

From Seawater to Shellfish: Microplastics... Find out what's slowly krilling you, and the best way to stay happy as a clam!



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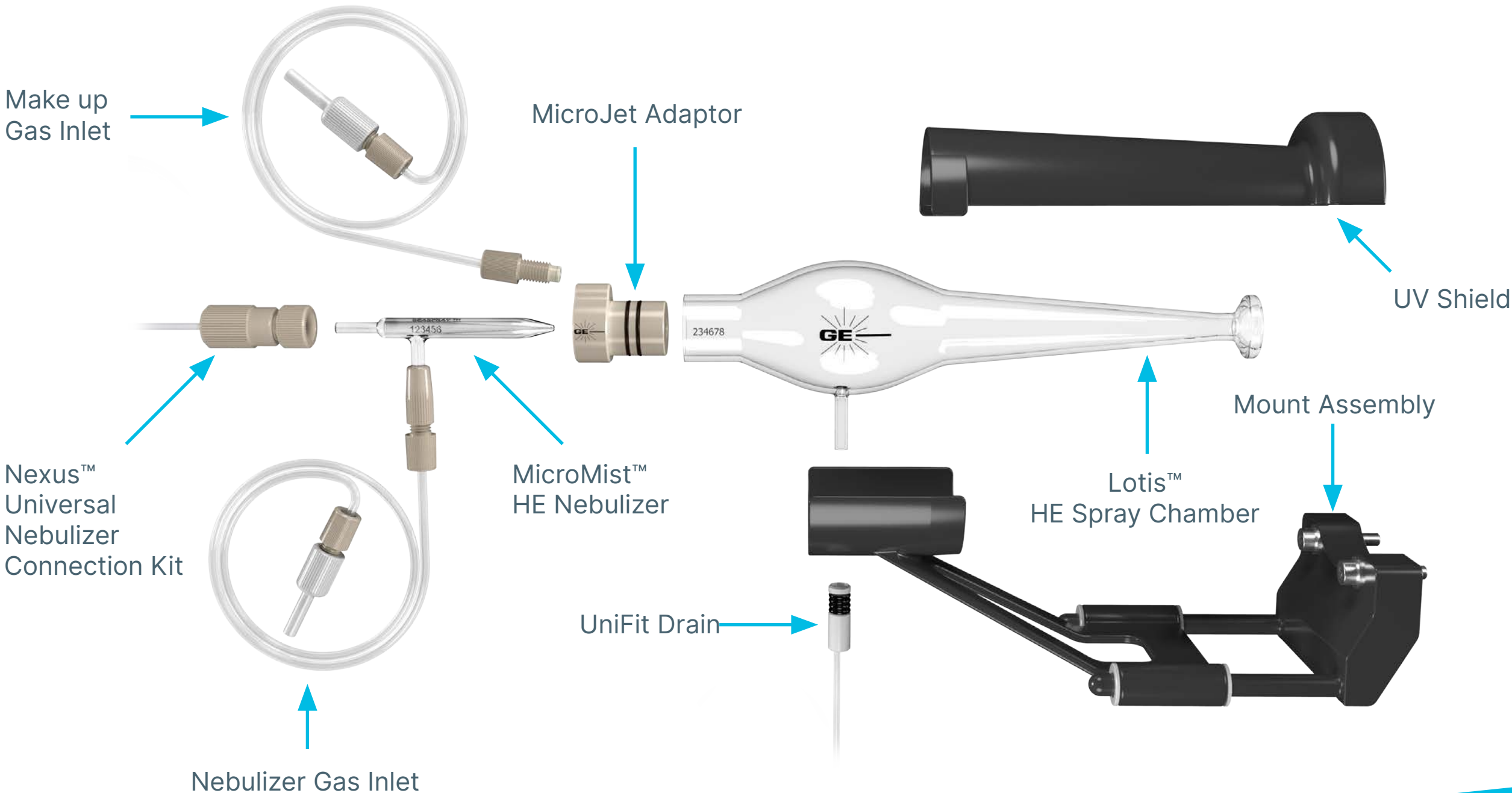
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High Efficiency Sample Introduction System (HE-SIS)



HE-SIS Bracket Support

Every HE-SIS is designed to suit a specific instrument model, and includes an instrument-specific mounting bracket support.

Part Number	Description
KT-1155	HE-SIS for Agilent® ICP-MS
KT-1172	HE-SIS for TOFWERK icpTOF
KT-1172	HE-SIS for Thermo Scientific® Q, RQ, TQ ICP-MS
KT-1172	HE-SIS for Thermo Scientific® Neoma MC-ICP-MS
KT-1184	HE-SIS for PerkinElmer® NexION 1000, 1100, 2000, 2200, 5000 ICP-MS
KT-1204	HE-SIS for PerkinElmer® NexION 300, 350 ICP-MS
KT-1205	HE-SIS for NU ATTOM
KT-1213	HE-SIS for Thermo Scientific® X-Series
KT-1215	HE-SIS for Thermo Scientific® Neptune/Element
KT-1219	HE SIS for Nu Vitesse



HE-SIS Kit Features



This specially designed concentric glass nebulizer is based on our popular MicroMist™ design, capable of efficiently nebulizing limited sample volumes at low sample and argon gas flow rates.



Our patent-pending MicroJet™ gas adapter shapes the nebulizer aerosol plume to reduce sample deposition on the spray chamber walls and enhance transport efficiency.

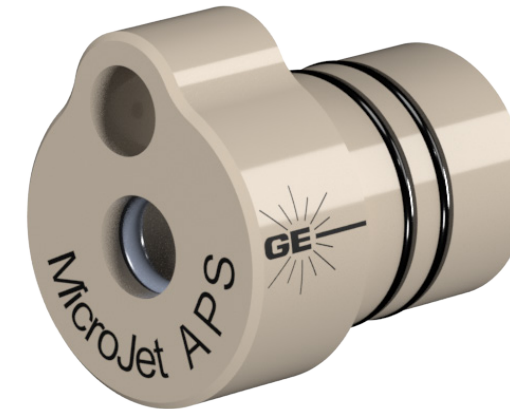


The Lotis™ HE spray chamber directly couples to the ICP-MS torch, providing the highest transport efficiency and excellent washout between samples.

Optimizing Operating Parameters



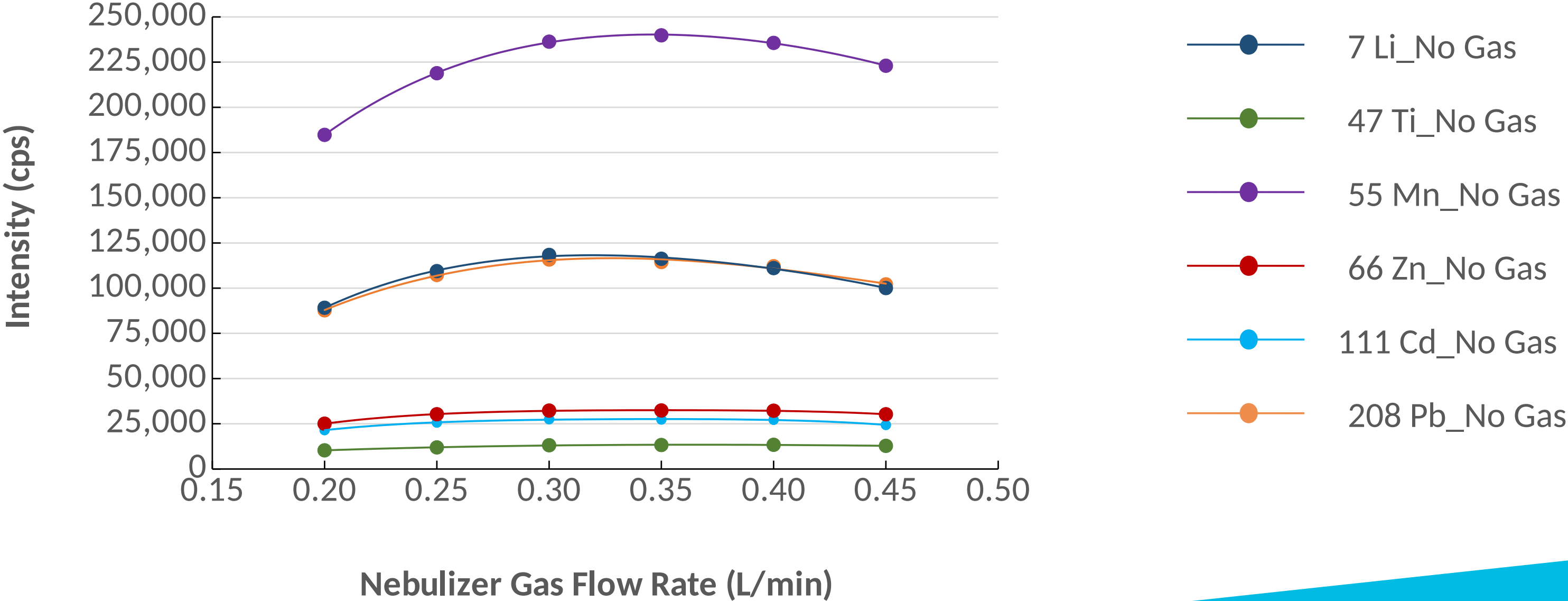
- Nebulizer gas flow rate (L/min)
- Nebulizer sample flow rate ($\mu\text{L}/\text{min}$)



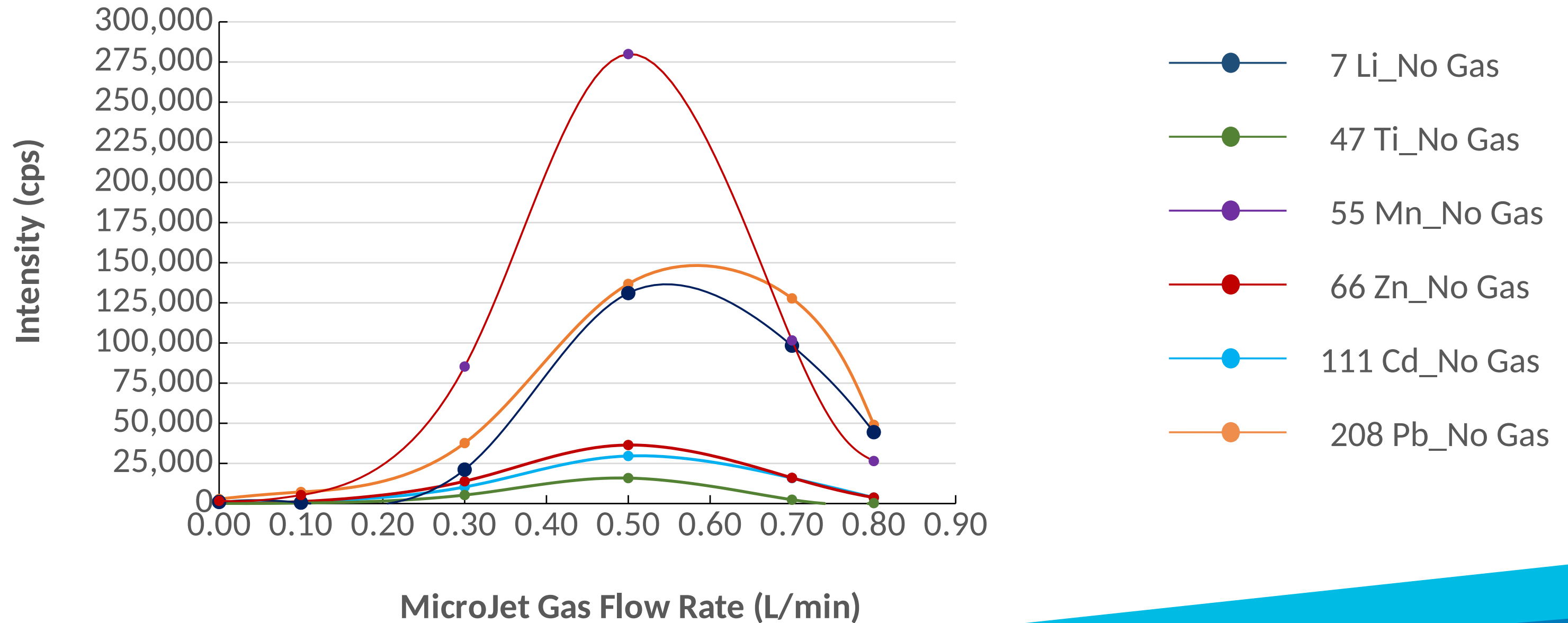
- MicroJet gas flow rate (L/min)

*Combined gas flow rate through the injector is typically close to 1.0 L/min

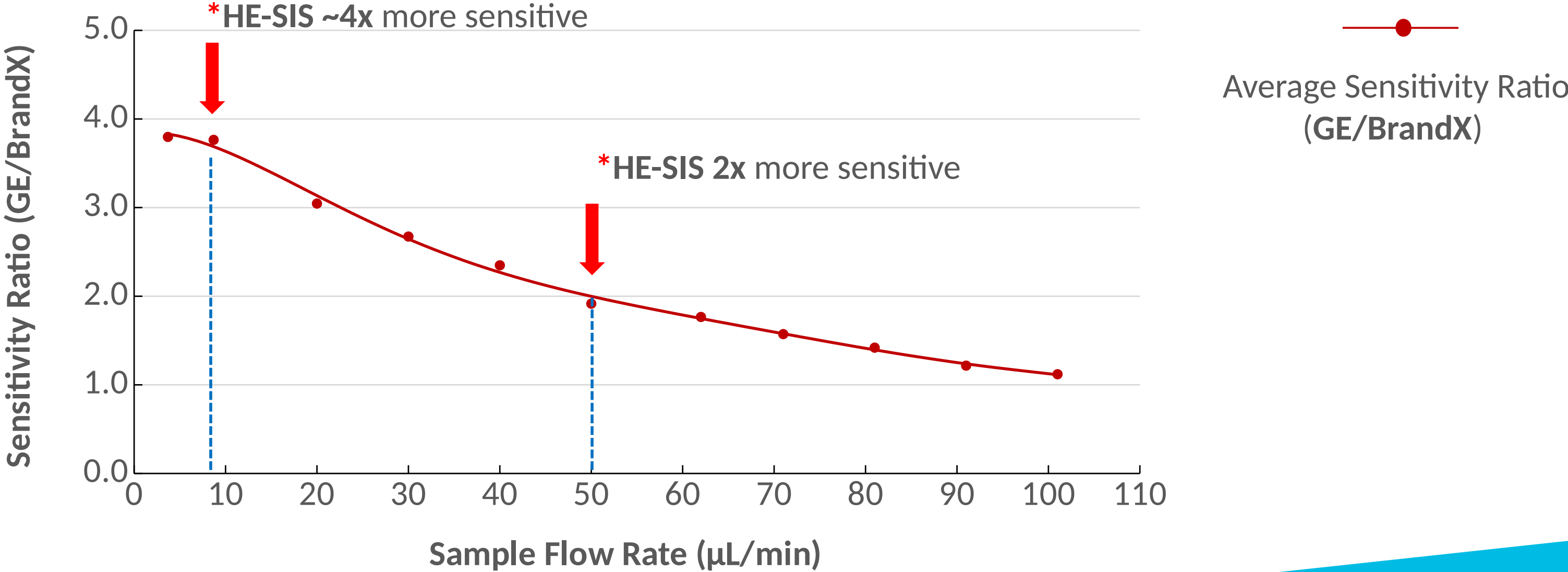
Optimizing Nebulizer Gas Flow Rate



Optimizing MicroJet Gas Flow Rate



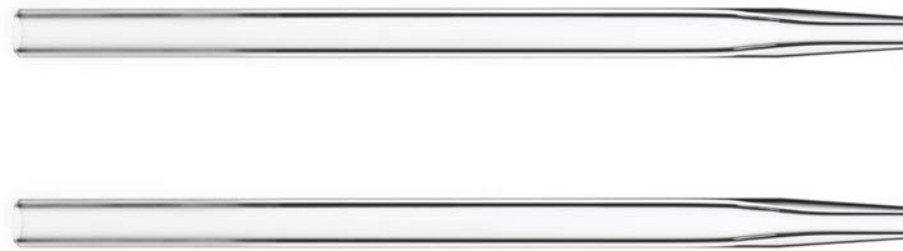
Average Sensitivity Ratio – Comparison Brand X



Demountable Torch – Interchangeable Injector

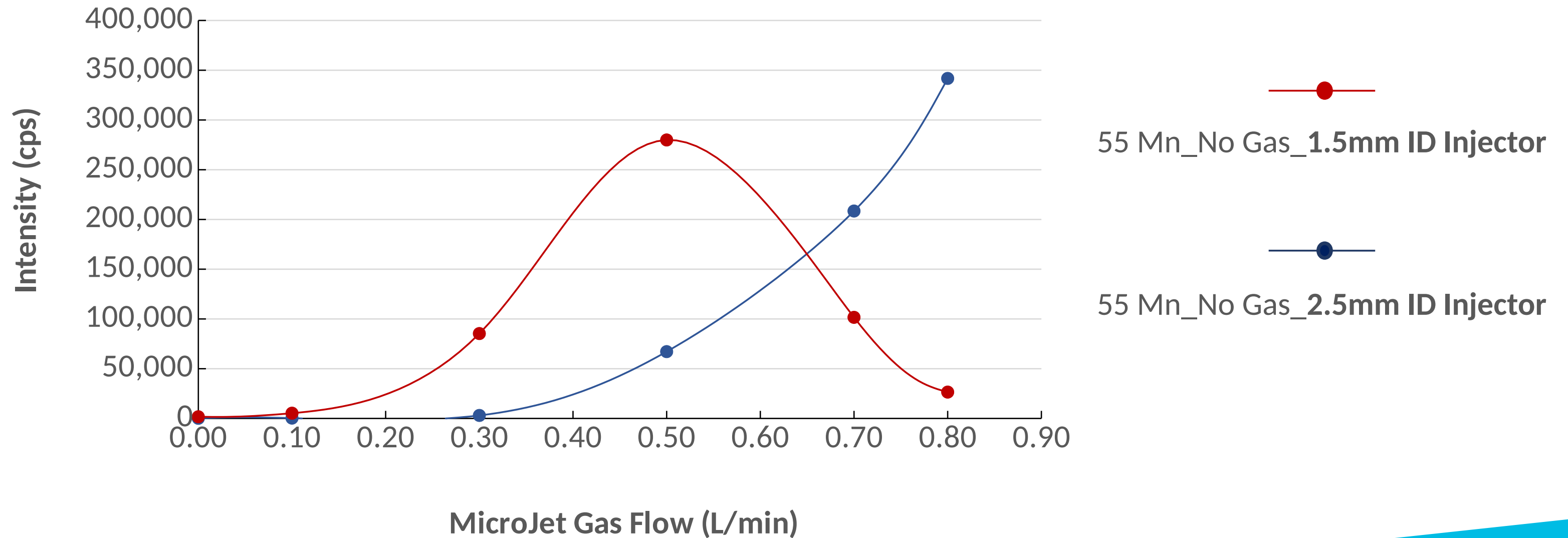


- A demountable torch provides the benefit of interchangeable injectors.
- 1.5mm and 2.5mm ID quartz studied
- Other injector ID's and materials available



* D-Torch™ for NexION 2200/5000 ICP-MS shown, P/N [30-808-3927](#)

Sensitivity Comparison – Injector ID



HE-SIS Literature

The HE-SIS has been coupled to many different ICP-MS platforms for a wide variety of applications, including single-cell, single-particle, nanoparticle, and low-volume sample studies, such as nanoplastics and microplastics with up to **95% transport efficiency**.

- [*Development of single-cell ICP-TOFMS to measure nanoplastics association with human cells, Environ. Sci.: Nano, 2023, 10, 3439.*](#)
- [*Breaking barriers in Microplastic Detection using Single-Particle ICP-TOFMS, Lyndsey Hendriks, TOFWERK.*](#)
- [*Towards Automated Routine Analysis of the Distribution of Trace Elements in Single Cells using ICP-MS, Current Trends in Mass Spectrometry, March 2020.*](#)
- [*Very low mass isotope data collection with the Nu Vitesse, measurement of microplastic particles, Vitesse Note NT10.*](#)
- In addition to many scientific presentations.

HE-SIS Summary

- In order to achieve optimum performance, it is necessary to optimize all operating conditions for both the instrument and sample introduction system.
- Our example showed the optimum sensitivity was observed at a nebulizer gas flow rate of 0.35 L/min and sample uptake in the range of 20 to 40 $\mu\text{L}/\text{min}$.
- Glass Expansion's HE-SIS is 2–4x more sensitive than another commercially available system.
- Optimum make-up gas flow was dependent on the ID of the injector:
 - Smaller bore injector (1.5mm ID) provided highest sensitivity at a make-up gas flow of 0.50 L/min, combined gas flow of 0.85 L/min.
 - Larger bore injector (2.5mm ID) provided highest sensitivity at a make-up gas flow of 0.80 L/min, combined gas flow of 1.15 L/min.