

# apex Ω Q

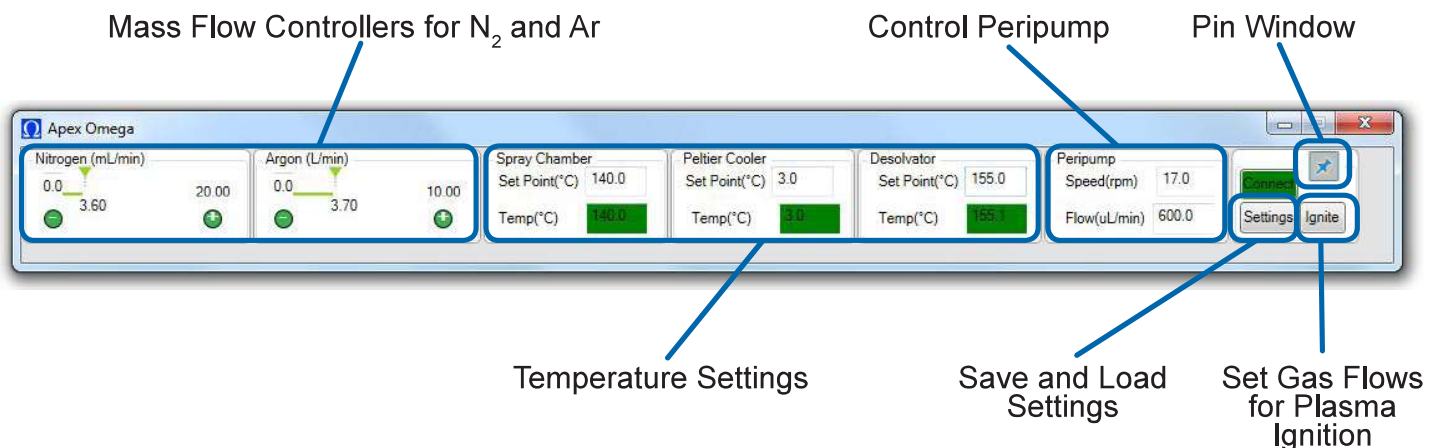
The apex Ω desolvating nebulizer is the highest performing ICPMS sample introduction system available. An innovative multistage Peltier-cooled desolvation system combined in series with a helical EPTFE fluoropolymer membrane desolvator simultaneously maximizes ICPMS sensitivity and reduces oxides.

## Features

- Qtz or PFA Versions Available
- Integrated Software Control
  - Temperature
    - Spray chamber
    - Desolvator
    - Condenser
  - Gas Flows
    - Ar Sweep
    - N<sub>2</sub> Addition
- Maximize Signal Intensity
- Minimize Oxides and Interferences
- Excellent Washout
- Combine with microFAST MC for syringe loading injection



## Software Control



The software control interface for the Apex Omega nebulizer is shown with several key components highlighted:

- Mass Flow Controllers for N<sub>2</sub> and Ar:** Two panels on the left showing Nitrogen (mL/min) and Argon (L/min) flow rates with set points and current values.
- Temperature Settings:** Three panels in the middle showing Spray Chamber, Peltier Cooler, and Desolvator temperatures, including set points and current readings.
- Control Peripump:** A panel on the right showing Peripump Speed (rpm) and Flow (uL/min).
- Save and Load Settings:** A button labeled 'Settings' in the bottom right corner.
- Set Gas Flows for Plasma Ignition:** A button labeled 'Ignite' in the bottom right corner.
- Pin Window:** A button in the top right corner of the software window.

# High Sensitivity Stability and Low Oxides

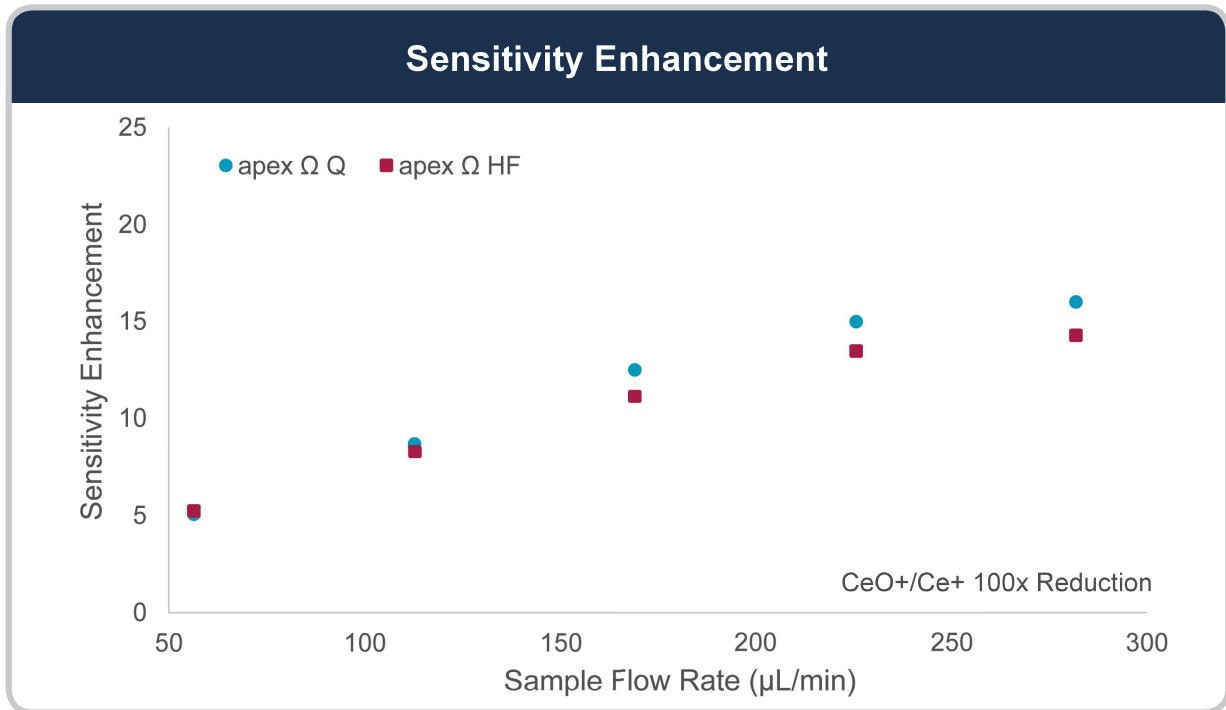


Figure 1: Similar sensitivity enhancement for both apex Ω Q and HF.

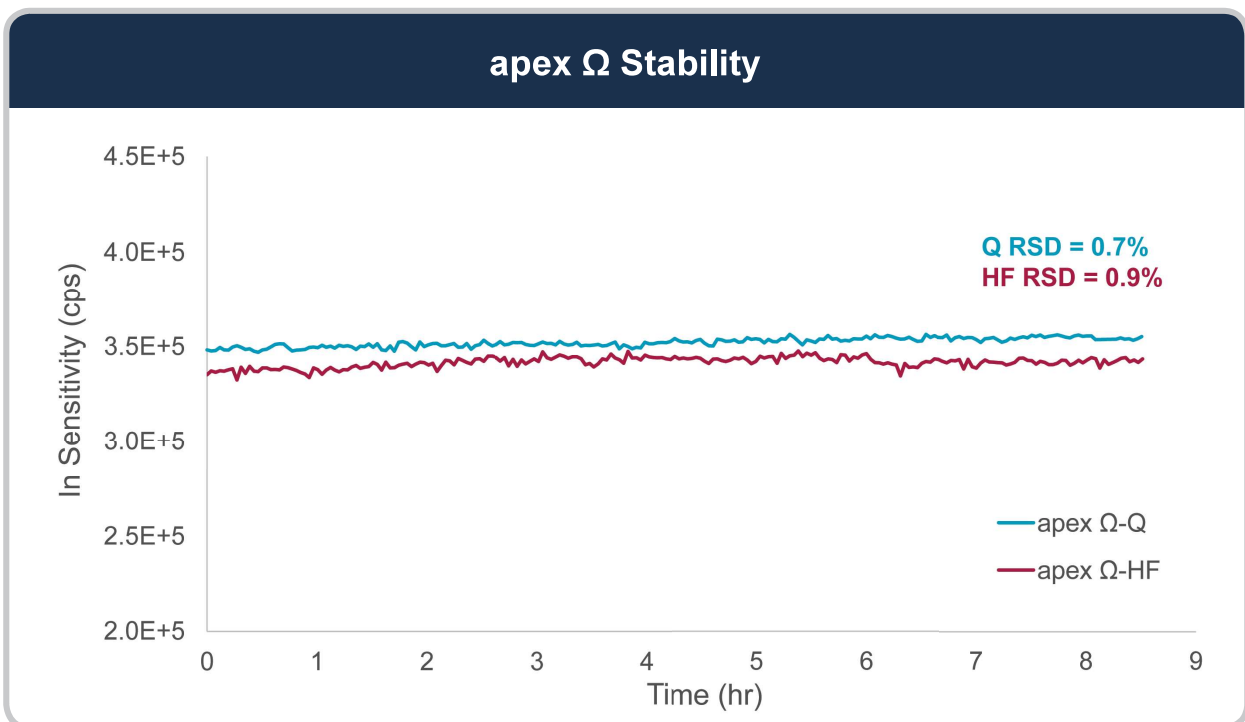
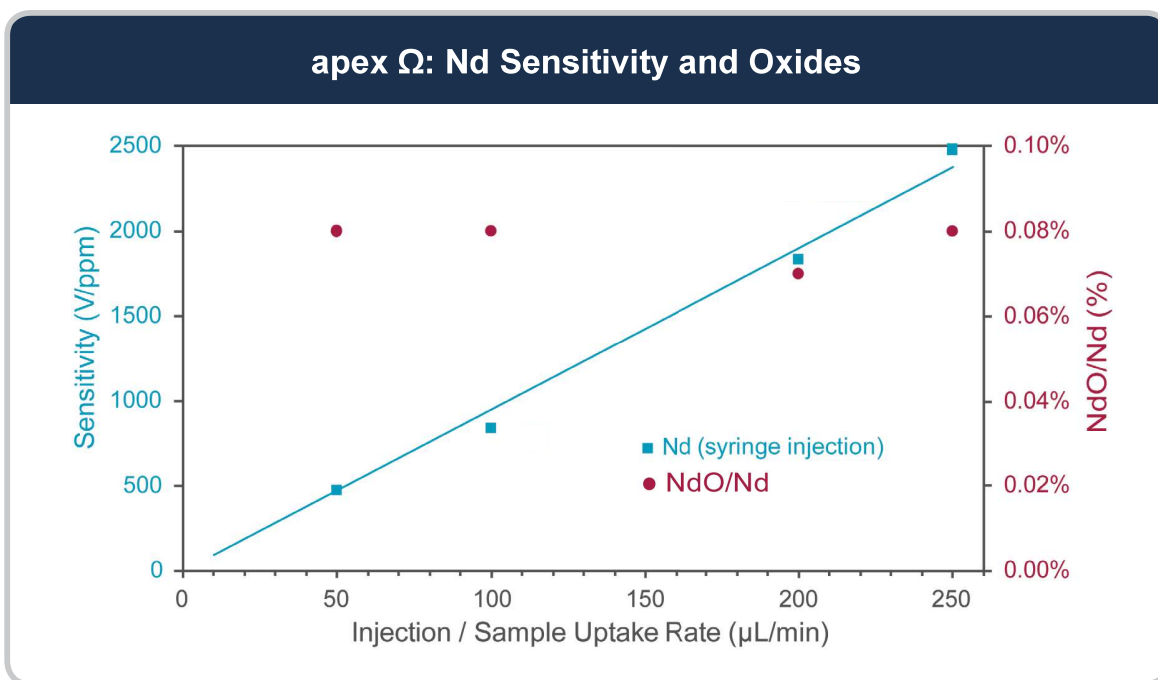


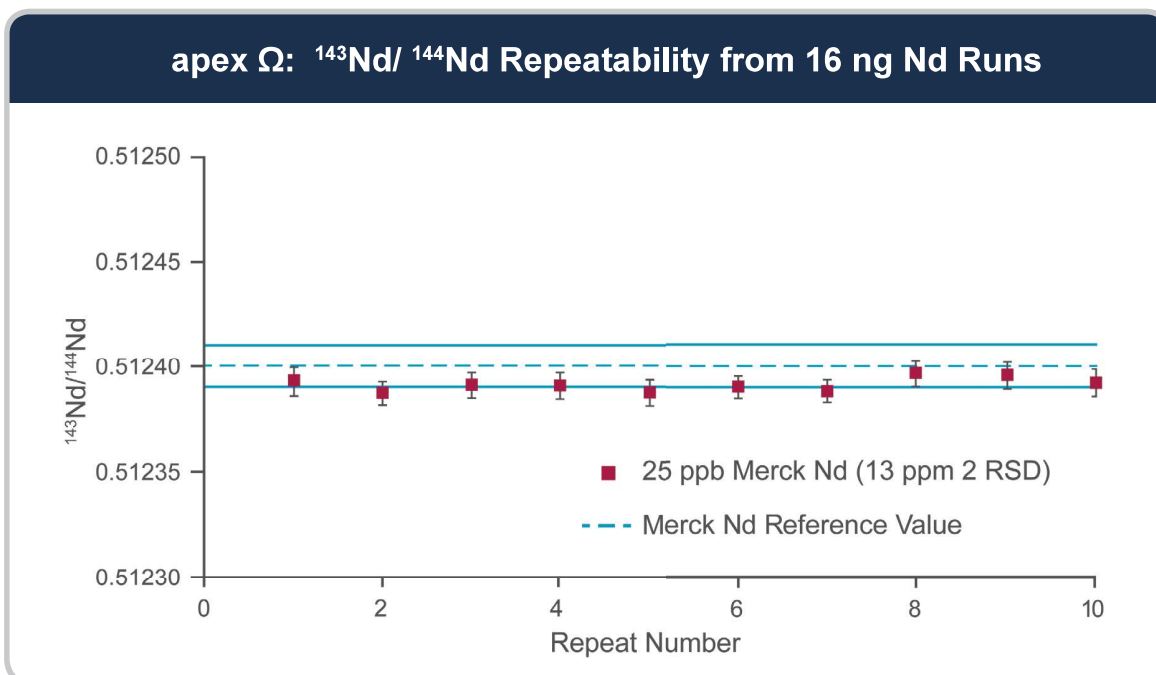
Figure 2: 8 hour stability test illustrates  $< \pm 1\%$  RSD ( $1 \delta$ ) for both apex Ω Q and HF.

# Precise Isotope Ratios



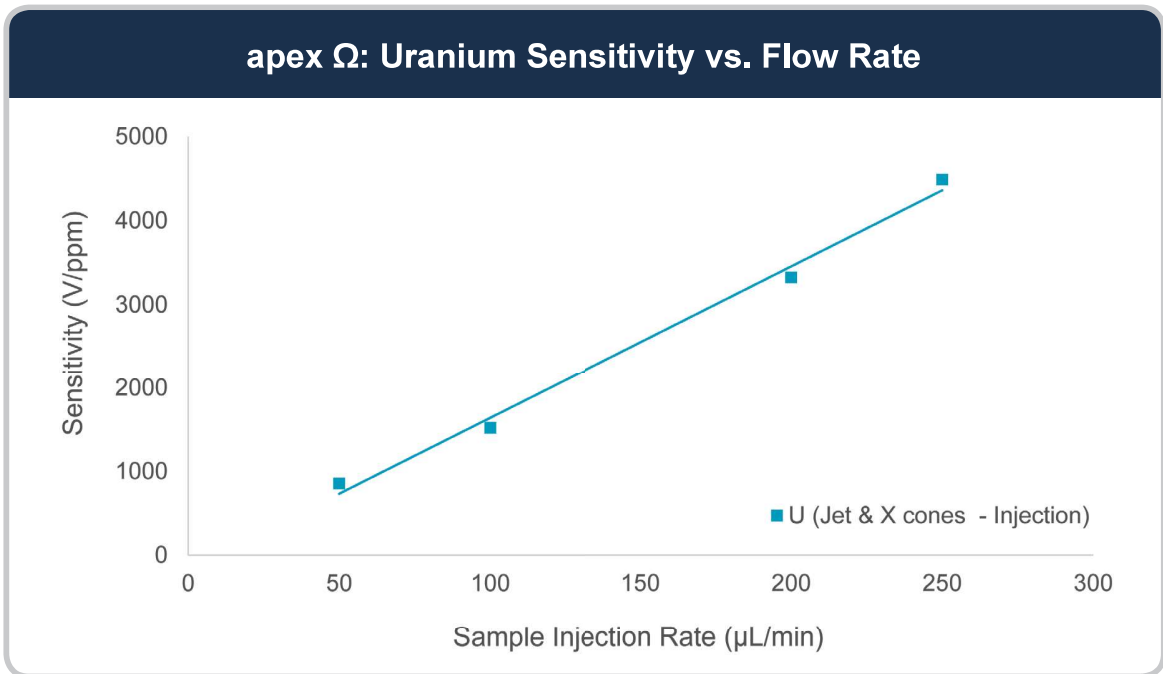
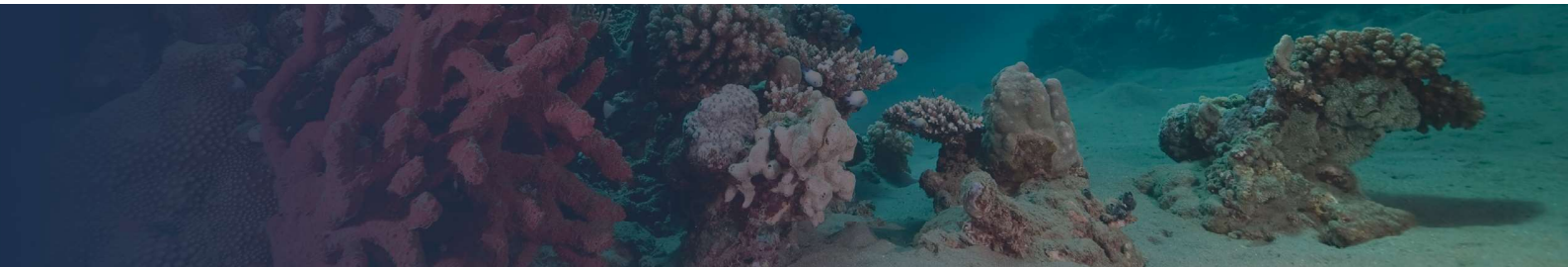
**Figure 3:** Signal increase is linear with sample injection flow rate while low oxides are maintained independent of sample flow rate.

Neptune *Plus* data courtesy of Nicholas Lloyd, Thermo Fisher Scientific (Bremen) GmbH.

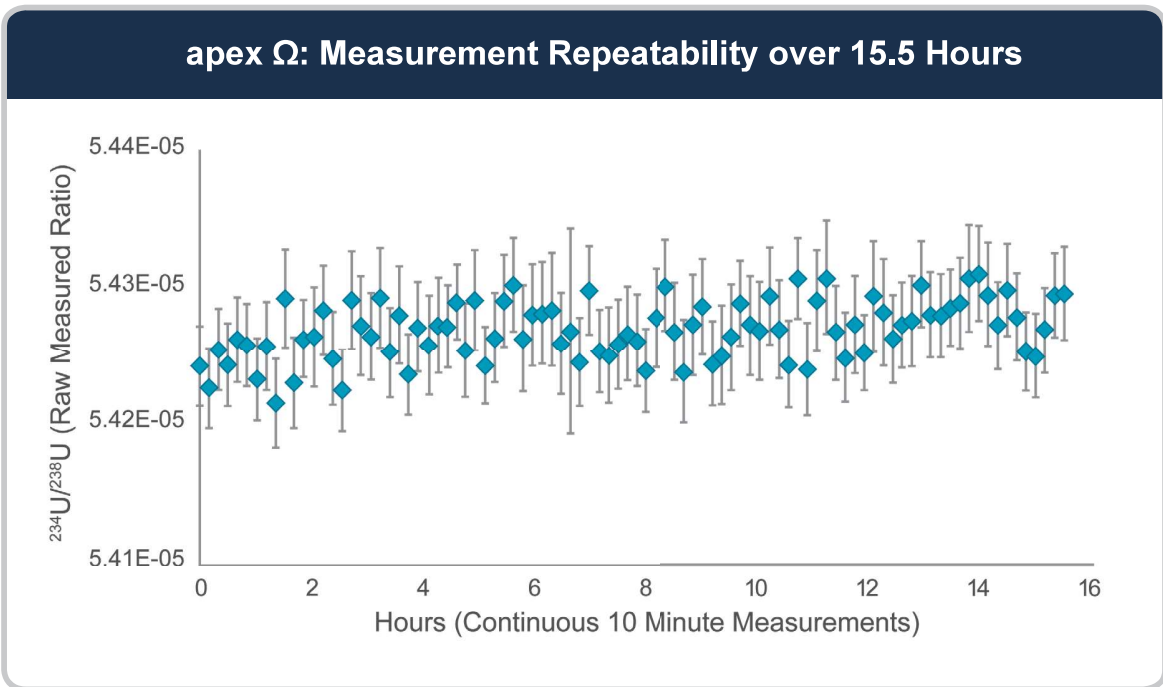


**Figure 4:** Repeatability of 16 ng Nd runs (25 ng/g solution), using apex  $\Omega$  with PFA-100 self-aspirating nebulizer and 5 minute acquisition time.

Neptune *Plus* data courtesy of Nicholas Lloyd, Thermo Fisher Scientific (Bremen) GmbH.



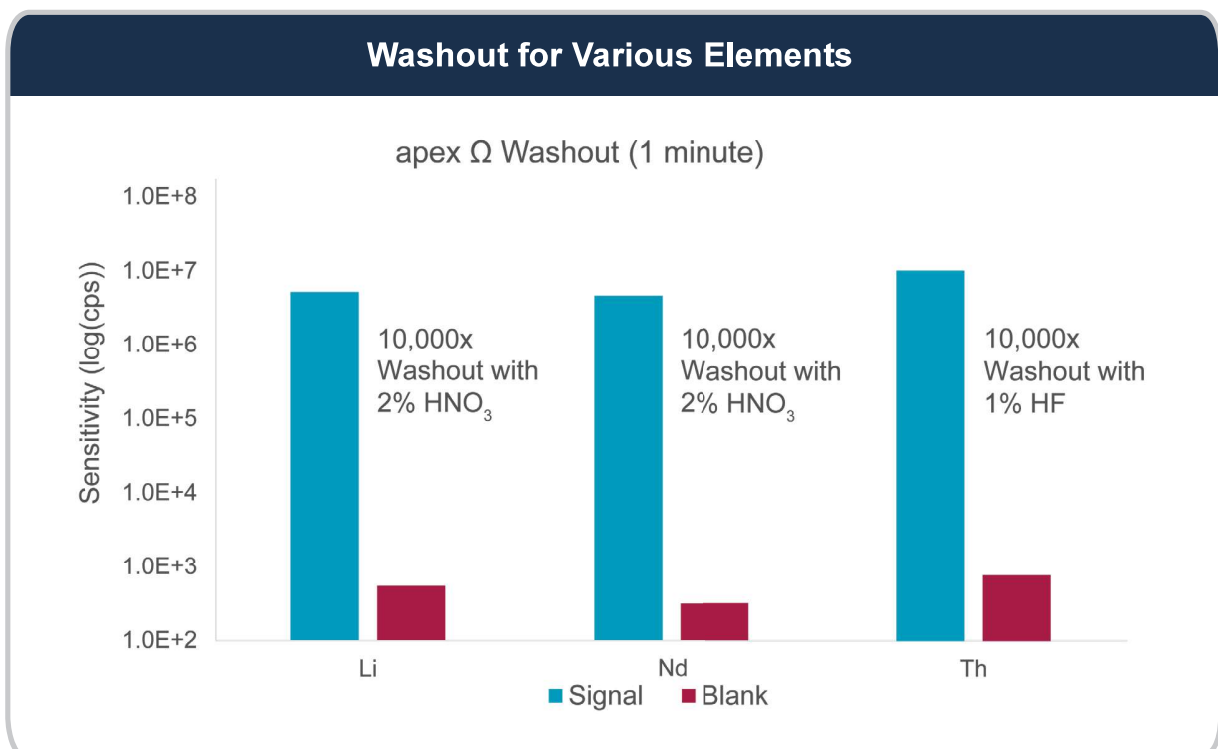
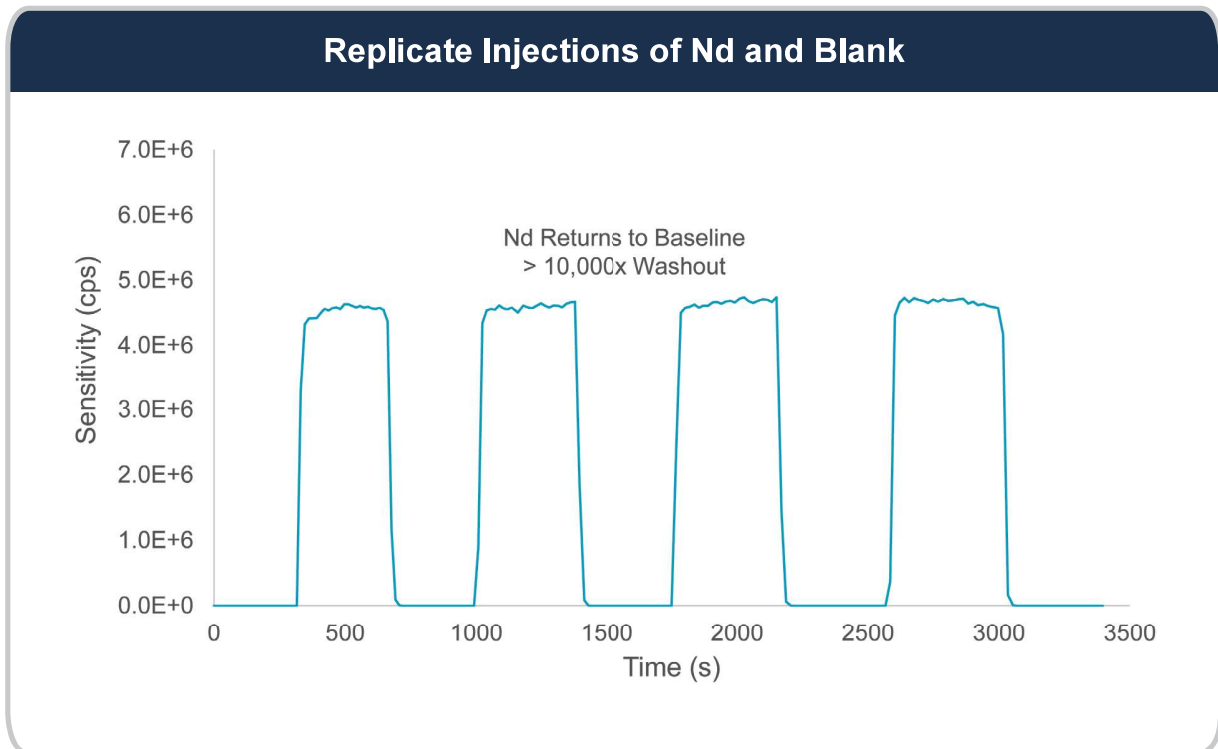
**Figure 5:** Signal increase is linear with sample injection flow rate up to 5000 v/ppm U.



**Figure 6:**  $^{234}\text{U}/^{238}\text{U}$  measured with 131 kcps (2 mv)  $^{234}\text{U}$  on  $10^{13} \Omega$  amplifier from 25 ng/g NBS U-010. 92 x 10-minute runs spanning 15.5 hours. Raw Ratio RSD: 0.04% (external), 2se (Internal)

Neptune Plus data courtesy of Nicholas Lloyd, Thermo Fisher Scientific (Bremen) GmbH.

# Washout



**Figure 7:** Replicate injections illustrate greater than four orders of magnitude (10,000x) washout is achieved in 1 minute for Nd. Two percent HNO<sub>3</sub> is used to achieve 10,000x washout for Li and Nd, whereas, classic memory prone elements such as Th are washed out similarly with 1% HF.

# Add microFAST MC

## Syringe Loading Injection

The microFAST MC precisely and accurately loads a loop and then smoothly injects solution to a  $\mu$ Flow concentric nebulizer at defined rates from 5-1000  $\mu$ L/min. The valve on the flow injection system selects from two discrete, parallel flow paths for standards and samples. This allows rapid switching between sample and standard solutions with minimal dead volume between the valve and the nebulizer.

### Features

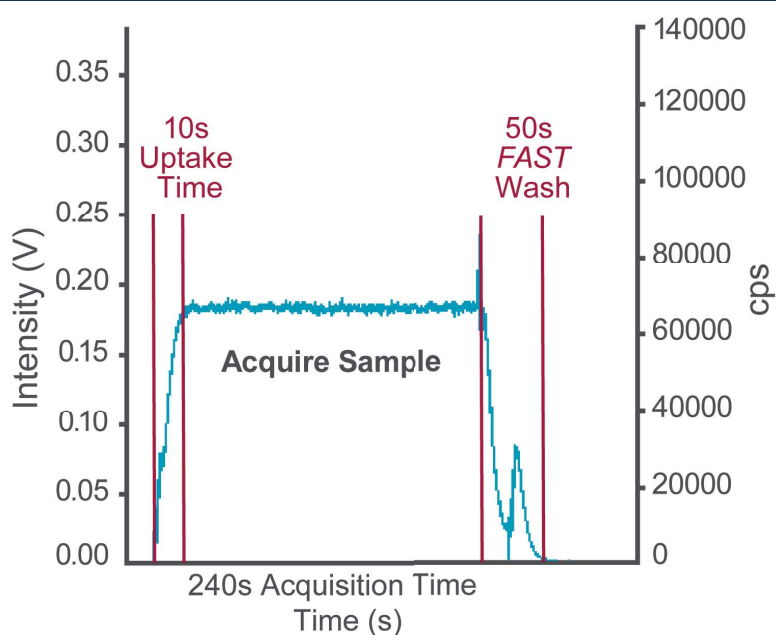
- Total sample consumption
- Eliminate waste
- Micro volume samples
- Micro flow rates
- Inject complete sample
- Dual loop system
- High sample throughput



### Pu Injection Parameters

- 220  $\mu$ L of sample
- 50  $\mu$ L/min flow rate
- ~4 minute sample acquisition
- 1 minute total uptake and washout
- 5 minute sample to sample

#### 4 min Injection Profile for 500 Femtograms of $^{239}\text{Pu}$



Data courtesy of Dr. Cole Hexel and Brian Tickior CRNL.