EXPANDING THE CAPABILITIES OF ICP-MS

ELAN DRC-e
Uncompromised sensitivity and performance in a robust system designed for routine laboratories
When your applications extend beyond the capabilities of conventional quadrupole ICP-MS, you need the power of the innovative ELAN® DRC-e. The DRC-e brings the interference-eliminating power of patented Dynamic Reaction Cell™ (DRC™) technology and performance-enhancing Axial Field™ Technology (AFT) to the industry-proven ELAN ICP-MS system. The result is uncompromised sensitivity and performance in a robust system designed for routine laboratories.

The ELAN DRC-e uses chemical resolution to eliminate plasma-based polyatomic species before they reach the quadrupole mass spectrometer. This ion-molecule chemistry uses a reaction gas to “chemically scrub” polyatomic or isobaric species from the ion beam before they enter the analyzer, resulting in improved detection limits for traditionally difficult elements, including As, Cr, Fe, Se and others. And, unlike collision-cell, high-resolution or cool-plasma systems, the ELAN DRC-e system eliminates not only the primary interference; but also prevents the formation of new interferences, while maintaining analyte sensitivity – providing ultratrace-level detection limits in virtually any matrix.

Combined with a robust HF-resistant sample introduction system and the purpose-designed productivity-enhancing features of the ELAN ICP-MS system, the maintenance-free Dynamic Reaction Cell provides a system with uncompromised performance that is rugged, reliable and easy to use – a must for today’s high-throughput production environments.

Superior detection capabilities

The superior interference reduction and maximum analyte transmission provided by the ELAN DRC-e produces excellent signal-to-background ratios. Background levels measured on-peak are typically less than 1 count per second – 50 to 150 times better than those reported by users of collision-cell based systems.

The ELAN DRC-e does not use high-voltage ion-extraction lenses that can become contaminated. This results in lower on-peak background levels and more importantly, a lower background equivalent concentration (BEC) – the real measure of detectability. If the signal falls below the BEC, it is masked by the background. In situations where ultratrace measurements are made, the BEC actually limits the analysis, not the detection limit. Lower BECs mean that ultratrace levels can be accurately quantitated, not just detected.
ELIMINATES INTERFERENCES FOR SUPERIOR PERFORMANCE

How does the DRC work?

The DRC is located between the ion optics and the mass-analyzer quadrupole. It consists of a quadrupole placed inside an enclosed reaction chamber. This quadrupole eliminates polyatomic interferences caused by the combination of plasma gases and sample-matrix constituents before they can enter the analyzing quadrupole.

Gas inlets pressurize the reaction chamber with a low flow of reaction gas, such as methane, oxygen, carbon dioxide or other gases and gas mixtures. The reaction gas is selected based on its predictable ability to undergo a gas-phase chemical reaction with the interfering species and remove the interference. Interference removal can occur through various processes, including collisional dissociation, electron transfer, proton transfer and oxidation. Analyte and interfering ions from the ICP enter the DRC. The reaction gas combines with the interfering ions, creating a non-interfering reaction product at a different mass. For extremely demanding applications, the DRC also provides the unique ability to carry out controlled reactions that can be used to predictably and reliably convert the analyte of interest to a different species, moving it away from the interference. No other system offers this level of predictable, controllable, reproducible or transferable chemistries, facilitating maximum interference removal in virtually any matrix.

Unlike collision-cell instruments, which pass all the reaction products into the analyzer quadrupole where they may cause interferences for other analytes, the DRC eliminates reaction by-products using the Dynamic Bandpass Tuning (DBT) mechanism. The DBT function ejects the precursor ions before they can react to form new interferences – a real concern with complex sample matrices.

The ELAN DRC-e is able to eliminate interferences by up to 9 orders of magnitude, while retaining analyte sensitivity. This provides exceptional detection limits and the ability to use ICP-MS to determine more elements than previously thought possible.

Leaves cool plasma out in the cold

DRC technology always uses a high-temperature or “hot” plasma for analysis, eliminating the recognized drawbacks of cool- or warm-plasma approaches. Cooler-temperature plasmas have limited ability to ionize all but the most easily ionizable elements. As a result, cool plasmas also suffer from severe suppression of the analyte signal by matrix constituents and often require the use of standard additions calibration. This decreases sensitivity and degrades detection limits for elements with high ionization potentials and limits the number of interferences that can be removed.

Using the cool-plasma approach, elements which benefit from cool-plasma conditions must be run in a separate analysis from normal plasma elements, requiring each sample to be run twice. The ELAN DRC-e can run all these elements in the same run, increasing productivity. And, the ELAN DRC-e provides interference-free determination of elements that cold plasma cannot, such as As, Cr and Se. Plus, DRC technology works in any matrix, eliminating the complicated matrix-reducing sample-preparation procedures often required for matrices such as hydrochloric acid when run under cool-plasma conditions.

The Dynamic Reaction Cell chemically scrubs interfering species from the ion beam using a reaction gas.

The ELAN DRC is the only system that can eliminate CaOH⁺ interference on ⁶⁰Ni – eliminating false positives in high-calcium matrices.
UNEQUALED PERFORMANCE FOR ROUTINE ANALYSIS

In addition to eliminating interferences in traditionally difficult-to-determine elements, the ELAN DRC-e system has been specifically designed for high-throughput analyses, providing a new level of productivity and performance for ICP-MS.

The ELAN DRC-e utilizes a rugged and reliable HF-resistant sample introduction system that has been field proven in over 2000 laboratories. The cost-effective, cross-flow nebulizer handles a wide variety of sample matrices and is virtually maintenance-free, providing trouble-free operation. The open architecture design makes switching to different sample introduction devices quick and simple. The ELAN DRC-e can utilize a variety of alternate sampling devices, including laser ablation, ultrasonic or low-flow nebulization systems or even liquid- or ion-chromatography systems for speciation analysis.

The unique single-ion lens simplifies operation with automatic optimization and specific on-the-fly mass settings for each element, minimizing undesirable space-charge effects that can lead to signal and performance loss. The ELAN DRC-e has unequaled detection limits, BECs, specificity and sensitivity, as well as a robust and trouble-free design – all requirements for the busy laboratory.

Axial Field Technology maximizes performance for all matrices

Innovative Axial Field Technology, developed specifically for ICP-MS, applies a linearly accelerating axial field to the ions inside the Dynamic Reaction Cell. This technology decreases matrix effects, improves stability and increases the speed of the DRC. This makes the ELAN DRC-e the ultimate analytical tool for all applications including environmental and geochemical, where optimal performance in challenging matrices is required.

Collisional focusing provides improved sensitivity and precision

The ELAN DRC-e offers exceptional sensitivity and stability. Using collisional focusing (Figure 1), sensitivity can be enhanced by up to 5 times, when compared to a standard ICP-MS system.

Collisions with the reaction gas allow ions to spend more time in the DRC, reducing short-term signal fluctuations. This lowers plasma noise, leading to improvements in short-term precision.

This excellent short-term precision dramatically improves isotope-ratio measurements performed on the ELAN DRC-e. Relative standard deviations for isotope ratios of less than 0.03% are routinely achievable.

DRC gets the right answer, faster

Unlike “cool-plasma” and high-resolution analyses where optimization of analytical conditions is done for each analyte and multiple runs are required to determine several analytes, the ELAN DRC-e removes multiple interferences during the same analytical run. The ELAN DRC-e significantly improves productivity by reducing the number of runs required. You can combine different sets of DRC conditions for different elements in the same analytical method along with conditions for elements run in standard mode, providing faster, more accurate results.

Figure 1. In the DRC, the ions collide with the reaction gas, causing them to lose energy and focus their motion on axis. This allows the ions to spend more time in the DRC, reducing short-term signal fluctuations. This collisional energy damping reduces the energy spread, while collisional focusing (migration of ions toward the quadrupole axis) results in improved ion transmission and sensitivity.
Dynamic Bandpass Tuning

Unlike other systems that use rf-only hexapoles and octapoles as simple ion guides, the quadrupole used in the patented DRC technology provides both high- and low-mass cutoffs – defining a precise mass bandpass window. The mass bandpass window ejects all ions with masses outside the window before they can react inside the DRC, preventing the formation of new interferences. The bandpass window is selected via the automated setup procedures based on the specific chemistry that needs suppression or promotion. And, since a specific bandpass range can be selected for each analyte, the bandpass filter can be dynamically tuned to best suit the analyte of interest. As a result, species falling outside of the analytical bandpass are completely eliminated, preventing the formation of new species and possible interferences (Figure 2).

In contrast, competitive systems use energy filtering, which only allows new interferences to be reduced after they are formed. This restricts interference removal, since the number of collisions in other systems must be limited in order to maintain a sufficient kinetic-energy spread between the analyte and interfering species for the filter to be effective. And, since energy filtering is non-selective, both interferent and analyte intensities are reduced.

DBT optimizes chemical specificity

Differentiation between the analyte and an interfering species is critical to success in ICP-MS. The ELAN DRC-e provides greater accuracy by eliminating false positives due to interferences. The presence of an isobaric or molecular interference can lead to an elevated signal at the analyte mass. For example, ArCl⁺ and CaCl⁺ are two molecular species that interfere with arsenic determinations at mass 75. In some cases, these interferences are extremely difficult to resolve, either because the analyte is monoisotopic (such as in the case of arsenic) or the interference is too large.

While other cell systems can partially remove some plasma-based interferences such as the ArCl⁺ interference on 75As⁺, they are limited in their ability to remove many matrix-based interferences, such as the CaCl⁺ interference on 75As⁺. In contrast, the ELAN DRC-e allows the interference to be removed, whether plasma- or matrix-based, giving you confidence that the correct results for the analyte and not a matrix interference are reported. Using the ELAN DRC-e, molecular interferences that have plagued trace-level determination of many elements by ICP-MS can be completely eliminated. Also, the superior specificity achieved with the ELAN DRC-e through the use of Dynamic Bandpass Tuning means reaction by-products are eliminated, preventing new interferences from forming. Left unchecked in all other systems, these by-products produce new interferences, which must be reduced by increasing the kinetic-energy filter – leading to additional analyte signal loss.

Method development on the ELAN DRC-e using the powerful ELAN software is now easier than ever. Use one of our developed methods and you will be up and running quickly. For more unique applications, automated procedures determine the best reaction-gas flow conditions and DBT settings, making the system easy to use. Unlike other cell instruments, where reaction-gas selection must be restricted in order to reduce formation of reaction by-products, the ELAN DRC-e allows you to use a variety of reaction gases for interference removal. The ability to use more reactive gases including CH₄, O₂, N₂O and others provides superior interference reduction and improved detection limits in a wide variety of sample types.

Figure 2. In this example, the DRC removes the Ar₂⁺ interference by converting it to neutral Ar and CH₄⁺ using methane as the reaction gas.
Not only does the ELAN DRC-e include the industry’s most effective method of eliminating interferences – it features a wealth of proven capabilities that make it superior to other ICP-MS systems.

- **Quick-change cones** – The nickel-based interface cones have large diameter orifices (1.1 mm sampler and 0.9 mm skimmer) to resist clogging and signal drift. The easy-in, easy-out design makes routine maintenance simple and easy. Platinum cones are available as an option for increased matrix tolerance.

- **Patented PlasmaLok technology** – Secondary discharges between the ICP torch and the interface cones can lead to signal drift and high background levels. PlasmaLok® technology essentially eliminates the possibility of secondary discharges, extending cone life, reducing background signal levels and stabilizing ion-energy distributions. As a result, switching between plasma conditions and sample matrices, including aqueous, organic and dry aerosols, is virtually transparent, with no special optimization required or consumable parts to replace.

- **Simple, effective Shadow Stop technology** – The ion optics in the ELAN were designed specifically for ICP-MS. Instead of bending the ion beam numerous times using complex multi-component lens systems to prevent uncharged species from entering the quadrupole, the ELAN DRC-e uses a simple, grounded Shadow Stop. The result is minimal maintenance and the elimination of tedious ion-tuning adjustments required by other systems as lens components and cells become contaminated, causing resistivity changes and requiring subsequent tuning changes. Since it is grounded, the Shadow Stop never needs to be optimized or cleaned to maintain its performance.

- **The industry’s only single ion lens** – Designed specifically for ICP-MS, the unique quick change single-ion lens used on the ELAN systems provides worry-free operation. Protected by the Shadow Stop, cleaning requirements for the SwiftMount™ quick change lens are also minimized. In contrast, complex competitive systems may have as many as 30 to 40 pieces in the ion-optic system – making them time-consuming to clean and reassemble. Unlike these competitive systems, changing the exclusive SwiftMount ion lens on the ELAN ICP-MS is as easy as changing a light bulb. In fact, the process takes just a few minutes. And, since the SwiftMount lens is so economical, when it does need to be cleaned you can simply swap the dirty lens for a spare and clean the dirty lens while your samples are being processed. This maximizes system productivity – an important requirement in high-throughput labs.

- **The industry’s only scanning, single ion lens with AutoLens™ one-touch adjustment** – Not only does it optimize itself at the click of a button, the unique SwiftMount single ion lens optimizes automatically for each specific mass – providing the best possible sensitivity for each analyte, at all times. In contrast, competitive systems must be tuned on a single mid-mass element, compromising analyte sensitivity and requiring frequent tuning as ion-lens settings change over time.

Figure 3. The new Build Run List feature will automatically build an exact listing of all your standards, quality-control checks and samples before you start your automated analysis – eliminating unexpected sample-run orders and errors.
SUPERIOR PRODUCTIVITY AND RELIABILITY

- **Integrated peristaltic pump with tubing saver** – The sample introduction system uses an integrated peristaltic pump to dramatically reduce sample-uptake time. The tubing-saver feature ensures optimum measurement precision and prolongs peristaltic tube lifetimes.

- **Simultaneous dual detector** – The SimulScan™ dual-stage detector measures both high- and low-level analytes simultaneously. This conserves valuable or limited samples, eliminates the need to perform time-consuming sample dilutions and allows you to quickly identify uncharacterized samples.

- **Powerful ELAN software** – Whether your lab performs qualitative, semi-quantitative, quantitative or specialized analyses such as isotope-ratio, isotope-dilution or even speciation analyses, the powerful ELAN software has all the features you need. Priority samples, flexible quality-control checks, transient-signal handling, speciation analysis, run-list build and customizable reporting are just a few of the features that will make your life easier (Figure 3). Plus, integrated maintenance videos and our new PathFinder™ HTML-based Help will make routine tasks even easier (Figure 4). And, if you’re in a highly regulated environment, our Enhanced Security™ software provides all the features you need to comply, even with 21 CFR Part 11 requirements.

- **The SmartTune™ software wizard** automatically sets up all your tuning procedures, runs them in the sequence you select and prints out a final tuning report based on user-selected pass/fail criteria (Figure 5). The result is effortless operation, all day, every day.

Figure 4. PathFinder HTML-based Help will guide you step-by-step through instrument setup, optimization, method development and sample analysis.

Figure 5. The SmartTune optimization wizard sets up user-defined optimization and performance-check procedures, automatically running them while you perform other tasks – maximizing your productivity.
Unrivaled DRC technology has provided hundreds of laboratories with significant improvements in their ability to perform a wide variety of applications by ICP-MS. Whether using a single gas for maximum productivity or using specific, selected gases for maximum interference removal, the ELAN DRC-e provides the flexibility for your needs today – and tomorrow.

Interference removal provides superior detection capabilities
Many elements suffer from common matrix-based interferences that can degrade BECs and detection capabilities. The ELAN DRC-e can reduce or eliminate these interferences, providing enhanced analytical capabilities (Figures 6 and 7).

Unlocking selenium
Prior to the development of DRC technology, interferences from the \(\text{Ar}_2^+\) dimer severely diminished the detection power of ICP-MS for selenium. Due to this large interference, selenium had to be determined at the less abundant \(^77\text{Se}\) and \(^82\text{Se}\) isotopes. The ELAN DRC-e unlocks selenium, allowing ppt detection in even challenging matrices (Figures 8a, 8b and 9).

Figure 6. Background from a conventional quadrupole ICP-MS for a 1% nitric-acid blank (blue) and 1 ppb multielement standard (red). Large molecular background peaks obscure analyte peaks from masses 55-60 and 70-85.

Figure 7. Spectra taken on ELAN DRC-e in DRC mode using methane as a reaction gas (0.6 mL/min) and an RPq setting of 0.75 of 1 ppb multielement solution in 1% nitric acid (red) overlaid with 1% nitric-acid blank (blue). Data shows elimination of large molecular background peaks observed in Figure 6, resulting in measurable peaks for all analytes.

Figure 8a. Spectra of 1 ppb Se standard (red) overlaid with 1% nitric-acid blank (blue) obtained by conventional ICP-MS. Large interference peaks from Ar species obscure Se peaks, making accurate detection and quantitation difficult.

Figure 8b. Spectra of 1% nitric-acid blank in standard mode (red) and in DRC mode (blue) obtained on ELAN DRC-e using methane (0.6 mL/min) as a reaction gas and an RPq setting of 0.75. The large interference peaks from Ar species have been removed by the DRC.

Figure 9. Scan obtained on ELAN DRC-e using methane reaction gas (\(\text{CH}_4 = 0.6\) mL/min, RPq = 0.75) of 1 ppb Se in a 1% nitric-acid matrix (red) overlaid with the 1% nitric-acid blank (blue). Ar background species have been removed at all Se isotopes and a good match with theoretical abundance fingerprint (green bars) is obtained.
Determining arsenic in Ca/Cl-containing samples – a unique capability

Many environmental and clinical samples contain high levels of chloride and calcium. In this case, spectral overlaps from $^{40}\text{Ca}^{35}\text{Cl}^+$ and $^{40}\text{Ar}^{35}\text{Cl}^+$ interfere with low-level determinations of $^{75}\text{As}^+$. Other cell-based systems can reduce the $^{40}\text{Ar}^{35}\text{Cl}^+$, but they have no effect on the $^{40}\text{Ca}^{35}\text{Cl}^+$ interference without also eliminating the arsenic signal. Using the unique capabilities of the ELAN DRC-e with Dynamic Bandpass Tuning to carry out controlled chemical reactions, the As analyte peak can be moved away from the interferences, providing an interference-free analysis (Table 1).

<table>
<thead>
<tr>
<th>Sample</th>
<th>As Measured (µg/L)</th>
<th>As Certified Value (µg/L)</th>
<th>Recovery (%)</th>
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</thead>
<tbody>
<tr>
<td>100 ppm Ca in 3% HCl Standard Mode</td>
<td>79</td>
<td>–</td>
<td>–</td>
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<tr>
<td>DRC Mode</td>
<td>0.30</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>100 ppm Ca in 3% HCl +2 ppb As Standard Mode</td>
<td>72</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td>DRC Mode</td>
<td>2.30</td>
<td>–</td>
<td>100</td>
</tr>
<tr>
<td>NIST 2670 Normal Urine SRM (DRC)</td>
<td>56</td>
<td>60</td>
<td>93</td>
</tr>
<tr>
<td>Volunteer Urine* + 5 mg/L (DRC)</td>
<td>5.0</td>
<td>–</td>
<td>100</td>
</tr>
</tbody>
</table>

*low seafood diet

Ultratrace detection of nickel in a high-calcium matrix

For many years, low-level determinations of nickel in environmental samples containing high levels of calcium have been hampered by the CaO⁺ interference on $^{60}\text{Ni}^+$. Calcium is a common high-level-matrix element in many environmental water samples and in many waste discharge streams. As a result, a minor isotope of nickel ($^{61}\text{Ni}$) was traditionally used, that limited detection capabilities. Using the ELAN DRC-e, this interference can now be virtually eliminated, improving the detection capability for nickel and reducing the chance of reporting false positive results (Figures 10 and 11).

Figure 10. Background spectrum of 100 ppm Ca in 1% HCl obtained in standard mode (red) overlaid with spectrum taken in DRC mode (blue) ($CH_4 = 1.5$ mL/min, $RPQ = 0.75$). Standard-mode spectrum shows large CaO peaks at masses 58 and 60 that can interfere with Ni determination at these masses. DRC-mode spectrum shows removal of this interference. Data taken on ELAN DRC-e.

Figure 11. Background spectrum of 100 ppm Ca in 1% HCl matrix (blue) overlaid with spectrum of 5 ppb multielement spike in the same matrix (red) using an ELAN DRC-e in DRC mode ($CH_4 = 1.5$ mL/min, $RPQ = 0.75$). Spectrum of spiked solution shows good agreement with isotopic abundance ratios (green) for measured nickel intensities at masses 58 and 60, indicating the interference has been removed. Interferences at masses 55, 56, 63-66 are also reduced under these conditions.
DRC – A TOTALLY UNIQUE APPROACH

Dynamic Reaction Cell technology coupled with Dynamic Bandpass Tuning and Axial Field Technology provides the latest innovation in ICP-MS.

The ELAN DRC-e brings you:

• **Superior interference reduction** – The ELAN DRC-e provides the highest level of interference reduction possible, up to 9 orders of magnitude – one million times better than other cell-based systems. And, the ELAN DRC-e maintains analyte-signal levels, unlike other systems.

• **Greater selectivity** – Dynamic Bandpass Tuning allows the ELAN DRC-e to completely control the chemistry occurring inside the cell, resulting in greater selectivity and maximum interference rejection.

• **Increased sensitivity** – Collision cells use a simple kinetic-energy filter to attempt to stop new interferences from reaching the detector after they are formed. This passive technique also reduces analyte transmission and allows many interferences to still be detected. The ELAN DRC-e uses the active mass-filtering quadrupole inside the DRC to remove any precursor species that could form new interferences before reaction can occur. The result is superior interference rejection with full analyte transmission, resulting in higher analyte sensitivities.

• **Uncompromising performance** – Innovative Axial Field Technology ensures maximum transfer of the ions from the DRC to the detector, while reducing scan times in difficult matrices. As a result, the ELAN DRC-e provides unmatched ruggedness, reliability and performance for all applications, including multi-element determinations in environmental, clinical, geological and semiconductor matrices.

• **No reaction by-products** – The ELAN DRC-e not only reduces primary interferences – it eliminates sequential side reactions that create new interferences before they can occur. Only a system with an active mass bandpass filter inside the reaction cell can control the cell chemistry to this extent. Other systems attempt to limit side reactions by restricting the types of reaction gases used and by using a simple energy filter to eliminate by-products. This results in compromised performance and uncontrolled reaction chemistry that often requires the use of tedious standards addition calibrations.

• **Proven quadrupole design** – Other systems use hexapoles and octapoles inside a low-pressure enclosed cell. Due to the complex nature of the mass-stability characteristics of these devices, these higher-order multipoles are only suitable as ion guides. In contrast, the quadrupole used in the ELAN DRC-e provides a well-defined mass bandpass, resulting in superior selectivity through its unique mass-filtering DBT function.

• **Use of multiple gases** – Different matrices may require different gases to optimize interference removal. Some analyses even require multiple gases on the same run to achieve uncompromised detection capabilities. Since collision cells don’t have Dynamic Bandpass Tuning, they must restrict operation to only one or two simple gases. The DBT function of the ELAN DRC-e allows the use of a variety of reaction gases, providing a wide range of solutions for demanding applications. In addition, computer control allows automatic switching of reaction gases during analysis and provides complete control of any make-up gases used.

• **Robust HF-resistant sample introduction system** – The HF-resistant Ryton™ Scott-type spray chamber and cross-flow nebulizer that is standard on the ELAN DRC-e provides excellent sensitivity as well as ease-of-use. The open architecture allows quick changeover if other sample introduction systems are used.

• The ELAN DRC-e is a future-proof system that is fully upgradable to the capabilities of the ELAN DRC II – providing limitless application capabilities.
Why is the DRC better than high resolution?

For many years, high-resolution ICP-MS was the only option to resolving some interference problems.

The ELAN DRC-e provides a superior alternative:
• DRC technology eliminates interferences, including $^{40}$Ar$^+$ from $^{40}$Ca$^+$, $^{87}$Rb$^+$ from $^{87}$Sr$^+$ and $^{40}$Ar $^{40}$Ar$^+$ from $^{80}$Se$^+$ that high-resolution ICP-MS cannot remove, because the required resolution is too great or the resulting analyte signal is too small.
• Unlike other cell-based and high-resolution systems, the DBT function used in the DRC system eliminates interferences without compromising sensitivity.
• The ELAN DRC-e has 10 times better abundance sensitivity than high-resolution ICP-MS, providing the ability to measure small analyte signals next to large matrix peaks without peak overlap.
• The ELAN DRC-e is less expensive and easier to operate than high-resolution systems that offer a fraction of the performance.

• Automated method development makes the ELAN DRC-e easy to use, while its design provides a rugged, workhorse instrument for your lab.

The undisputed leader in ICP-MS

For over 20 years, PerkinElmer and SCIEX have partnered to develop and distribute the most innovative and powerful ICP-MS systems. There are over 2000 ELAN ICP-MS systems and over 600 ELAN DRC systems installed in industries ranging from environmental and clinical to semiconductor, geochemical and metallurgical, making PerkinElmer SCIEX™ the industry leader in ICP-MS.

PerkinElmer SCIEX also leads the industry in innovations and improvements. Technology has evolved from standard ICP-MS to cold plasma to collision cells and now to the Dynamic Reaction Cell technology used in the ELAN DRC-e. At each step in the technology development cycle, interference removal has improved, allowing the use of ICP-MS for more elements than previously imaginable.

A HISTORY OF INNOVATION BY PERKINELMER SCIEX

PRESENT DAY

EARLY 1980’S

1983 SCIEX introduces first commercial ICP-MS
1986 PerkinElmer SCIEX joint venture established
1990 PerkinElmer SCIEX shows first ICP-MS with turbomolecular pumps
1994 PerkinElmer SCIEX introduces ELAN 6000
  • First ICP-MS with simultaneous extended dynamic-range detector
  • First ICP-MS with single, scanning lens optimized for ICP-MS
  • Improved signal-to-noise ratios through single-point peak-hopping
1999 PerkinElmer SCIEX introduces ELAN 6100
  • 5th-generation ICP-MS with quick-change lens design
  • Stable torch mount eliminates the need for XYZ adjustment
1999 PerkinElmer SCIEX introduces DRC technology
  • First system with automated DRC optimization and Dynamic Bandpass Tuning
  • PITTCON® Editors’ Award – Gold medal
2001 PerkinElmer SCIEX introduces the ELAN DRCPlus
  • 2nd-generation DRC instrument with Axial Field Technology for optimal performance in all matrices
2002 PerkinElmer SCIEX introduces the ELAN DRC II
  • Integrated peristaltic pump for superior unattended operation
  • New design allows use of heat-exchanger-based cooling system
2003 PerkinElmer SCIEX introduces the ELAN DRC-e
  • First DRC system for routine analytical use in high-throughput labs
  • Enhanced ELAN software speeds setup and optimization, provides new features to make ICP-MS even easier
PERKINELMER, INC.

Expect more from the leader in inorganic analysis
With over 40 years experience and a product line that includes flame AA systems, high-performance graphite furnace AA systems, flexible ICP-OES systems and the most powerful ICP-MS systems, PerkinElmer is the undisputed leader in inorganic analysis. We have placed over 40,000 systems throughout the world, performing inorganic analyses every hour of every day. With the largest technical service and support staff in the industry and a solid reputation for quality products and service, the ELAN DRC-e instruments deliver the performance required to maximize ICP-MS performance and productivity.

Whatever you’re looking for, we’ve got it
PerkinElmer is a world leader in chemical analysis. Our analytical instrument technologies serve the fast-evolving pharmaceutical, chemical, forensics, environmental and semiconductor industries, providing integrated solutions – from sample handling and analysis to communication of test results.
As one of the best-known brands in research, analysis and testing, ours was probably the first analytical instrument you ever used. In addition to our ICP-MS systems, we offer a broad range of solutions in Luminescence, UV/Vis, NIR, GC, GC/MS, HPLC, AA, ICP-OES, Thermal Analysis, Elemental Analysis, FT-IR and LIMS. There are over 60 years of experience built into every product we make. So, for leading edge R&D and demanding QA/QC, you get the speed, accuracy and reliability you seek – for the productivity you need.

Unbeatable service and support – worldwide
Maybe you are new to ICP-MS or maybe you are an expert who wants to discuss an application with a knowledgeable ICP-MS scientist. In either case, PerkinElmer SCIEX has more people focused on ICP-MS applications than any other company. Clearly, we understand sample preparation, interferences and method-development issues facing today’s laboratory. With extensive applications experience and knowledgeable service specialists, you can be assured that our organization is here for you well after the system has been installed.
Our service and support teams are located in 125 countries throughout the world and are factory trained. Compliance doesn’t get any easier than with our software, including 21 CFR Part 11 technical compliance on many products. And, convenient consumables and accessories ordering lets you get your hands on what you need fast.