

lab-loving people

ICP-MS tailored to your requirements.

PlasmaQuant MS

ICP-MS

analytikjena
An Endress+Hauser Company

PlasmaQuant MS series

If unrivalled analytical performance can be optimally adapted to the requirements of an application, best results are achieved. Choose the best solution.



Mass spectrometry with inductively coupled plasma (ICP-MS) is the versatile, sensitive and fast analytical standard method in various fields of application.

With the PlasmaQuant MS series, Analytik Jena offers ICP-MS that exceed all expectations in terms of reliability, precision and throughput and fulfill all requirements for sample handling, robustness and compliance.

Benefit from superior ICP-MS technology:

- Best analytical performance with **10 times more sensitivity**
- Highest throughput with **50% more samples per hour**
- Most efficient operation saving **50% of the plasma running costs**
- True wide range multielement analysis with **11 orders of analytical range** in pulse-counting mode only
- Exceptional application efficiency with **outstanding mass separation** and **lowest abundance sensitivity** in ICP-MS

PlasmaQuant MS

ICP-MS tailored to your requirements

The PlasmaQuant MS series of ICP-MS provides not only the most sensitive instruments on the market but also exceptional robustness, speed and efficiency in ICP-MS analysis. Four models optimized for individual application requirements allow you to decide for the best solution:

PlasmaQuant MS

The robust ICP-MS for sensitive characterization of high matrix samples.

PlasmaQuant MS Q

The universal workhorse for high throughput and best detection limits in routine monitoring and quality control.

PlasmaQuant MS Elite S

The specialist with elite sensitivity and best signal-to-noise ratio for unparalleled ultra-trace performance.

PlasmaQuant MS Elite

The only ICP-MS of choice for research applications.

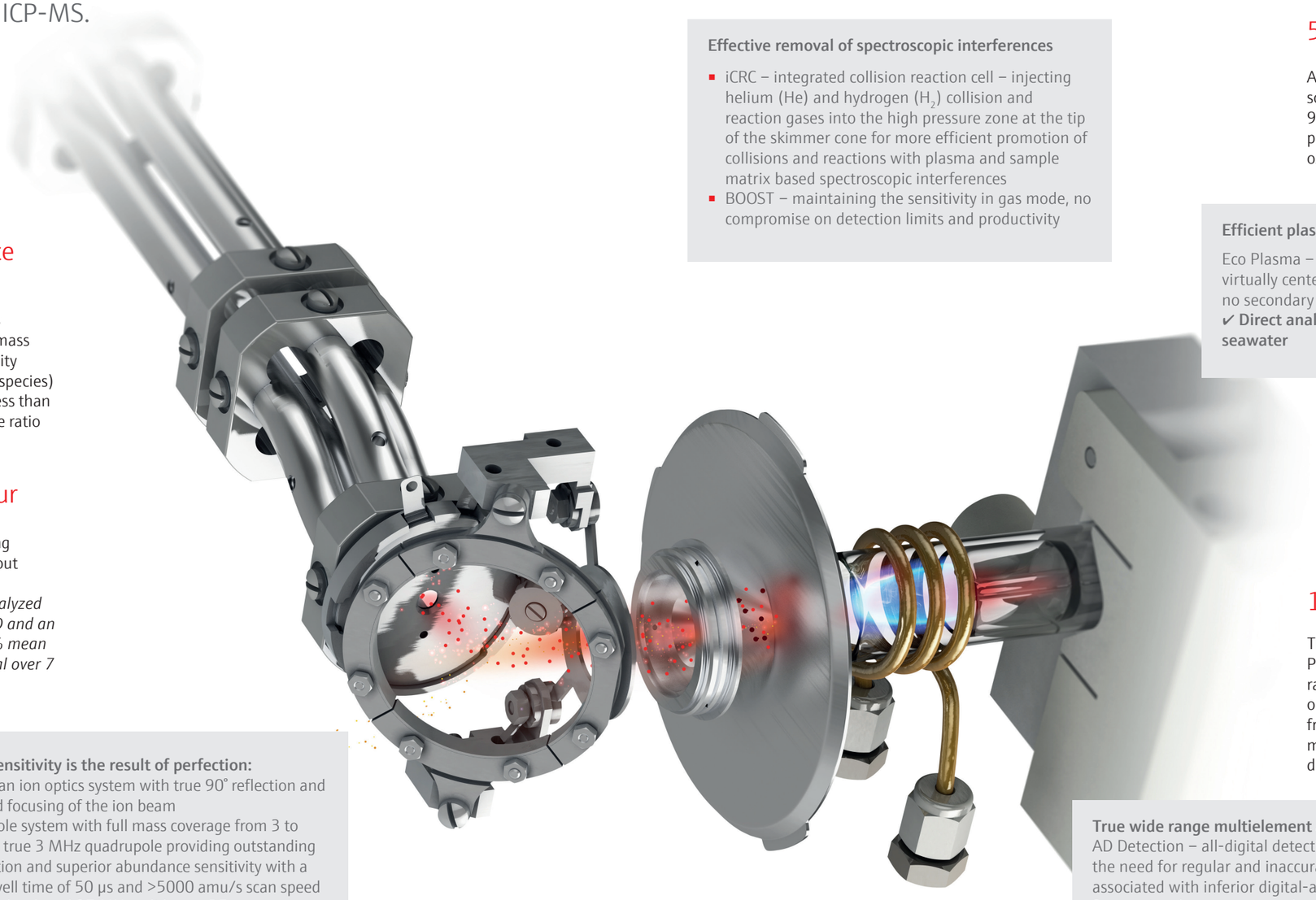
In addition, individual instrument configurations, upgrade options and accessories allow you to customize your PlasmaQuant MS system to your analytical needs.

Your benefits

- An ICP-MS perfectly tailored to your analytical requirements and laboratory conditions
- Flexible configuration, upgrade options and selection of accessories
- Optimized processes and simple operation

Market leading performance and lowest running costs

Unrivalled sensitivity and halved argon consumption guarantee efficiency and precision in high-throughput analysis and demanding research with unsurpassed low operating costs. Find out how patented technology solutions combine to form a perfect ICP-MS.



Best analytical performance

The market leading sensitivity of the PlasmaQuant MS instruments guarantees lowest detection limits. The outstanding mass separation and lowest abundance sensitivity allow the detection of ultra low element (species) concentrations and single particles with less than 5 nm diameter as well as a superior isotope ratio precision.

50% more samples per hour

The outstanding sensitivity allows reducing the measurement time considerably without sacrificing precision and reproducibility.
→ *More than 80 water samples can be analyzed per hour with a precision of about 2% RSD and an outstanding long-term stability (96-104% mean recovery rate of certified reference material over 7 hours).*

Outstanding sensitivity is the result of perfection:

- ReflexION – an ion optics system with true 90° reflection and 3D controlled focusing of the ion beam
- HD Quadrupole system with full mass coverage from 3 to 260 amu – a true 3 MHz quadrupole providing outstanding mass separation and superior abundance sensitivity with a minimum dwell time of 50 µs and >5000 amu/s scan speed
- A specifically developed 27 MHz solid state RF generator delivers 300 to 1600 W plasma power guaranteeing optimum performance for any application.

Simple and effective interference management

The unique interference management with the **iCRC**, brings fast, simple and effective removal of molecular (spectroscopic) interferences to ICP-MS analysis and guarantees excellent long-term stability with tough samples. Fast switching between gases and BOOST technology raise productivity.

Effective removal of spectroscopic interferences

- iCRC – integrated collision reaction cell – injecting helium (He) and hydrogen (H_2) collision and reaction gases into the high pressure zone at the tip of the skimmer cone for more efficient promotion of collisions and reactions with plasma and sample matrix based spectroscopic interferences
- BOOST – maintaining the sensitivity in gas mode, no compromise on detection limits and productivity

50% less plasma running costs

A unique inductively coupled plasma ionization source allows running the ICP-MS on less than 9 L/min argon gas while at the same time providing an exceptional matrix tolerance at low oxide formation (<2% CeO^+/Ce^+).

Efficient plasma generation

Eco Plasma – highly efficient RF system producing a virtually center-grounded, stable and robust plasma, no secondary discharge, no torch shield
✓ Direct analysis of 100% organics or undiluted seawater

11 orders of analytical range

The all-digital detection system of the PlasmaQuant MS provides 11 orders of analytical range (0.1-10^{10} cps) in pulse-counting mode only. This allows accurate multielement analysis from ultra-trace to major levels in a single measurement and guarantees an exceptional detector lifetime.

True wide range multielement analysis
AD Detection – all-digital detection system eliminating the need for regular and inaccurate cross-calibrations associated with inferior digital-analog detectors.
Strong signals are attenuated automatically.



Best performance is a matter of usability

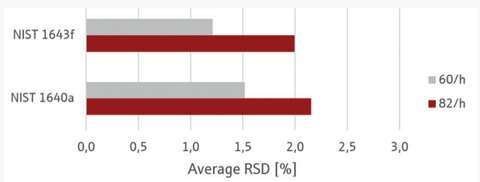
High flexibility and a range of helpful features assist you in solving your analytical challenges. Combined with the lowest operating costs and simple operation, PlasmaQuant MS allows you to work efficiently and comfortably.

Simple handling of tough samples

The market leading sensitivity of the PlasmaQuant MS instruments guarantees lowest detection limits even when diluting high matrix samples. With the aerosol dilution, samples are diluted online which simplifies the handling of samples with high TDS (total dissolved solids) like seawater or digested geological samples. This reduces sample preparation to a minimum and thus increases productivity. In combination with the Nitrox gas accessory pure organic solvents are analyzed with ease. Adding oxygen to the auxiliary gas of the ICP removes the carbon matrix while nitrogen improves the performance for environmental or food matrices.

Best sample throughput

The outstanding sensitivity of the PlasmaQuant MS instruments directly translates into high sample throughput without compromising precision.



Drinking water analysis according to U.S. EPA 200.8. RSD of certified reference materials were measured with two different speeds. The outstanding sensitivity allows to measure >80 water samples per hour with competitive precision.

Low cost, high performance

The combination of an efficient RF generator and an intelligent torch design allows the reduction of argon consumption by half while providing outstanding plasma robustness even at high or frequently changing matrix loads. The widest plasma power range on the market and stable cool plasma capability ensures high flexibility to adapt the plasma performance to your application.

Minimum maintenance

The PlasmaQuant MS ensures minimum downtime and maximum output of sample results. Downtimes for cleaning are significantly reduced thanks to faster measurement of the samples and the robust interface. In addition, the clever book design allows quick access and easy maintenance. Interface cones can be replaced in less than one minute, while the sample introduction system remains in place for quick restart and less optimization.
The patented ion optic system, the ReflexION is maintenance-free due to the unique 90° reflection of analyte ions. Unwanted particles are elegantly removed. The pre-quadrupole with curved fringe rods features patented self-cleaning properties and thus prevents the quadrupole from being contaminated.

Safety first – meet industry health and safety standards

The PlasmaQuant MS instruments are tested and certified according to international standards and regulations to ensure a safe and healthy operation in laboratories worldwide. The plasma compartment of the ICP-MS is fully interlocked and shielded providing complete safety during plasma operation.

Intuitive navigation and compliance

The ASpect MS software of the PlasmaQuant MS features a range of automated options, including a customizable setup and initialization routine, plasma alignment, mass calibration and resolution tests for fast measurement readiness. Automatic optimization of ion optics simplifies method development and includes a selection of optimization routines for different application requirements. The intuitive worksheet interface makes all analysis data, mass scan graphics, calibration data and data logs available at the click of a button.
Comprehensive quality control protocols with a vast selection of automated QC tests and failure actions ensure quality data for the entire analysis.

Including aerosol dilution, Nitrox and BOOST technology, ASpect MS makes fast work of your most difficult samples. Software modules for HPLC coupling and single particle detection provide the flexibility to satisfy all analytical requirements and future demands.

Full **21 CFR Part 11** support guarantees compliance with standards of the pharmaceutical industry and data integrity. All requirements for validation, safety and traceability of analytical data are satisfied.



The ICP-MS that fits your lab

Four models, four optimized sample introduction kits, numerous upgrade options and accessories.

PlasmaQuant MS

The robust system for efficient and stable characterization of high matrix samples with:

- Outstanding plasma robustness for high matrices
- Minimized drift at changing matrix load
- Efficient interference management with outstanding ease of use

Fields of application

- Environmental waters – surface water, waste water, seawater
- Industrial effluents and process samples
- Geology, mining & metals – ores, metals and alloys
- Organic solvents and sample matrices
- Petrochemical samples – raw oils and refined products, e.g., naphtha, kerosene and destillates



PlasmaQuant MS Q

The fast system for high-throughput analysis and superior precision for large sample batches with:

- High sensitivity for optimized data acquisition
- Universal interference management mode
- 11 orders of dynamic range for full coverage of required concentration range

Fields of application

- Environmental waters – drinking water, rain water
- Food samples – beverages, dissolved and digested matrices
- Pharmaceutical industry – raw materials, intermediate and final products
- Life science – urine, serum, plasma and whole blood
- Consumer goods, toy samples, cosmetics

PlasmaQuant MS Elite S

The high sensitivity instrument for routine ultra-trace element detection in clean sample matrices with:

- Ultra sensitive and stable performance for best signal-to-noise ratio
- High ion transmission with full sensitivity control on complete mass range
- Market leading abundance sensitivity

Fields of application

- Semiconductor industry – high-purity acids and surface contaminations
- Purity control of organic solvents and synthesis research
- Geology – analysis of ultra-trace concentrations of rare earth elements
- Isotope ratio analysis for geochronology or provenance studies



PlasmaQuant MS Elite

The flexible system with ultimate sensitivity and targeted performance optimization using various accessories for advanced research:

- Flexible connection of accessories using two entry ports to the plasma compartment
- Ultimate freedom of optimization through full ion focus control
- Shortest dwell time and best mass separation

Fields of application

- Laser ablation ICP-MS for trace analysis and element mapping with high spatial resolution
- Detection of nanoparticles <5 nm or in combination with field flow fractionation
- Analysis of isotopes with extremely low abundance
- Investigation of element species using HPLC

Matrix-optimized sample introduction kits

- **Starter Kit PQMS STANDARD**
  Standard sample introduction kit for aqueous samples with moderate acid concentration (<10% HNO_3 or HCl)
- **Starter Kit PQMS ORGANIC**
  Sample introduction kit for organic solvents and organic matrices
- **Starter Kit PQMS INERT Geochem**
  Sample introduction kit made of corrosion resistant PFA material incl. a sapphire injector for the semi-demountable torch
- **Starter Kit PQMS INERT Semicon**
  Sample introduction kit made of corrosion resistant PFA material incl. a platinum injector for the semi-demountable torch

Upgrade options

- **Adaptive Mass Range (AMR)**
  Limited isotope separation according to regulatory export requirements
- **Aerosol dilution**
  Direct analysis of high TDS samples
- **Autosamplers**
  For high-throughput applications
- **Clarity HPLC Software**
  Control of the complete HPLC workflow
- **FAST sample introduction**
  For improved speed and washout
- **Hydrogen generator**
  Safe and reliable supply of hydrogen gas
- **Internal Standards Kit**
  On-line addition of internal standards
- **Nitrox**
  Additional gas supply of O_2 and N_2
- **Platinum Interface Cones**
  For petrochemical applications or for applications with highly corrosive acids
- **Trigger Box TTL**
  For laser ablation coupling

Meeting industry needs

Do not wait for an answer to your analytical requirements. Choose the optimal instrument solution with a support team that is commited to its mission and achieve your goals straight away.

Fast and robust multielement analysis

- Precise measurement of elements from percentage to ultra-trace range
- High throughput of up to 80 samples per hour and beyond
- Robust long-term performance with <3% RSD over 5 hours
- High flexibility with exceptional hot and cool plasma capability

Speciation analysis far below current international limit values

- Fast and reliable speciation analysis for elements such as arsenic, chromium, and mercury
- Best ultra-trace capability for research applications thanks to market-leading sensitivity

Extra sensitive detection with part-per-quadrillion detection limits

- Sensitive detection of REE in minerals
- Impurities testing in high-purity metals
- Impurity control in semiconductor applications

Accurate isotope ratio determination

- Reliable results in dating and provenance testing
- Precise determination of isotope ratios in industrial environments, e.g., food provenance and food fraud, cooling water in nuclear power plants

Efficient laser ablation analysis using smallest sample spot sizes

- Direct elemental analysis of rocks, minerals, metals and alloys
- Highly sensitive isotope ratio analysis of minerals for geochronology
- Element mapping of tissues, rocks and minerals with smallest spot sizes for excellent spatial resolution

Detection of smallest particles

- Accurate and reliable detection of single particles even with diameters <5nm
- Interpretation of acquired data for particle characterization
- Coupling to Field Flow Fractionation for extended particle research

Dedicated support

- Application team for worldwide support on technology and method development
- Extensive training program with workshops, seminars, user trainings
- Global service network for immediate response to your requests






Environment

Fast and efficient environmental analysis meeting all international environmental regulations for all kinds of water, including sea and waste water, soils and sediments, or industrial process and waste monitoring, e.g., waste incineration, sludge, combustibles, with:

- Simple sample handling thanks to high matrix tolerance and aerosol dilution
- Wide-range detection from percentage down to pg/L range
- Advanced performance for Se and As using Nitrox
- Predefined methods

Food & agriculture

Fast and reliable quality control and food safety testing of beverages, digested food stuffs, seeds, plant materials and fertilizers, with:

- Detection limits far below current international limits
- Highly sensitive speciation analysis using HPLC coupling
- High-throughput with fast sample introduction
- Simple sample handling with aerosol dilution
- Wide-range detection from percentage down to pg/L range
- Advanced performance for Se and As using Nitrox

	Concentration µg/Lx				
	As (III)	As (V)	DMA	MMA	As total
Apple juice 1	0.297	1.550	0.088	0.010	1.945
Apple juice 2	0.186	0.430	0.084	0.007	0.707
Organic apple juice	0.052	0.102	0.037	0.007	0.198

Arsenic species concentration in apple juice samples
DMA = dimethyl arsenic; MMA = monomethyl arsenic

Geology, mining & metals

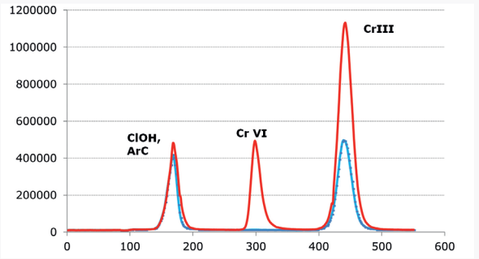
Highly sensitive analysis of minerals and metals for ultra-trace REE detection in geochemical analyis, QC analysis in metal production and process control and advanced research in geochemistry, with:

- Simple sample handling thanks to high matrix tolerance, exceptional hot and cool plasma capability and direct solids analysis using laser ablation
- High spatially resolved elemental mapping results using laser ablation
- Reliable isotope ratio analysis

Chemicals & materials

Efficient and sensitive analysis of high-purity chemicals, safety testing of consumer goods according to international standards, process control and advanced materials research with:

- Best detection limits with outstanding signal-to-noise ratio
- Ultra-trace speciation analysis using HPLC coupling
- Wide-range detection from percentage down to pg/L range
- Direct solids analysis using laser ablation



Chromatograms showing an addition of 0.005 mg/kg (red) of Cr(III) and Cr(VI) on a toy sample (blue)

Pharma & life science

Reliable and sensitive analysis of pharmaceutical raw materials and final products as well as body fluids and tissue with:

- Full compliance to 21 CFR part 11 and international pharmacopoeias
- Ultra-trace speciation analysis using HPLC coupling
- Stable analysis of aqueous and organic sample matrices
- Simple sample handling thanks to high matrix tolerance and aerosol dilution or laser ablation coupling for direct solids analysis

Oil & gas

Robust, yet sensitive analysis of organic solvents, petrochemicals and combustibles:

- Simple sample handling thanks to temperature controlled sample introduction, high matrix tolerance and exceptional hot and cool plasma capability
- Long-term stability with Nitrox reducing carbon deposition on the cones
- Particle characterization from abrasion processes

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