

# The New Perspective in ICP-MS

## PlasmaQuant® MS

Inductively Coupled Plasma Mass Spectrometry



# PlasmaQuant® MS Series

"Excellence is not a skill. It is an attitude."  
(Ralph Marston)

Our aim is to provide the most comfortable and reliable instruments for diverse analytical tasks. Continuous improvement and development plus the use of selected, certified components guarantee absolute precision, outstanding analytical performance, robustness and durability of Analytik Jena instruments.

## PlasmaQuant® MS – patented technology solutions

- **Eco Plasma**  
Robust plasma performance with half the Argon gas
- **iCRC – Integrated Collision Reaction Cell**  
Interference-free analysis plus BOOST technology
- **ReflexION**  
3D focusing ion mirror for unsurpassed sensitivity
- **HD Quadrupole**  
True 3 MHz quadrupole provides superior mass separation
- **ADD<sup>10</sup> – All-Digital Detection System**  
10 orders linear dynamic range

## PlasmaQuant® MS:

The universal workhorse for a wide range of applications

## PlasmaQuant® MS Elite:

The only instrument of choice for research applications



# PlasmaQuant<sup>®</sup> MS

The New Perspective in ICP-MS



# Smart Technologies – Work Simply

## Save your resources

A major advancement in RF generator design has produced a world first in ICP-MS. A plasma system that requires only half the argon gas.

The highly efficient RF system of the PlasmaQuant® MS produces a virtually center-grounded, stable and robust plasma with a conventional torch using as little as 7 L/min plasma gas. Superior design means that no torch shield is required to eliminate problematic secondary discharge as the plasma is electrically balanced.

The PlasmaQuant® MS is extremely reliable – able to run any sample matrix from waste water to organic solvents. The **integrated aerosol dilution** allows direct analysis of high TDS samples. Simply dilute samples online.

The **Nitrox** provides an additional gas flow controller, allowing for the introduction of alternate gases to the plasma including oxygen and nitrogen, depending on your application requirements.

## Eco Plasma – Your Benefits

- New and advanced design
- Robust plasma performance
- Increased productivity
- Lowest operating costs



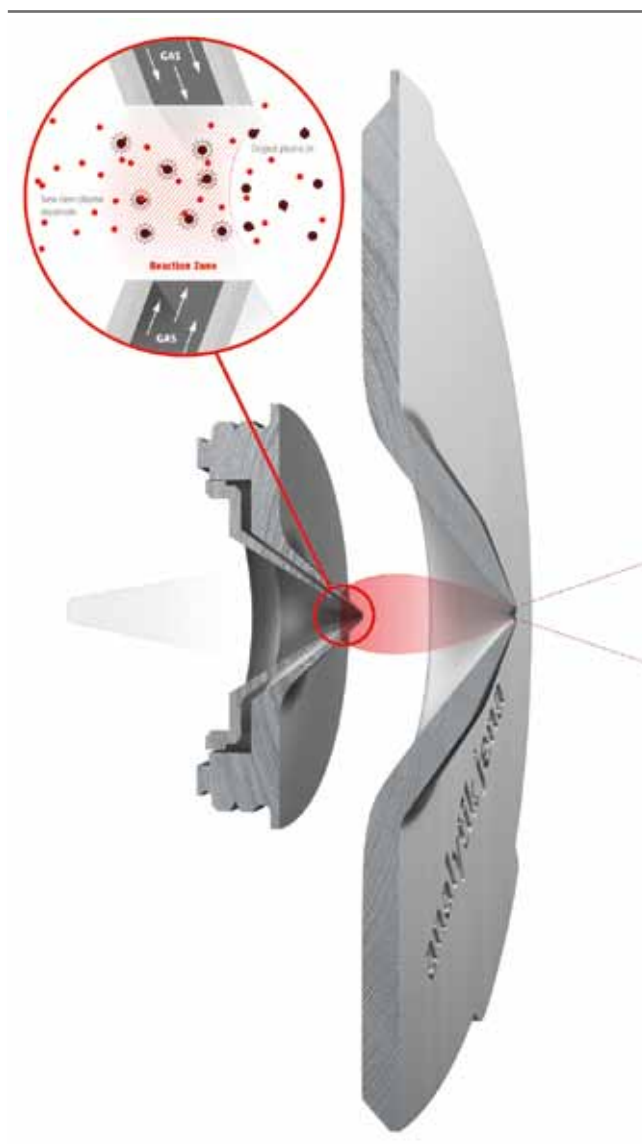
### Boost your performance for difficult matrices

The integrated Collision Reaction Cell (iCRC) brings simple and effective removal of troublesome interferences to your sample analysis. The iCRC injects helium (He) and hydrogen (H<sub>2</sub>) collision and reaction gases into the high pressure zone at the tip of the skimmer cone. This more efficiently promotes collisions and reactions with plasma and sample matrix based spectroscopic interferences in a much smaller cell volume for fast, simple interference-free analysis.

On any ICP-MS, the introduction of collision/reaction gases results in the loss of analyte signal. While this is expected for interfered isotopes, analyte ion signals not directly interfered with are also suppressed. The operator must choose to either sacrifice detection limits to increase productivity or completely remove the collision/reaction gas from the cell before making another measurement. With the exclusive BOOST technology, sensitivity is maintained without having to remove the collision or reaction gas. That means no waiting for the cell to purge and no compromise on detection limits and productivity.

#### iCRC – Your Benefits

- Efficient removal of spectroscopic interferences
- Fast switching between gases raises productivity
- Excellent long term stability with tough samples
- Achieve peak performance with BOOST
- No additional maintenance



### Be accurate – Detect ions all-digital

The PlasmaQuant® MS is the only ICP-MS to offer an all-digital detection system, providing ten orders of linear dynamic range in pulse-counting mode only. This eliminates the need for regular and inaccurate cross-calibrations associated with inferior digital-analog detectors.

The ADD<sup>10</sup> accurately attenuates strong signals automatically without requiring a separate analog measurement. The benefit is exceptional detector lifetime and fast, accurate multi-element analysis from ultra-trace to major levels in a single measurement.

#### ADD<sup>10</sup> – Your Benefits

- Full 10 orders linear dynamic range
- No inaccurate analog calibrations
- Exceptional detector lifetime

# High-Tech Engineering – Raise Your Limits

## Focus your ions

The ReflexION is an innovative three-dimensional focusing ion mirror that efficiently reflects the ion beam 90 degrees. Generating a parabolic electrostatic field, the incoming ion beam is reflected, and not deflected. The result is analyte ions of different size and energy are tightly focused before entering the quadrupole. This means more ions enter the quadrupole providing higher signals for all analyte ions across the entire mass range. At the same time, photons and neutrals pass harmlessly through the electrostatic field, reducing the background signal for lowest detection limits.

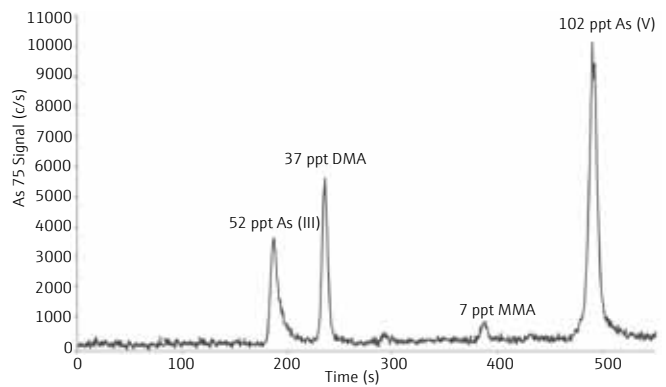
Only the PlasmaQuant® MS offers up to 5 times the sensitivity of competitive systems.

### ReflexION – Your Benefits

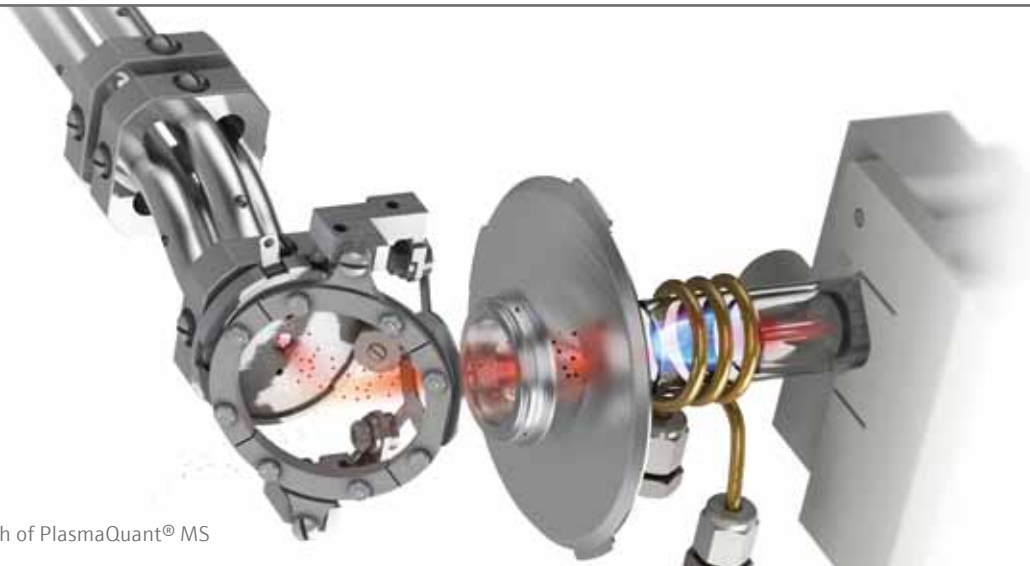
- Reflects the ion beam 90° for superior sensitivity
- Full 3D ion beam control for easy optimization
- Low background as photons and neutrals pass straight through
- No contamination – no maintenance

	Concentration µg/L				
	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

DMA = dimethyl arsenic; MMA = monomethyl arsenic



Separation of organic and inorganic Arsenic species in organically grown apple juice using LC-ICP-MS.



Ion beam path of PlasmaQuant® MS

### Be different – Separate ions in HD

The true 3 MHz, high-definition quadrupole mass analyzer delivers exceptional mass separation and ultra-fast scan speeds. Precision machined from stainless steel, the low noise quadrupole rods provide a near-perfect hyperbolic field. With full mass coverage from 3 to 260 amu, the PlasmaQuant® MS can quantify all known stable isotopes. Superior abundance sensitivity makes it well suited to isotopic analysis, while the ability to quickly integrate signals at 50  $\mu$ s is ideal for laser ablation and single-particle analysis.

Preceding the quadrupole, the patented selfcleaning curved fringe rods provide a double off-axis mass analyzer, reducing background noise to < 1 count per second.

#### HD Quadrupole – Your Benefits

- True 3 MHz quadrupole for superior mass separation
- Ultra-fast scan speeds and integration times
- Low background from double off-axis design
- No contamination – no maintenance



## Intelligent Design – Make Lab-Life Easy

### Dual connection technology – Customize to your needs

The twin-position, bench-mounted design includes dual connection technology offering complete flexibility in configuring the system to your laboratory requirements. Two entrance ports located on the front and side of the instrument allow direct connection of multiple accessories to the plasma torch at the same time. You are only limited by your imagination.

### Designed like a book – Open up to easy maintenance

The clever book design allows for easy access and maintenance. Interface cones can be easily replaced in less than one minute. The plasma torch compartment is fully inter-locked and shielded providing complete safety during plasma operation. Yet, allows for easy access when not in use. The self-locating torch is automatically aligned when reloading, producing reliable and repeatable performance.



Two entrance ports to the sample compartment allow for individual installation of the instrument and easy connection of accessories.

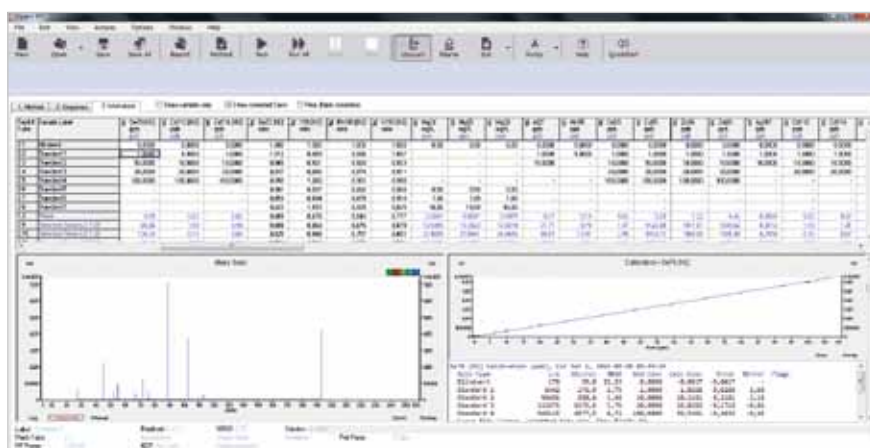




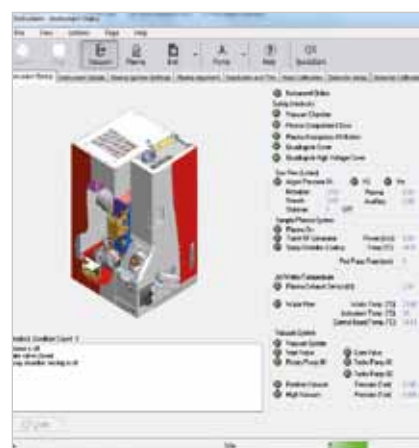
### Work smoothly with intuitive navigation

Analytik Jena's ASpect MS software redefines ease-of-use with our intuitive worksheet interface. All analysis data, mass scan graphics, calibration data and data logs are available at the click of a button. The dynamic Instrument Status window provides a quick visual status check of all system components. An excellent diagnostic tool that maximizes instrument up-time.

ASpect MS features a range of automated options, including setup and initialization routine, plasma alignment, mass calibration and resolution tests. Automatic optimization of ion optics simplifies method development and includes a selection of optimization routines for different application requirements. 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 and new BOOST technology controls, ASpect MS software makes fast work of your most difficult samples.



Worksheet



Instrument status

# Enjoy Simplicity in Demanding Applications



The PlasmaQuant® MS delivers outstanding performance for applications, including research, that benefit from industry-leading sensitivity and low background.

## Laser ablation

When coupled to a laser ablation device, the PlasmaQuant® MS Elite's unmatched Gigahertz sensitivity allows the analysis of smaller spot-sizes and thus an excellent spatial resolution. Making it ideal for applications in geochemistry, material sciences and biological imaging.

## Liquid chromatography

With fully-integrated LC-ICP-MS compatibility, low level quantification of analyte species is a breeze. The PlasmaQuant® MS offers dual entry port into the torch compartment allowing for easy setup of any HPLC system.

## Isotope ratios

The Elite's high sensitivity and extended range all-digital detector delivers excellent results for isotope ratio determinations. High precision and accuracy is always achieved whether measuring low concentrations or large isotope ratios.

## Single particle analysis

The combination of high sensitivity and fast scan rates makes the PlasmaQuant® MS Elite the perfect technique for single-particle analysis. Detection of nano-particles of less than 10 nm diameter are no challenge.

Analytik Jena is part of a long tradition in developing innovative analytical systems in Jena

# Engineered for Excellence

which dates back to the inventions made by Ernst Abbe and Carl Zeiss more than 150 years ago. Within the last 25 years our company group has grown to become one of the most innovative manufacturers of analytical measuring technology worldwide.

## Technology competence

Analytik Jena develops and manufactures instruments in High-Resolution Continuum Source and Line Source AAS, High-Resolution Array ICP-OES, ICP-MS, Mercury analysis, UV/Vis/NIR spectroscopy, TOC/TN<sub>6</sub>, as well as AOX/EOX/TOX/POX analysis, C/N/S/Cl elemental analysis and the determination of the antioxidant capacity.

The company's broad product range also comprises dedicated accessories and laboratory consumables.

## Completing the picture

The PlasmaQuant® MS and PlasmaQuant® MS Elite expand Analytik Jena's elemental analysis portfolio. Combined with our extensive range of atomic spectroscopy products, including the novAA® and ZEEnit line source AAS range, the innovative High-Resolution Continuum Source contrAA® AAS series and the PlasmaQuant® PQ 9000 High-Resolution Array ICP-OES, Analytik Jena has the solution to your analytical needs.

## Analytik Jena – the technology leader in spectrometry

### Optical Spectrometry



**novAA® Series**  
Classical line source AAS with Dual Optics and Deuterium background correction.



**contrAA® Series**  
High-Resolution Continuum Source AAS with simultaneous background correction for fast sequential and simultaneous multi-element analysis.



**ZEEnit Series**  
Line source AAS with Deuterium and Zeeman background correction with third generation magnetic field control.



**PlasmaQuant® PQ 9000 Series**  
High-Resolution Array ICP-OES with Dual View PLUS plasma observation for automated attenuation of axial and radial plasma views.

### Mass Spectrometry



**PlasmaQuant® MS Series**  
Bench-top ICP-MS with patented ion optics for unmatched sensitivity and robust plasma performance with only half the argon gas.

### Sample Preparation



**TOPwave®**  
Microwave digestion system with contactless pressure and temperature monitoring for all samples.

#### Headquarters

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Photos: Analytik Jena AG  
Subjects to changes in design and scope of delivery as well as further technical development!

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