Powerful, Flexible,
Single Quadrupole ICP-MS

Agilent 7900 ICP-MS

The Agilent 7900 ICP-MS Opens Up a New Dimension in Single Quadrupole ICP-MS

Can one ICP-MS combine high performance with great flexibility and ease of use? The answer is yes.

The 7900 ICP-MS has exceptional matrix tolerance, high sensitivity, wide dynamic range, and unmatched helium collision cell mode for control of polyatomic interferences. This high performance is combined with a suite of autotuning, method setup, and data analysis tools that make ICP-MS easier than ever to operate.

Innovative technology and a new MassHunter software platform combine to make the Agilent 7900 the world's most powerful, and most automated quadrupole ICP-MS.

Matrix tolerance has been extended into the tens of %TDS range and the 7900 has a linear dynamic range of 11 orders of magnitude. Plus, the updated octopole reaction system (ORS) supports the industry's most effective helium collision mode. The Agilent 7900 ICP-MS delivers superior data quality whatever your application.

With automated setup, faster analysis, better interference removal, and a simplified MassHunter software interface, the Agilent 7900 ICP-MS blends high performance with unprecedented ease-of-use.

Unrivaled Performance Driven by Hardware Innovation

Exceptional matrix tolerance

Historically, ICP-MS has been limited to samples that contain <0.2% total dissolved solids (TDS). The robust plasma (indicated by a CeO/Ce ratio <1%) enables the 7900 ICP-MS to easily tolerate this matrix level.
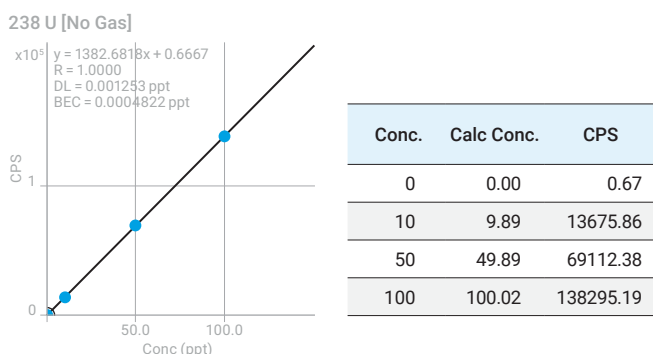
The standard Ultra High Matrix Introduction (UHMI) capability enables you to routinely measure samples containing up to 25% TDS. This is 100 times higher than the traditional limit for ICP-MS, allowing a range of new applications to be addressed.
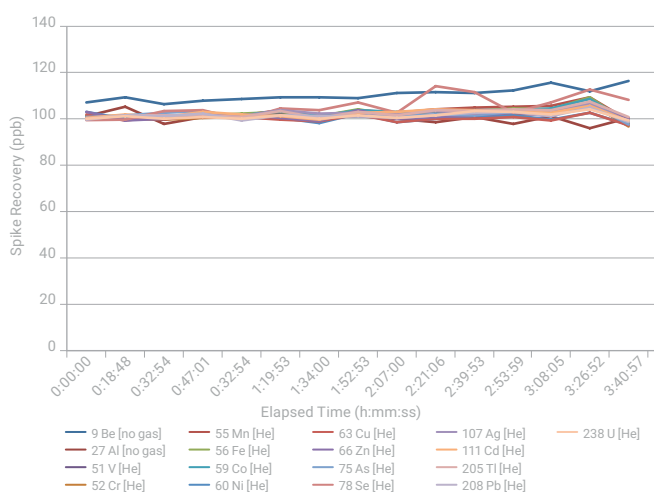
Long-term (3.5 hours) stability of 100 µg/L spike in 25% NaCl brine

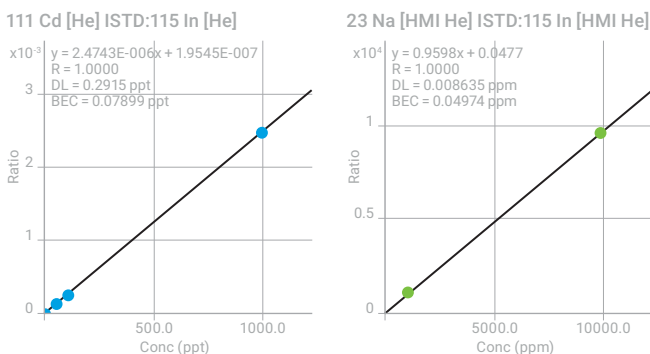## Better trace-level detection

A novel interface design and ion lens and optimized vacuum system increase ion transmission, providing >10^9 cps/ppm sensitivity at <2% CeO. What's more, the new orthogonal detector reduces background, dramatically improving signal-to-noise for lower detection limits and more accurate ultratrace measurements.

238 U [No Gas]

$$y = 1382.6818x + 0.6667$$
R = 1.0000
DL = 0.001253 ppt
BEC = 0.0004822 ppt

Conc.	Calc Conc.	CPS
0	0.00	0.67
10	9.89	13675.86
50	49.89	69112.38
100	100.02	138295.19

[238]U calibration demonstrating sensitivity >1.38 GHz/ppm and BEC < 0.5 ppq

## The widest analytical range of any quadrupole ICP-MS

The new Orthogonal Detector System (ODS) delivers up to 11 orders of magnitude dynamic range, from sub-ppt to percent-level concentrations. That means you can measure trace elements and majors in the same run, simplifying method development and virtually eliminating over-range results.

111 Cd [He] ISTD:115 In [He]

$$y = 2.4743E{-}006x + 1.9545E{-}007$$
R = 1.0000
DL = 0.2915 ppt
BEC = 0.07899 ppt

23 Na [HMI He] ISTD:115 In [HMI He]

$$y = 0.9598x + 0.0477$$
R = 1.0000
DL = 0.008635 ppm
BEC = 0.04974 ppm

Calibrations for Cd (BEC < 0.1 ppt) and Na (top standard 10,000 ppm (1%))

Faster analysis of transient signals

Fast transient signal measurement—used for applications such as capillary chromatography, single-nanoparticle and single-cell analysis, and laser ablation—requires an instrument with very short integration times. The 7900 ICP-MS provides ultrafast data acquisition, with 10,000 separate measurements per second.
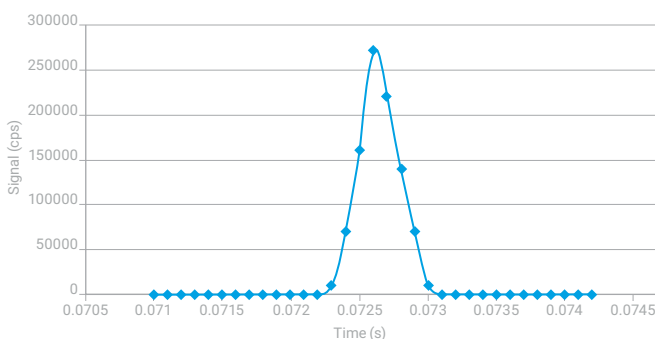
Time Resolved Analysis signal for single 30 nm Au nanoparticle (dwell time 0.1 ms)

Usability By Design

Every component of the Agilent 7900 ICP-MS
is engineered for performance and reliability

Based on Agilent's history of ICP-MS technological
leadership, the 7900 ICP-MS has been re-engineered from
the bench up, with every component optimized for the
demands of busy laboratories.

Sample introduction

The standard low-flow, Peltier-cooled
sample introduction system increases
operational stability and consistency.
The Advanced Valve System (AVS MS) adds
a piston pump and close-coupled seven-port
valve for high-speed discrete sampling.
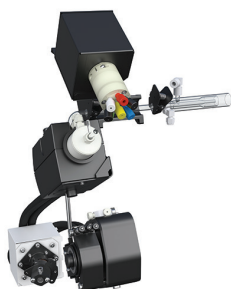
Ultra High Matrix Introduction (UHMI)

Increases matrix tolerance up to 25% total
dissolved solids (TDS). UHMI also improves
plasma robustness, dramatically reducing
matrix suppression.
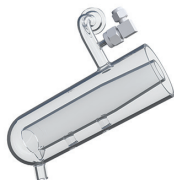
Plasma and Shield Torch System (STS)

Provides precise ion energy control, ensuring high sensitivity
and effective interference removal in helium mode. The torch
auto-aligns with the interface following maintenance.

27 MHz plasma RF generator

The fast, frequency-matching RF generator increases the
tolerance of changing matrices. Even volatile organic solvents
can be introduced without affecting plasma stability.
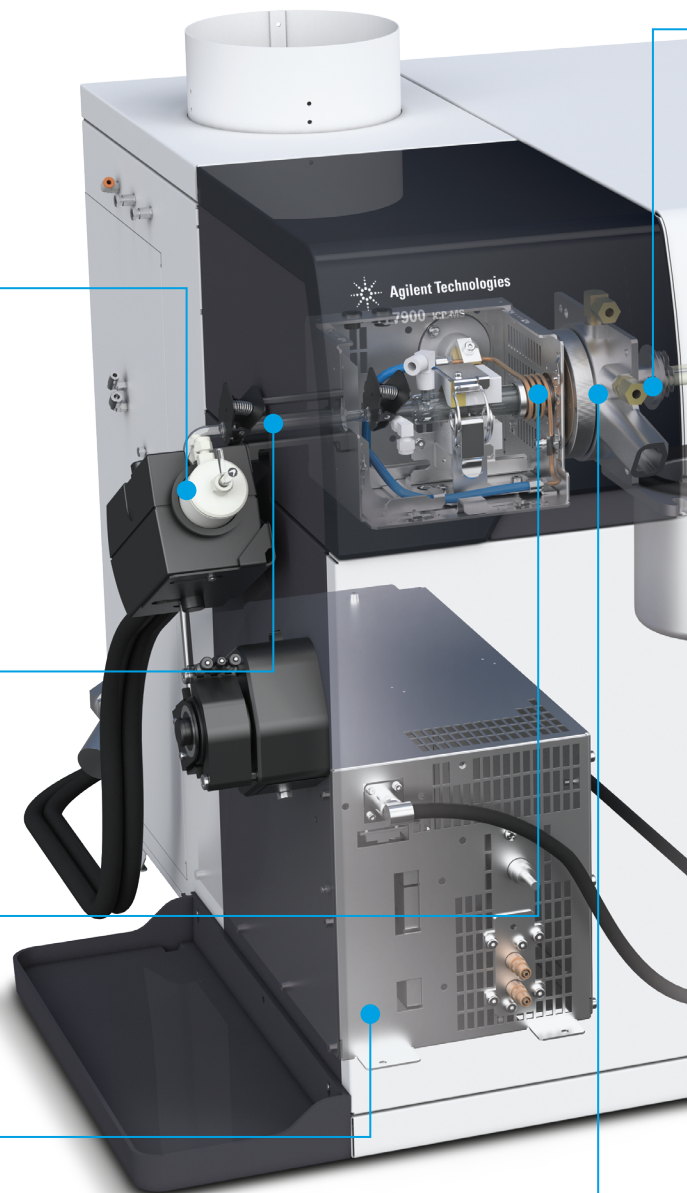
Interface and cones

Standard Ni, or optional Pt-tipped cones
increase ion transmission and matrix
tolerance. Screw-threaded for easy removal
during maintenance.
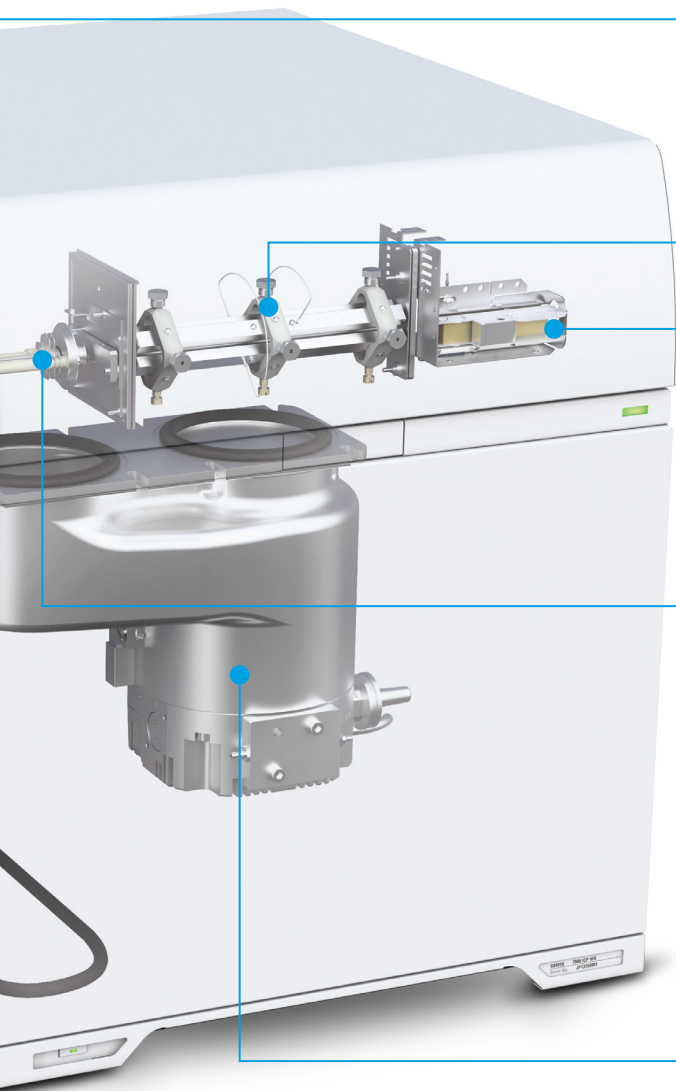
Off-axis ion lens

Improves ion transmission across the mass range, minimizing mass bias and eliminating the need for mass-specific voltage optimization.

Hyperbolic quadrupole

The only hyperbolic quadrupole used in ICP-MS. It delivers superior peak separation and abundance sensitivity, without the need for custom quadrupole settings to separate adjacent peaks.

Orthogonal Detector System (ODS)

The ODS delivers higher sensitivity, lower background, and a wider measurement range—up to 11 orders of magnitude from 0.1 cps to 10 Gcps—virtually eliminating over-range results.
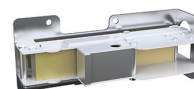
4th-Generation Octopole Reaction System (ORS[4])

Temperature-controlled collision/reaction cell with a new gas controller for fast cell gas switching in less than 3 seconds.
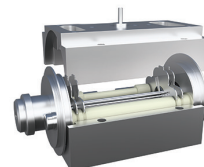
Octopole ion guide

The octopole provides superior interference removal by KED in helium collision mode, and has been field-proven in thousands of Agilent ICP-MS installations.

Vacuum system

A single, high-performance split-flow turbo pump and external rotary pump optimize vacuum in the interface region, increasing sensitivity while improving matrix tolerance.

Compact benchtop design

The world's smallest ICP-MS system saves valuable bench space while ensuring easy access for servicing and maintenance.

Agilent parts and supplies

Manufactured to stringent specifications, and rigorously tested to ensure top quality and maximize instrument performance.

The World's Most Powerful ICP-MS Software

Streamline your workflow

Our next generation ICP-MS MassHunter software features a dashboard layout with gadgets that guide you through every step of your analysis. This user-friendly interface makes learning and using the software easier and more intuitive, without compromising power and flexibility for advanced or research applications.

For labs that follow a well-defined, routine analytical workflow, our browser-based, touch-compatible user interface, ICP Go, is also available as an option.

Automate your method development

ICP-MS MassHunter includes a range of preset methods and an enhanced, innovative Method Setup Wizard. The Method Wizard creates a fully functional method for your sample types, enabling all users, experienced and new, to consistently obtain high-quality data.

Chromatographic data analysis

The Agile2 integrator provides parameter-less integration for accurate and consistent LC peak detection, without requiring the operator to manually enter integration parameters.

Increase the quality and speed of your data review

MassHunter's batch-at-a-glance data table gives you a customizable overview of the current batch—including counts, concentrations, RSD, and replicate data. Other functions of the interactive data table include:

– Comprehensive results, updated in real time

– Flexible, interactive calibration plot display

– Onscreen flags for outliers and QC failures

– Graphical display of internal standard recovery, QC stability plots, IntelliQuant results and mass spectrum or chromatogram

IntelliQuant and Star Rating

IntelliQuant uses a rapid full-spectrum scan to semi-quantitatively analyze every sample even for elements not calibrated. It uses this and other data to highlighting result quality issues using a simple five-star rating. This gives confidence in the data while giving quick access to any problems. The star rating uses multivariate data analysis, reducing analyst stress and time needed to assess data quality. The star rating considers:

– Interferences from unknown elements and matrix components

– Measurement quality

– Detection limits

This happens for every measured isotope in every sample throughout the run; it's like having a QC on every sample.

Simplify your nanoparticle/single cell analysis

The fully integrated and updated Agilent nanoparticle and single cell application module incorporates the process of particle or cell determination into ICP-MS MassHunter software. The Method Wizard guides you through the creation of methods and supports data acquisition in both FFF-ICP-MS and single multielement nanoparticle/single cell modes. With a few clicks, the method is set up and ready to run. The method includes optimized acquisition parameters, reference material values, and data analysis parameters.

Final batch results are reported in tabular and graphical formats. Tab through individual samples in the table and review individual graphical results with powerful optimization tools.

Enhance the Capability of the 7900 ICP-MS

Automated sampling systems to optimize your laboratory's workflow
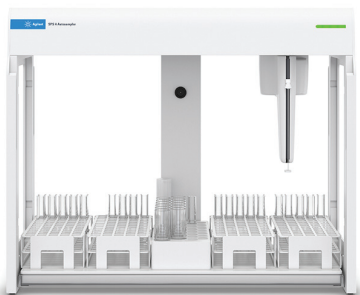
SPS 4 Autosampler

This flexible-configuration automatic sampler holds up to 360 samples. It is robust, easy to use, and ideal for unattended elemental analysis. Also compatible with well-plates.

Agilent I-AS Autosampler with pumped rinse station

Ideal for ultratrace analysis and small sample volumes (0.5 mL). Flexible rack configurations offer a maximum capacity of 89 vials, plus 3 rinse vials. Combined with the 7900s (option #200), the I-AS is ideal for ultratrace analysis of high purity semiconductor reagents.

Advanced Valve System (AVS MS)

High-speed uptake pump and close-coupled seven-port switching valve provide highest possible throughput with discrete sampling.

Industry-leading speciation measurement

The Agilent 7900 ICP-MS can be combined with Agilent HPLC systems through a field-proven interface, documentation, and fully developed application kits. Other hyphenated techniques including CE, IC, and FFF are also easily configured.

Factory-qualified engineers are also available to support your coupled systems.

Advanced Dilution System (ADS)

Designed and manufactured by Agilent, the ADS automates standard preparation and pre-run sample dilutions. It also automates post-run sample dilutions for over-range samples using real-time reactive dilutions during the analysis. Automating dilutions removes common sources of human error, contamination, and wasted time.

Optional accessories support a range of configurations and applications

Nebulizer options—including low-flow, concentric, inert (HF resistant), and parallel path—suit your unique sample types and volumes.

Inert sample introduction kit is O-ring free, and manufactured from PFA for low contamination levels. HF resistant and suitable for high-purity reagents.

Organics kit contains the sample introduction parts you need to run volatile organic solvents.

Laser ablation enables direct sample analysis for bulk and time-resolved applications.

Software control

Virtually unlimited possibilities for optional accessories are now available via Agilent's open-source Software Developers Kit (SDK).

Agilent CrossLab: Real insight, real outcomes

CrossLab goes beyond instrumentation to bring you services, consumables, and lab-wide resource management. So your lab can improve efficiency, optimize operations, increase instrument uptime, develop user skill, and more.

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