonic spray chamber via a PFA-ST nebulizer.

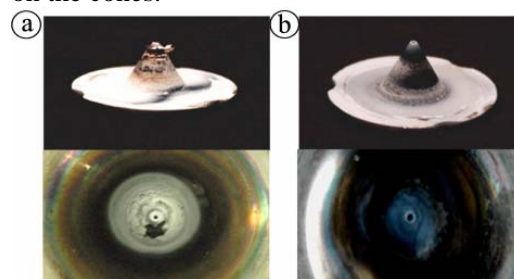
#### Operating parameters

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 ( $500\mu\text{L}$  loop). Matching the timing of the SC-FAST with the Element2 reduces the method to 130s.

#### Cone Salting

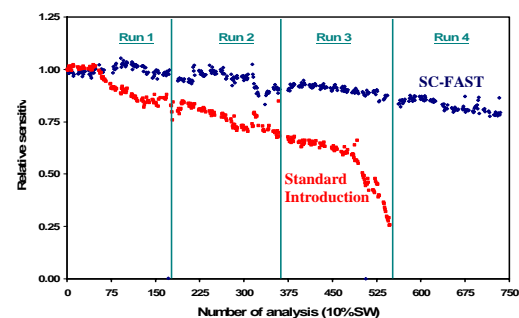
Switching the valve after the sample has been analyzed, reduces the amount of matrix reaching the cones by 30–50%. This dramatically reduces the amount of salting on the cones.



Cones after (a) standard introduction and (b) SC-FAST introduction of 10% Seawater

#### 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.

