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ACE 3000 ICP-MS

Inductively Coupled Plasma Mass Spectrometer



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Collision Reaction Cell

Using argon plasma, ICP-MS can be affected by mass interferences caused by polyatomic ions from argon gas or solvents. The ACE 3000 ICP-MS employs an Octopole-style Collision Reaction Cell to effectively eliminate these interferences, ensuring clear results.

Interface chamber(Patents)

Focusing elemental ions and removing interferences is critical in trace analysis with ICP-MS. Utilizing specialized lenses tailored to the characteristics of the sample matrix enhances the accuracy and precision of the analysis. The ACE 3000 ICP-MS delivers optimal analysis conditions through its patented sigma and epsilon lenses.

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ICP-MS stands out in elemental analysis with its low detection limits, multi-element simultaneous analysis, and extensive dynamic range, broadening its use across diverse sectors. Traditional methods like Flame AAS, GF-AAS, and ICP-OES faced challenges with low sensitivity, the inconvenience of element-specific lamps, and isotope analysis—challenges now overcome by the advanced ICP-MS.

From detecting harmful heavy metals in pharmaceuticals, foods, and cosmetics to ultra-trace analysis in the semiconductor industry and environmental contaminant assessment, ICP-MS applications span a wide array of everyday industries.

Technological advances such as Cool plasma and Collision Reaction Cells have resolved ICP-MS's main drawback: the reliability issues due to interferences.

The ACE 3000 ICP-MS embodies precision, featuring a proprietary mass filter, a patented interface chamber for precise ion navigation, and an Octopole structured Collision Reaction Cell, creating an optimal system for trace element analysis.

Your Lab Performance is our Priority

Custom-made Quadrupole

At the heart of the mass spectrometer lies the Quadrupole Mass Filter. Through continuous R&D, Youngin Ace independently develops and supplies mass filters. With complete in-house management from RF/DC control to the quadrupole rods, we ensure system consistency, minimize external influences, and gain an advantage in post-service management.

Hyper Stable Plasma

The performance of ICP-MS begins with the formation of a stable argon plasma. Building on expertise in plasma ion sources, including Inductively Coupled Plasma as well as Microwave Induced Plasma and Dielectric Barrier Discharge Plasma, we generate and maintain stable plasma for superior analysis.

ACE 3000 ICP-MS

01

Proprietary developed QMF

The Quadrupole Mass Filter (QMF) is the cornerstone of our mass spectrometer. Engineered with precision, our custom Quadrupole ensures unmatched straightness and parallelism, delivering consistent and stable mass analysis.

02

Collision Reaction Cell

Our Octopole-style Collision Reaction Cell offers the ideal combination for ion transfer, with a higher collision frequency necessary for Kinetic Energy Discrimination (KED) compared to Quadrupole or Hexapole structures.



• Interface Chamber

The interface chamber efficiently removes metastable atoms and photons, thus eliminating elements that could interfere with the analysis.



• Plasma Source

Introduced samples are ionized through the creation of plasma via argon gas. In this high-temperature plasma environment, elements within the sample are effectively ionized, producing ions ready for analysis.



• Sample Introduction System

Our sample introduction system accurately and reliably introduces samples of various matrices into the system. This system allows users to prepare samples quickly and efficiently, matching various analytical conditions.



✓ **Outstanding Sensitivity and Low Detection Limits**

✓ **Effective Removal of Interfering Substances**

03

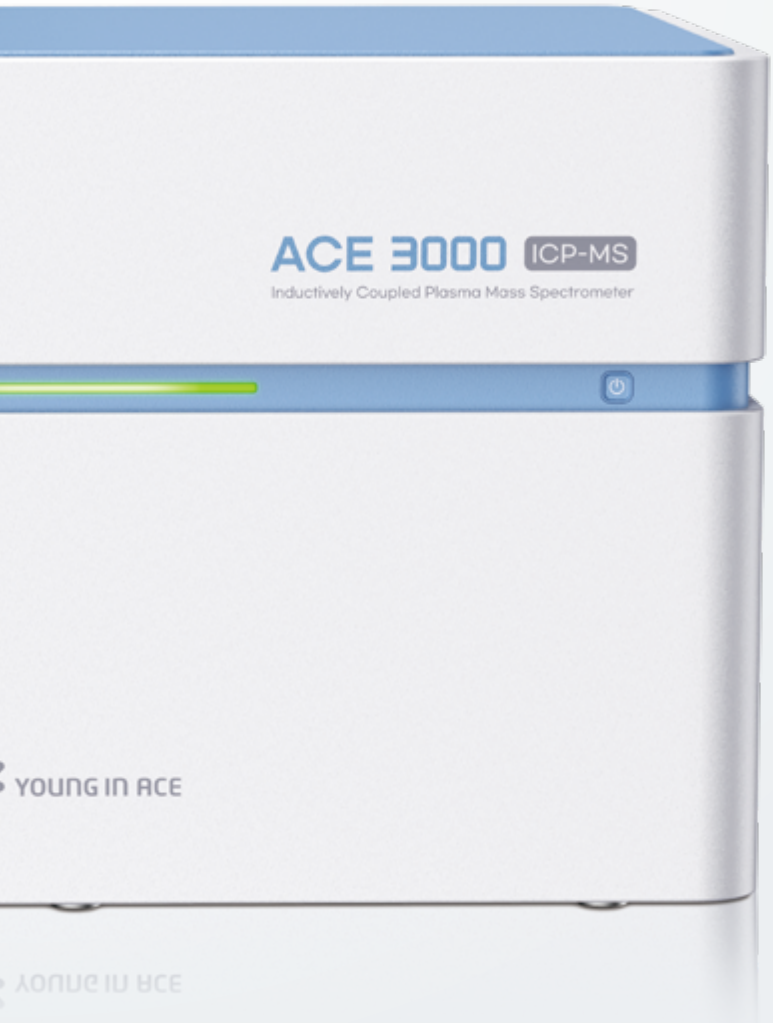
Patented Interface Chamber

Our patented interface chamber's ion lenses are tailored to sample matrices, allowing for the preemptive removal of argon, which is a major interfering substance, or unnecessary ions from complex sample matrices.

04

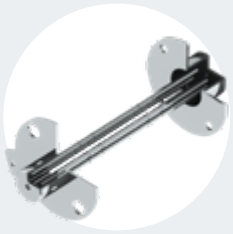
Nano particle analysis

With the increase in nano-material usage, we provide application solutions supporting characterization and quantitative analysis of nano particles, including concentration, distribution, and environmental impact studies.



- **Collision Reaction Cell**

To ensure high accuracy in analysis, ions interact with helium to effectively remove the interference of polyatomic ions.



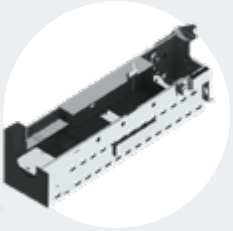
- **Analyzer Chamber**

The analyzer chamber examines sample ions based on the m/z (mass-to-charge ratio) value, allowing selective analysis of desired elemental ions with high resolution.



- **Detector**

The detected signal is converted into analysis results, allowing for the precise measurement of elemental concentrations and presence.



Wide Dynamic Range and Matrix Tolerance

Advanced Analytical Capabilities and Versatility

Application



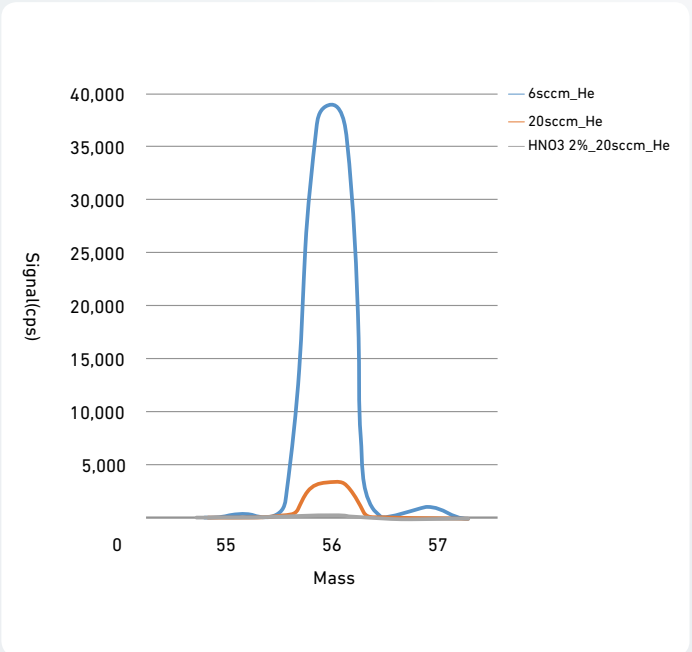
Metal Analysis
Semiconductor
Environmental Monitoring
Life Sciences
Food
Pharmaceuticals
Cosmetics
Petrochemicals

Advantage

Collision reaction cell(CRC) Test Results

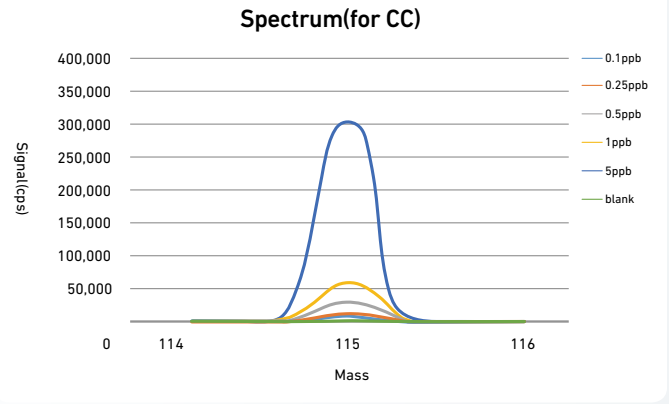
The creation of interfering ions significantly impacts the quantitative analysis of elements using ICP-MS. Solutions like cool plasma, Collision Reaction Cells (CRC), and high-resolution mass spectrometers are proposed to address this. However, cool plasma has limitations due to its low ionization energy, which can result in incomplete ionization of target elements during the ion generation phase. This under-ionization can lead to low analytical sensitivity and a reduction in analysis signals, ultimately causing errors in the analytical results.

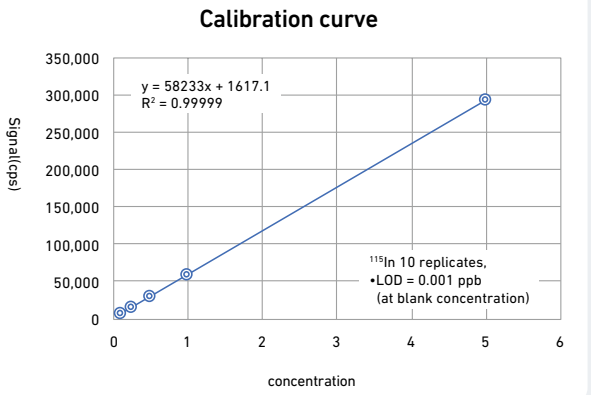
For the analysis of Iron (Fe), it is ideal to target the most abundant isotope, ^{56}Fe. However, if interfering components such as $^{40}Ar^{16}O$ are not effectively removed, analysis may need to shift to the less abundant ^{57}Fe. The diagram demonstrates how helium-based CRC effectively eliminates these interfering components, ensuring accurate analysis.



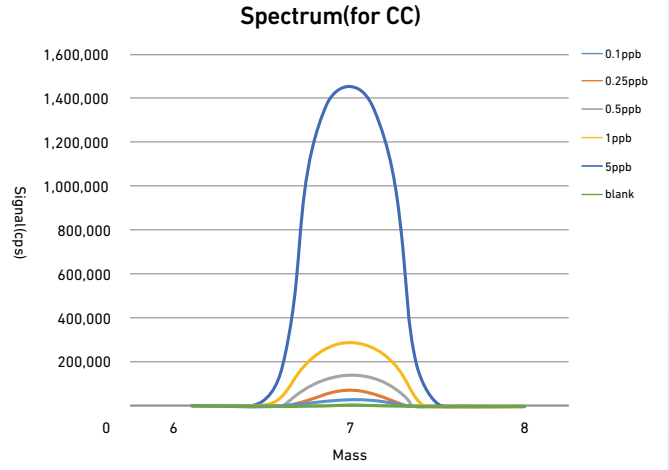
System Performance

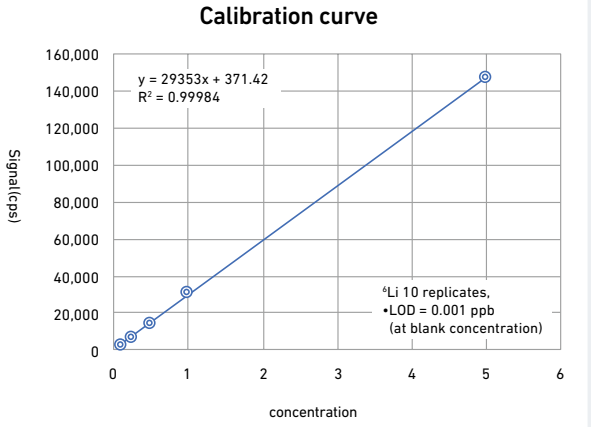
Indium test result



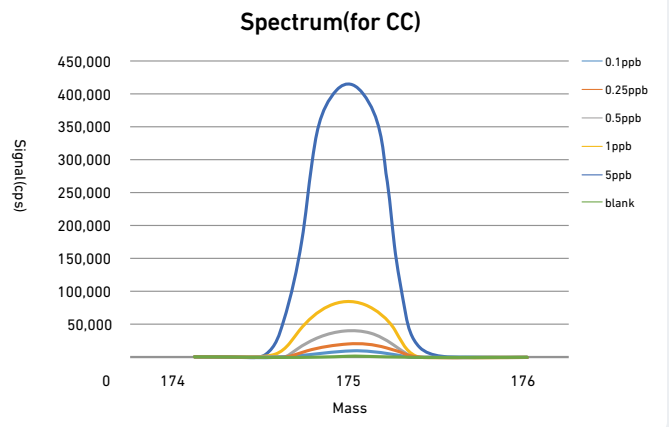


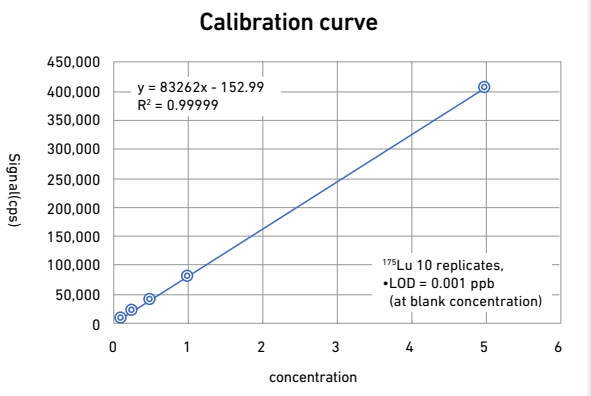
Lithium test result





Ruthenium test result





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