

The Thermo Scientific XSERIES 2 Quadrupole ICP-MS (Inductively Coupled Plasma Mass Spectrometer) is the most comprehensive quadrupole ICP-MS platform for high performance across the entire periodic table.

Thermo Scientific XSERIES 2 ICP-MS

Embrace all elements



Outline Description

The XSERIES 2 ICP-MS is robust enough for your toughest analytical challenges. It is a powerful, precise measurement tool designed for maximum productivity in a wide cross section of applications. More than just an instrument, the XSERIES 2 is a complete solution that includes proven reliable hardware, fully featured software, on-going methods development, responsive service, and knowledgeable technical support.

Source

ICP source with all solid-state 27.12 MHz RF generator.

Ion Optics with π extraction

Unique Infinity[®] Ion Lens with lowest background and highest signal to noise ratio of any quadrupole ICP-MS.

The unique π Extraction optics used in the XSERIES 2 greatly reduce the Blank Equivalent Concentrations seen in all instrument configurations. This dramatically improves detection limits in a wide range of applications.

Analyzer

Off-axis high-performance quadrupole, mass range 2-255 amu.

Detector

Simultaneous analogue/pulse counting electron multiplier >10⁹ dynamic range.

Electronics

Solid-state with high-speed signal processing for transient signal analysis.

Software

PlasmaLab Windows[®] platform.

Sample Introduction

Open architecture sample introduction system utilizing an externally mounted spray chamber. Includes a standard "Plug-in" self-locating torch mounted to a close-coupled torchbox housed within a compact Faraday cage for RF protection. A viewing window is fitted to the torchbox door providing full UV protection. Plasma gases are efficiently extracted and a vapor shield prevents ingress of corrosive plasma gases into the critical components of the mass spectrometer.

Peristaltic Pump:

Close coupled, computer controlled, variable speed (up to 100 rpm), 3-channel and 12-rollers.

Nebulizer:

Glass concentric nebulizer (0.8 ml/min).

Spray Chamber:

Glass single-pass conical spray chamber with fixed impact bead.

Torch:

One-piece quartz torch, 1.5 mm I.D. injector.

Precision Torch Adjustment:

Full PC control of the horizontal, vertical and plasma sampling-depth positions is included, with all parameters stored in each analytical method.

Precision Gas Control:

3 computer controlled mass flow controllers, for Nebulizer, Coolant and Auxiliary gas flow.

RF Generator

Solid State Technology, crystal controlled with dynamic tuning.

Frequency:

27.12 MHz

Power Range:

PC controlled 100 W to 1600 W in 10 W increments. Optimum power settings defined and stored within each method for different sample types. Automated plasma startup and shutdown under PC control.

Interface

Optimized Plasma Interface:

Provides uniform mass response. A unique, hinged interface front-plate allows easy access to the extraction ion lens.

Sample and Skimmer materials:

Ni Standard (Pt tipped optional), replaceable without venting the analyzer chamber.

Slide Valve:

PC controlled slide valve, automatically isolates mass analyzer when power or plasma is off. The slide valve allows the cones and extraction lens to be cleaned without venting the vacuum system.

Ion Optics

Elimination of photons and neutrals:

Unique chicane Ion Lens with offset analyzer and detector, reduces background noise to <0.5 cps.

Infinity[®] Ion Lens:

Incorporates a high efficiency hexapole ion guide, driven by mass dependent RF voltages to optimize ion transmission across the whole mass range. Interactive or autotune controlled ion focusing with optimized parameters stored in the analytical method.

The Infinity[®] Lens is fitted in the vacuum chamber using a polarized (asymmetric) hanging mount system to facilitate fast removal and refitting by a service engineer at a preventative maintenance visit.

Quadrupole/Mass Analyser

RF Generator:

Solid state, 2.0 MHz

Vacuum System:

Three-stage pumping configuration with advanced split-flow turbomolecular pumping for extremely high gas throughput. "Top-entry" vacuum-chamber with simple access to analyzer components.

Vacuum Chamber Electrical Connections:

All connections within the vacuum chamber utilize gold spring contacts fixed into the chamber lid, eliminating wiring and minimizing RF leakage to ensure good electrical contact at all times.

Stable Vacuum:

15 minutes from atmosphere

Analyser Pressure:

<6 x 10⁻⁸ mbar (Slide Valve Closed)

<2 x 10⁻⁶ mbar (Slide Valve Open)

Quadrupole Configuration:

230 mm x 12 mm rods utilizing an easy access polarized hanging mount system.

Quadrupole Material:

Molybdenum plus high purity alumina ceramic

RF Pre-filter:

Yes

Quad Settle Time:

Dynamically set from a minimum of 100 µsecs

Mass range:

2 - 255 amu

Scanned at >12000 amu/sec.

Detection

AutoRange Plus:

An advanced simultaneous, discrete dynode electron multiplier, with nine orders of linear dynamic range, accurately measures major and minor concentrations in a single analytical run. Intelligent over-range protection and fully-automated detector cross-calibration for superior linearity, leads to unparalleled long term signal stability and cross-calibration stability between detector modes.

A unique cradle design ensures no cable connections are required inside the high vacuum area for improved reliability and easy replacement.

Measurement Range:

>9 orders of magnitude.

Protection:

Full software protection in all modes of analysis, with auto reset.

Data Acquisition

Multichannel Analyzer:

65,000 channels.

Sweep accumulation:

Multiple buffer data acquisition allows uninterrupted fast data acquisition.

Minimum Dwell Time:

100 µsecs for both pulse counting and analog detector modes.

Acquisition Modes:

Peak Jumping, Scanning, Split Scanning, Mixed Peak Jumping and Scanning in same acquisition and Time Resolved Analysis (TRA) using integral software.

Instrument Control Electronics

Instrument Communications:

RS232C serial communications

Embedded PC control:

Industrial model PC with 128 Mb onboard RAM and Solid State "Disk-on-a-chip" non-volatile memory. The embedded PC uses proprietary ICP-MS control code running on a state-of-the-art QNX® Neutrino® real-time operating system. Data acquisition and instrument control uses a custom designed PCI card.

Distributed Control Electronics:

Separate electronic control boards with their own fail-safe control logic are mounted close to the hardware items they control reducing cabling to a minimum.

All internal communications for the distributed electronics use the industrial quality highly robust Centralized Area Network (CAN) protocol.

PlasmaLab Desktop PC

Supplied with all XSERIES 2 ICP-MS instruments, it provides fully automatic control of the spectrometer and appropriate accessories under Microsoft Windows® XP operating system.

The software features a re-designed user interface using a range of tools to make setting up even complex analyses very fast and easy with advanced automatic optimization algorithms. All raw data, results and parameters are stored in a single database for each experiment giving easy access to all information. Comprehensive reporting facilities are provided, and data can be transferred to other applications for consolidation with other data. Comprehensive QC facilities provide confidence in results quality and compliance with legislative requirements. PlasmaLab software is available in several languages.

Manuals

A comprehensive Getting Started Guide and extensive online, context sensitive Help/Software Reference Guide are supplied as standard.

The Standard XSERIES 2

The XSERIES 2 ICP-MS is designed for demanding applications requiring exceptional matrix tolerance and extreme productivity. As such it is configured with the following tailored system components.

Xt Interface

The interface has been designed to give very low matrix-based polyatomic species to allow easy correction with simply derived equations. With the Xt interface it is possible to measure to over 200 mg/l sodium in the same mass scan as ng/l levels of ultra-trace analytes without the use of a sensitivity attenuating CCT mode.

Sampling Aperture: 1.1 mm

Skimmer Aperture: 0.75 mm

PlasmaScreen Plus

At normal plasma RF powers (1400 W) PlasmaScreen Plus enhances sensitivity without compromising the <0.5 cps background seen in the standard XSERIES 2 performance.

Optional XSERIES 2 Components

Peltier Cooling

A Peltier cooled, low-volume conical spray chamber fitted with a fixed impact bead and a high performance glass concentric nebulizer is provided to enhance stability and to enable fast washout and minimum cross contamination. The Peltier block is electronically controlled enabling different spray chamber temperatures to be used within an analytical method.

Xs Interface

The Xs interface (available in either nickel or platinum) provides improved sensitivity at low and (especially) high masses whilst retaining the incredibly low background characteristics.

Inert Spray Chamber

Comprises second generation, inert, high-purity, polypropylene, single-pass conical spray chamber with impact bead, suitable for use with aqueous, organic and HF solutions.

Additional Gas Kit

An additional computer controlled mass flow controller to provide make-up gas capability with high performance low flow nebulizers and/or mixed gas plasmas for solution or LA-ICP-MS applications.

Collision Cell Technology (CCT)

The XSERIES 2 features third generation collision cell technology, incorporating 2 computer controlled mass flow controllers for interactive or fully automated optimization. The innovative π Extraction

optics control the energy of the ions entering the collision cell so they are optimized for both kinetic energy discrimination or reaction chemistry.

CCT allows energy discrimination that efficiently eliminates matrix and argon-based spectral interferences using simple reaction gases, minimizing unwanted reactions in the cell without complex electronics.

Gas Purity: H₂/He 99.996 %

Flow rate: 0.1-10 ml/min

Regulated pressure: 30 – 50 mBar

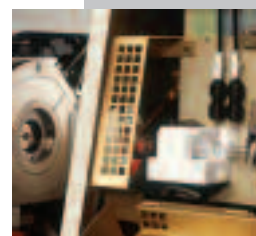
Required: High quality 2 stage regulator

Organics Kit

The analysis of organic solvents is accomplished by utilizing the Organics Kit. Comprising of computer controlled 0-500 ml/min mass flow controller for oxygen addition, together with an inert spray chamber with O₂ port, a 0.1 ml/min glass concentric nebuliser and organic solvent compatible pump tubing.

Speciation Kits

The XSERIES 2 can be coupled to either HPLC or GC systems to allow speciation of elements for a wide variety of matrices. Thermo Scientific coupling kits include all the necessary parts to allow a completely automated system with analyte transfer without degrading the quality of the chromatography and full, two way communication between the ICP-MS and chromatographic system. The GC-ICP-MS kit includes a unique dual sample inlet system so liquid sample introduction can be used alongside the gaseous inlet for tuning, internal standardization and a more robust plasma.



XSERIES 2 ICP-MS Accessories

SC-FAST Autosampler

The SC-FAST from ESI is a random access, high throughput autosampler with two, four or fourteen sample racks to allow the unattended analysis of up to 1260 samples depending on rack configuration. Optimized sample handling through the use of a six port valve allows for improvements of over 40 % in sample throughput when compared to traditional autosamplers.

CETAC ASX-520 Autosampler

Random access, large capacity, x-y movement autosampler with up to 370 maximum position capability, dependent on rack configuration.

Configuration: 1 x 10-position standards rack, 4 x 60 position sample-racks. Supplied with a PTFE probe, 10 standard bottles and 240 x 14 ml polypropylene sample tubes. Pumped wash facility. RS232C cable. Rinse and drain vessels. Rack capacity can be doubled using the CETAC ERX 8 option.

CETAC ASX-110 Micro Autosampler

Random access, carousel, micro volume autosampler with total 36 to 180 maximum position capability, dependant on rack configuration.

Configuration: 1 x 12-position standards-rack, 1 x 24 position sample-rack and PTFE probe. RS232C cable.

Thermo Scientific ID100 Autodilutor

A multi-piston pump constructed from inert materials, capable of performing dilutions in excess of 50:1. Under full software control the system can be programmed to intelligently dilute samples in a variety of user selectable modes.

Hydride Generation Kit

A kit comprising the plumbing components and membrane gas-liquid separator required for continuous flow hydride generation.

On-line Internal Standards Kit

Enables internal standards to be added to the sample on-line. Kit comprises of an inert Y-piece and all associated tubing and adaptors.

EPA Productivity Pack

Provides everything required to establish the 6020, 6020A, ILM05.3 and 200.8 protocols in the laboratory.

Calibration solutions, QA/QC solutions, interference check solutions are available. Tailored PlasmaLab method templates and autotune/performance reports. Full documentation to assist in the preparation of the laboratory SOP.

XSERIES 2 Dimensions (in cm)

