Independently designed, relentlessly validated, and meticulously engineered

HanSel^MS

HanSel MS

iQuad 2300 Series
ICP-MS

A fusion of extraordinary sensitivity, stability, and productivity

Reimagine elemental analysis with Hansel ICP-MS

Hansel (Beijing) Instrument Co.,Ltd.

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02

04
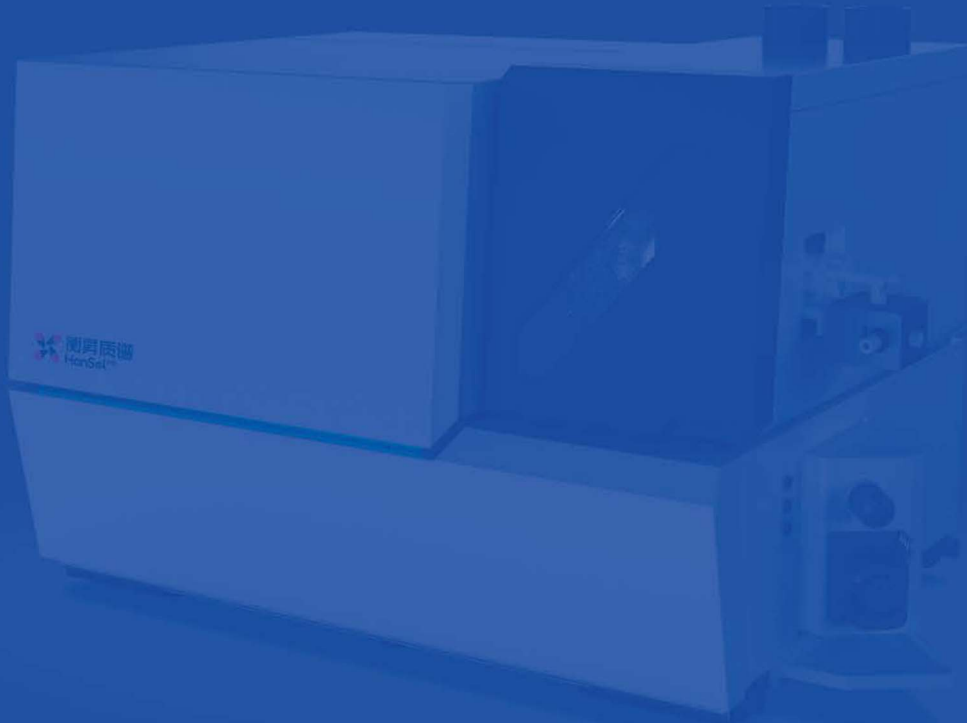
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iQuad 2300 Series ICP-MS
Product Brochure

Product Overview

Hansel ICP-MS
A Ten-Year Journey

iQuad 2300 Series
ICP-MS

After 5 years of unrelenting R&D efforts, the robust 2nd generation iQuad ICP-MS was commercially launched in 2022, featuring technological innovations and breakthroughs in core functional modules such as digitally synthesized RF generator and huminity / temperature indiscriminate quadrupole mass analyzer.

Hansel's endeavor to further improve the performance and user friendliness of iQuad ICP-MS did not stop there. Merely one year later, the release of an extensively modernized iQuad 2300 in July 2023, incorporating an upgraded 7-port rapid sample introduction system, enhanced hexapole collision/reaction cell with axial acceleration, one-button system initiation and app-based remote instrument control, substantially elevated its sample throughput capability and overall competitiveness in the single-quad ICP-MS category.

2014
- Founding of Hansel

2016
- Kick-off of ICP-MS project

2018
- 1st gen. ICP-MS prototype

2021
- 2nd gen. ICP-MS prototype and validation

2022
- Prodction of iQuad series ICP-MS began
- Launch of iQuad 2300 ICP-MS modernization project

2023
- Commercial launch of iQuad 2300 series

...

Performance Highlights

- Mature interference removal
- Superb handling of complex matrices
- Rapid sample analysis and data acquisition

A Performance Beyond Your Expectation

01 Unrivalled sample throughput

● **7-port high speed sample introduction system**——reduce per sample analysis time up to 50%


Equipped with a high-speed uptake pump, the 7-port high speed sample introduction system allows sample loading and rinsing to execute simultaneously. This discrete sampling technology achieves drastically improved sample throughput and substantially reduced argon consumption for the customer.

sample loading

sampling
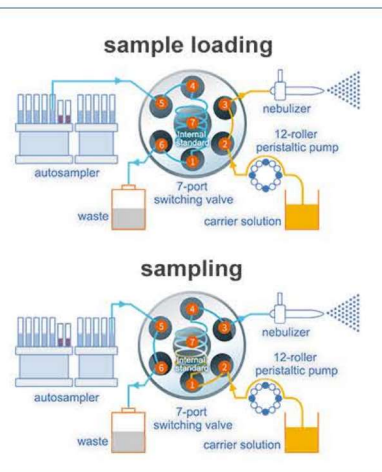
The 7-port high speed sample introduction system effectively diminishes the 'dead time' in conventional ICP-MS analysis while greatly improving the efficiency up to 50%.

Sample throughput
50%+
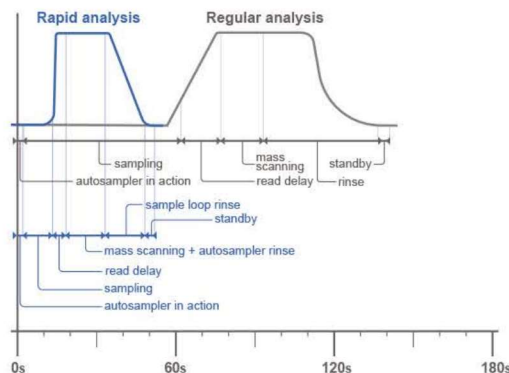
● **Intelligent electronic dilution technology**——**Simultaneous determination of isotopes from ultratrace level to 1000s of ppm.**

The per-isotope electronic dilution can effectively extend the linear dynamic range up to 11 orders of magnitude and enable the system to analyze extremely low and high concentration isotopes in the same sample simultaneously, thus greatly improve the analytical efficiency for customers tasked to analyze multi-elements in a large number of samples on a daily basis.

Case study: electronic dilution used for rich elements in food applications
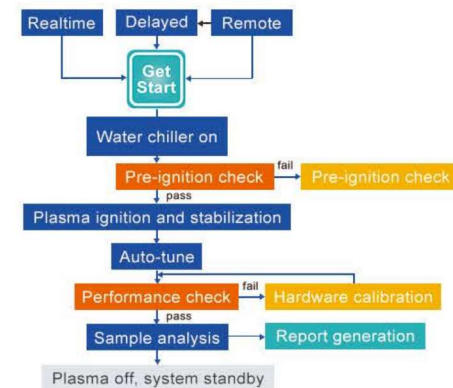
Identifier	Dwell time (s)	Channels	Spacing (u)	Measurement mode	△H	Resolution
23Na (KED)	0.05	3	0.05	KED	0.17	Normal
27Al (KED)	0.05	3	0.05	KED	0.04	Normal
52Cr (KED)	0.05	3	0.05	KED	0	Normal
60Ni (KED)	0.05	3	0.05	KED	0	Normal
75As (KED)	0.05	3	0.05	KED	0	Normal
114Cd (KED)	0.05	3	0.05	KED	0	Normal
208Pb (KED)	0.05	3	0.05	KED	0.04	Normal

Analyte/Isotope	Concentration	Unit	Pre-dilution	△H	Post-dilution	Dilution factor
Na 23	100	mg/L	212,235,821	0.17	934,605	227.09
Al 27	5	mg/L	3,713,367	0.04	679,693	5.46
Cr 52	50	µg/L	890,056	0	916,519	0.97
Ni 60	50	µg/L	367,205	0	375,734	0.98
As 75	50	µg/L	63,288	0	66,699	0.95
Cd 114	50	µg/L	431,550	0	441,591	0.98
Pb 208	50	µg/L	3,615,170	0.04	740,711	4.88

● **Intelligent one-button system start**——**accessibility enhanced by remote control and system monitoring**

Get Start **Analytical results one button away**

✔ Water chiller on
✔ Plasma ignition
✔ Plasma stabilization
✔ Auto-tune
✔ Performance test
✔ Sample analysis
✔ QC and data validation
✔ Generate QC report
✔ Plasma off, system standby
✔ Delayed system kick-off
✔ Remote system kick-off

Realtime Delayed Remote
Get Start
Water chiller on
Pre-ignition check — fail → Pre-ignition check
pass
Plasma ignition and stabilization
Auto-tune
Performance check — fail → Hardware calibration
pass
Sample analysis → Report generation
Plasma off, system standby

ENGINE START STOP

02   Outstanding system stability

序号	7Li	59Co	115In	238U	Bkg4.5	Bkg220.5	137Ba++ / 137Ba	140Ce.16O / 140Ce
1	35169.11	63695.03	143033.64	193412.83	0.00	3.17	0.013	0.019
2	34828.15	61363.40	140085.49	197668.85	0.00	1.17	0.013	0.019
3	35581.29	63435.63	140800.47	188159.45	0.00	2.67	0.014	0.018
4	35298.21	63157.60	142939.57	200100.06	0.00	0.83	0.013	0.018
5	34402.31	59915.74	136914.74	192500.20	0.00	0.33	0.012	0.019
6	35743.75	64604.65	145690.10	195153.79	0.00	0.50	0.013	0.019
7	35994.83	63345.51	143522.20	201375.94	0.00	1.17	0.013	0.020
8	35409.80	62684.89	139771.80	187928.48	0.00	0.00	0.014	0.018
9	35520.12	62701.97	140283.71	191576.21	0.00	0.50	0.012	0.018
10	34350.19	60182.03	133546.26	184133.56	1.00	1.33	0.014	0.017
11	35938.62	64111.11	141044.28	194223.83	0.17	3.17	0.014	0.020
12	35849.41	64398.22	142915.65	195977.76	0.50	0.00	0.013	0.020
13	35240.00	61654.73	138869.07	194766.82	0.00	2.67	0.012	0.018
14	36254.23	63555.29	141887.23	195740.75	0.00	0.50	0.014	0.019
15	36056.99	63862.82	143596.09	190340.55	0.00	1.33	0.014	0.018
16	36280.63	63378.78	141276.64	198492.23	0.00	2.83	0.014	0.018
17	35871.53	63768.74	142059.42	197573.87	0.00	0.00	0.013	0.018
18	36614.62	65547.87	143365.83	187154.46	0.00	2.67	0.013	0.017
19	36343.15	64296.39	140842.78	189302.88	0.00	3.67	0.014	0.017
20	36018.88	63176.04	139355.79	189252.79	0.00	0.83	0.014	0.017
21	36330.12	64082.62	141106.67	181462.68	1.00	2.17	0.014	0.017
22	36738.64	65497.30	142501.75	187722.62	0.00	1.83	0.014	0.018
23	36786.43	64875.01	144125.87	193187.47	1.67	1.00	0.013	0.018
24	36138.24	63243.67	140812.15	192415.04	0.50	2.33	0.014	0.019
AVG	35781.64	63355.63	141264.47	192484.30	0.20	1.53	1.34%	1.83%
SD	661.39	1424.18	2528.61	4992.20				
RSD	1.85%	2.25%	1.79%	2.59%				

● **Extraordinary long-term stability** – 4 hour signal drift < 3%

Stability test for saturated saline water matrix
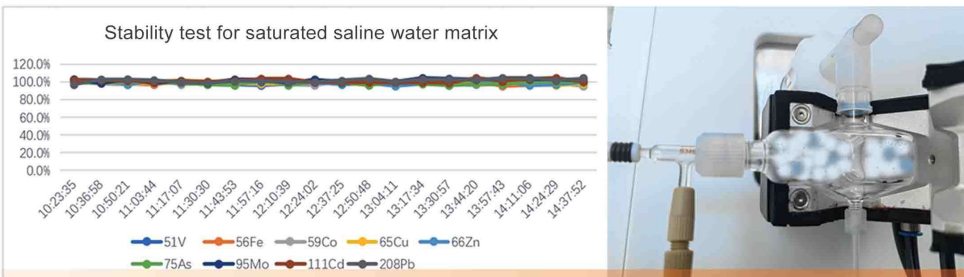
● **Online aerosol dilution** – tackles the most complex and challenging sample matrices

● **One of the longest quadrupole mass analyzer in the industry** – source of highly reproducible data

03   Superb data accuracy

● Streamlined hexapole collision/reaction cell permits efficient removal of polyatomic interferences.

● Proprietary axial acceleration technology drastically improves the ion transmission efficiency and overall sensitivity.

● High performing ion optics and the dual off-axis ion pathway work to effectively eliminate neutral particles in the post plasma ion beam, substantially reducing the background of the analysis.

● High Sensitivity. Li≥ 110Mcps/ppm; In:≥ 300Mcps/ppm; U≥ 500Mcps/ppm

Analytical results of GBW E 080684, a Rice Powder CRM

Element	Concentration	Spike recovery	Measured value	Certified value
Na	ppm	106.2%	8.79	8±1
Mg	ppm	104.6%	261.66	252±23
K	ppm	93.1%	997.24	1060±70
Ca	ppm	106.8%	66	67.3±8.4
Mn	ppm	103.9%	11.772	12.4±0.7
Fe	ppm	95.9%	4.49	4.7±0.6
Cu	ppm	101.3%	1.77	1.97±0.23
Zn	ppm	94.0%	11.7	13±1.3
As	ppm	101.8%	0.11	0.11±0.02
Se	ppm	94.4%	53.51	45±15
Cd	ppm	99.5%	0.0075	0.009±0.004
Pb	ppm	98.9%	0.15	0.024±0.01

iQuad 2300 Series: a Schematic View

iQuad 2300 Series ICP-MS

An ICP-MS of exceptional
matrix handling capability

High-precision collision/reaction cell

- High transmission hexapole
- Mature KED (Kinetic Energy Discrimination) and
  SER (Selected Exothermic Reaction) dual mode interference removal

High-performing quadrupole mass analyzer driven by digitally synthesized RF generator

- Matching box and air capacitor free
- Delivers superior peak separation and abundance sensitivity
- No custom quadrupole setting required

Robust Plasma Interface

- Water cooled sampling and skimmer cones, with nickel and platinum options
- Robust design ensures steady high matrix tolerance and low contamination in the vacuum

High-sensitivity electron multiplier detector

- Classic analog/pulse dual mode
- Linear dynamic range >10^{11} (with electronic dilution)
- 10μs minimum integration time

Formidable plasma RF generator

- 27.12 MHz with variable-frequency impedance matching
- Matching box free
- Virtual Granding designing, without Shild Torch
- Digitally driven and maintenance free
- Convenient switching between cold/hot plasma
- Plasma TV

Beyond the conventional ICP-MS applications

- Compatible with various autosamplers and auto-dilution devices (CETEC, ESI)
- Direct solid analysis with laser ablation
- LC, GC, IC hyphenation for speciation analysis
- Nano-particle and single-cell analysis

Reliable and customizable sample introduction system

- Standard concentric nebulizer and cyclonic spray chamber (Scott Double-pass optional)
- Compatible with all mainstream nebulizers (high purity quartz, PTFE, PFA)
- 4-channel, 12-roller peristaltic pump with speed control
- 7-port switching valve available for high-speed discrete sampling
- Automatic X-Y-Z alignment and sampling depth optimization
- Standard Peltier cooled spray chamber optimizes signal drift

衡昇质谱
HanSei™
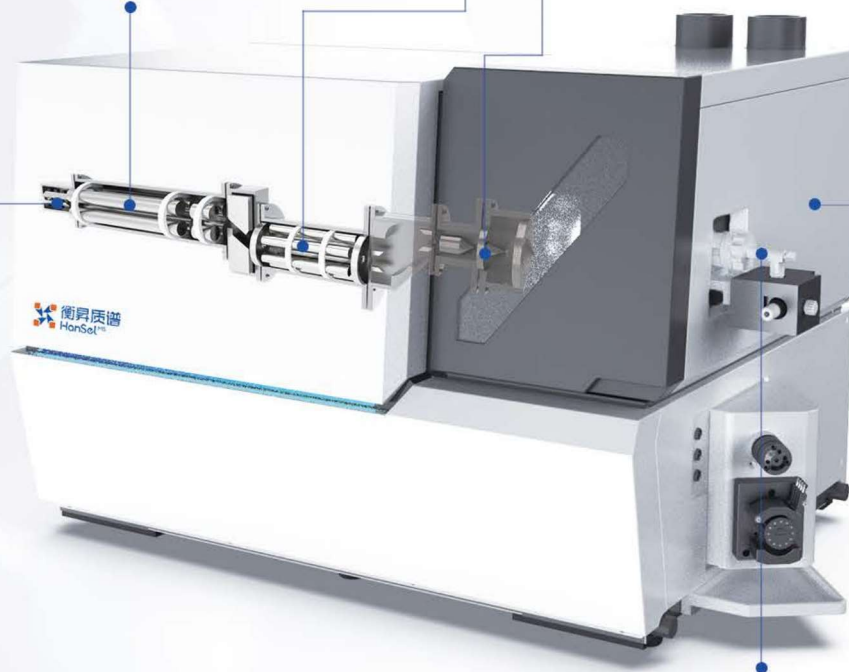
Intelligent iTrace Software
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iTrace

Expert software designed for multi-element ICP-MS analysis

iTrace – convenience, accessibility, and advanced applications

- One button "Get Start"
- System auto-tune
- Comprehensive quality control
- Speciation, nano-particle, single-cell analysis
- Laser ablation analysis

Intuitive and powerful software operation — extremely friendly for beginners and experts alike

- Simplified method development dashboard
- Simultaneous sample analysis and data processing capability
- Advanced data acquisition in chromatographic, nano-particle, and single-cell applications

Alternative APP-based operation — an ICP-MS at your fingertip

- Delayed system start, remote system start, and automatic plasma off
- Unattended sample analysis achieved via intelligent cellphone app

Uncompromising regulatory compliance to protect data integrity

- FDA 21CFR Part 11 compliant
- User access control, data validation and security, e-signature and audit trail
- Open to customize and implement special regulatory requirements

Focused Application Fields

01

- Food safety regulatory development and enforcement
- Nutritional research in food
- Metal toxicity research in food

Food & Agriculture

02

- Environmental regulatory development and enforcement
- Heavy metal toxicity research in Water, soil, and air
- Metal toxicity research in solid waste
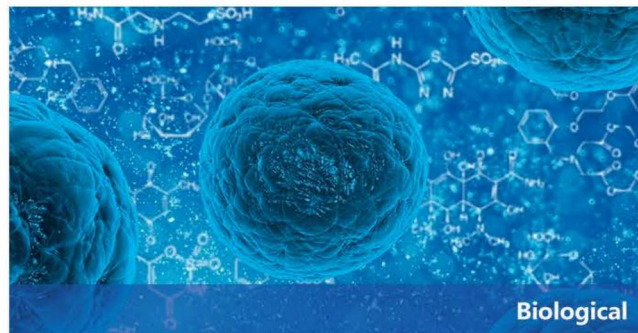- Environmental emission monitoring

Environmental

03

- Help pharma industry normalize practices adhering to USP/EP/CP requirements
- Heavy metal toxicity in TCMs
- Metal toxicity research in clinical, gene-focused, and other life science applications

Pharma

04

- Geological / Mineral / Metal material/New material
- Electronics / general consumer products
- Semi-conductor / photovoltaics / battery materials

Material

05

- Research in proteins, nucleic acids, and (single) cells
- Isotope-specific radiolabelling in immunology
- Nano-particle analysis

Biological

06

- Petrochemical and generic chemical production
- Alternative energy research and development
- Specialized chemical material

Engergy & Chemical