



Elemental Scientific Inc Technical Note-6

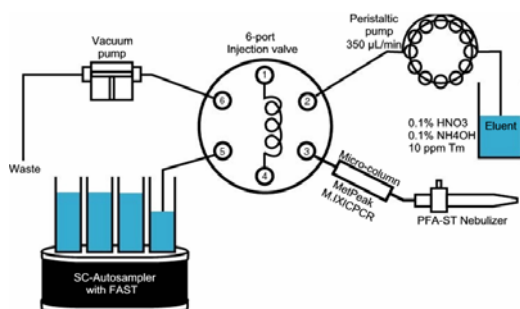
Chromium speciation using SC-FAST

Chromium exists in the environment in several forms which differ in their effects upon organisms. Chromium enters the air, water and soil in the Cr(III) and Cr(VI) form through natural processes and human activities. Cr(III) is an essential nutrient to humans, whereas Cr(VI) is known to cause various health effects including cancer and death. The SC-FAST can be used to perform a simple, but robust and fully automated separation of Cr species.

Instrumentation & sample intro

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

SC-FAST for Chromatography



- Column: MetPeak M.IXICPCR
- Eluent: 0.1% HNO₃ / 0.1% NH₄OH / 10ppm Tm
- Carrier Flow Rate: 350µL/min
- Loop volume 100µL

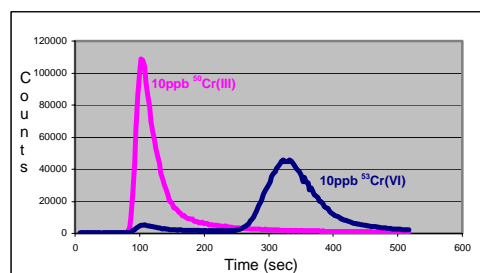
Operating parameters

Samples and standards were loaded into the loop via the Teflon diaphragm pump, once loaded the valve was switched and the sample pushed through the column with the peristaltic pump. The Cr species were separated on the column and nebulized using a low dead volume PFA-LC nebulizer. The

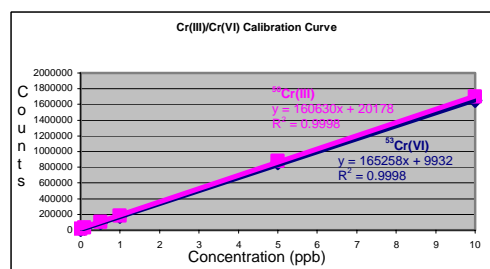
peaks for Cr(VI) and Cr(III) were measured using the Element2's time resolved software.

Separation and Calibration Studies

Isotope enriched standards of ⁵⁰Cr(III) and ⁵³Cr(VI) were used to perform separation and calibration studies.

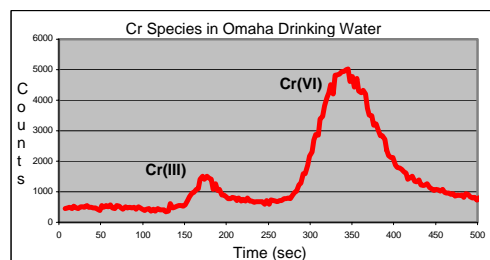


Calibration graphs were found to be linear over the range 0.1 -10ppb



Sample Analysis

Various drinking water samples were analyzed for total Cr, Cr(III) & Cr(VI).



	Omaha Drinking Water	Mineral Water (Still)	Mineral Water (Sparkling)	Spring Water
Total Cr				
Cr(III)	0.23ppb			
Cr(VI)	1.05ppb			

The SC-FAST provides a simple but effective means of performing speciation /chromatography applications.