

PlasmaQuant MS in Organic Solvents and Petrochemical Analysis

Recommended configurations

Industry requirements

- Robust and reliable performance
- Matrix tolerance
- Easy operation
- Start-up routine
- Low maintenance

Regulations

National and global regulations, e.g., ASTM, EN

Instrument characteristics

- Temperature controlled sample introduction
- Robust plasma with exceptional hot and cool plasma capability handling 100 % organics with ease
- Stable instrument performance even with changing matrices
- Throughput typically 10-20 samples per hour with standard sample introduction
- Unique interference management



In petrochemical industries the growing number of elements to be determined as well as the increasing specifications concerning detection limits, make ICP-MS the method of choice for specific applications. In addition ICP-MS is used in purity control of organic solvents and the analysis of samples only soluble in organic solvents, such as digested food and pharmaceutical matrices. Typical laboratories are contract labs, private labs as well as refinery QC labs.

Sample types

- Organic solvents – Ethanol, IPA, Toluene, Xylene, DMF or Decane
- Samples only soluble in organic solvents – pharmaceutical raw materials and end products, food samples

- Petrochemicals – all types of oils, naphtha, gasoline, kerosene, diesel, distillates

Recommended instruments

PlasmaQuant MS is the most suitable instrument for organic samples and the petrochemical industry. It provides the sensitive solution for the characterization of samples with moderate matrix concentration.

PlasmaQuant MS Q can be recommended whenever sensitivity and hence lower limits of detection matter or a higher sample throughput is required.

Application	Sample Introduction Kit	Sheath Gas / Aerosol Dilution	Nitrox	FAST Sample Introduction	Cones	PlasmaQuant MS		PlasmaQuant MS Elite	
							Q	S	
Highly volatiles	Organic	Optional	Yes O ₂	Optional	Platinum	✓	✓		
Solvents	Organic	Optional	Yes O ₂	Optional	Platinum	✓	✓		
Oils	Organic	Optional	Yes O ₂	Optional	Platinum	✓	✓		

When to choose which instrument

Rule of thumb:

- Challenging organic matrices and moderate sample throughput → PlasmaQuant MS
- Lowest detection limits or higher throughput → PlasmaQuant MS Q

In combination with HPLC all PlasmaQuant MS models guarantee fast and reliable speciation analysis far below current international limits of, e.g. CrIII and CrVI.

Furthermore all models allow the characterization of natural and artificial single particles, e.g. in the characterization of motor and gear box oils. For diameters <20 nm the PlasmaQuant MS Elite S is recommended.

Nitrox mandatory: allows the addition of nitrogen or oxygen to the plasma. Oxygen guarantees stable instrument performance when analyzing organic matrices, since it prevents carbon deposition on the cones. All PlasmaQuant MS instruments furthermore need to be upgraded with Pt tipped cones when applying oxygen to the auxiliary gas of the ICP.

Recommended basic configuration

- PlasmaQuant MS model
- Start Kit Organic
- Autosampler
- Chiller
- Nitrox
- Pt cones

Upgrades and accessories

- Fast/discrete sample introduction
- Aerosol Dilution
- HPLC, e.g. PQ LC
- Microwave digestion, e.g. TOPwave

Benefits of upgrades and accessories

Autosampler: automated sample introduction provides the user with time for other activities. Combined with QC samples and defined response actions the automated sequence can run unattended or over night.

Fast/discrete sample introduction: autosampler upgrade that reduces sample or rinse delay times by 80 %, significantly increasing sample throughput.

Aerosol dilution: is recommended since an additional argon gas flow can stabilize the plasma conditions when working with very low sample uptake and reduced nebulizer flow.

HPLC: coupling of a PQ LC HPLC or others for chromatographic separation of element species for speciation analysis of elements such as As, Se, Cr or Hg using LC-ICP-MS.

Microwave digestion: systems for microwave assisted acid digestion of samples, e.g. the speedwaveXPert, guarantee a complete digestion of solid or highly viscous samples and thus the basis for complete quantification of all components and high reproducibility.

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