

thermoscientific

# Join the **mass** movement towards mass **spectrometry**



Thermo Scientific  
ISQ EC and ISQ EM single quadrupole  
mass spectrometers

**ThermoFisher**  
SCIENTIFIC

# Embrace the power of mass spectrometry

Achieving a comprehensive understanding of the samples you analyze is always a challenge. At Thermo Fisher Scientific, we believe the easier we can make the journey from sample to knowledge, the more information you will have to succeed with your analyses.

Despite the benefits of incorporating mass spectrometry (MS) into your analyses, we know MS can seem complex. That is why we designed the Thermo Scientific™ ISQ™ EC single quadrupole mass spectrometer and the Thermo Scientific™ ISQ™ EM single quadrupole mass spectrometer with robustness and ease-of-use in mind.

The ISQ EC and ISQ EM mass spectrometers seamlessly integrate with your chromatography system setting new standards for user friendliness.

## Gain greater insights from your sample

Coupling ion or liquid chromatography to MS, allows you to gain greater insights from your samples. Adding MS gives you:

- Higher sensitivity and selectivity
- Chromatographic peak mass confirmation, reducing the likelihood of false negatives and positives

## Resolve complexity

Confidently analyze samples with complex matrices based on the superior robustness of the ISQ EC and ISQ EM mass spectrometers. These single quadrupole mass spectrometers offer:

- Improved detection of analytes in complex matrices
- Identification of co-eluting peaks based on their mass-to-charge ( $m/z$ ) ratios



## Easily master MS

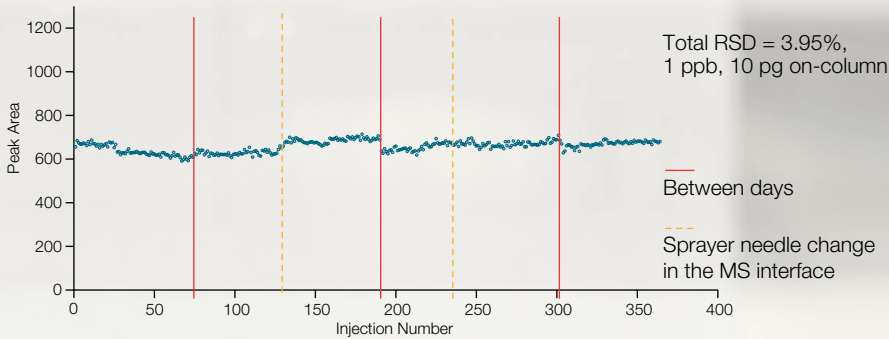
The seamless integration of the ISQ EC and ISQ EM mass spectrometers with your IC or LC system allows you to focus on successfully using the system with:

- Integrated tools to help you quickly learn the MS system
- Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software for analysis, including embedded control of the mass spectrometer

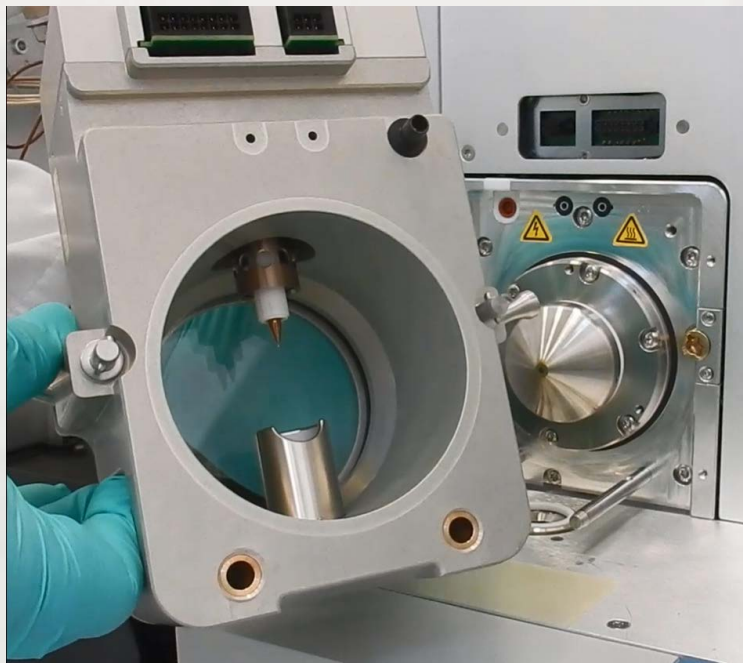
# Resolve complexity

The ISQ EC and ISQ EM mass spectrometers enable the analysis of a variety of complex sample matrices with unparalleled robustness.

Reserpine Peak Area Robustness



The ISQ EC and ISQ EM mass spectrometers demonstrate reliable day-to-day peak area reproducibility, even while simultaneously performing routine maintenance.



The ISQ EC and ISQ EM mass spectrometers feature an orthogonal ion source specifically designed to address challenging sample matrices. The ion source provides longer, uninterrupted operation by saving time spent on maintenance.

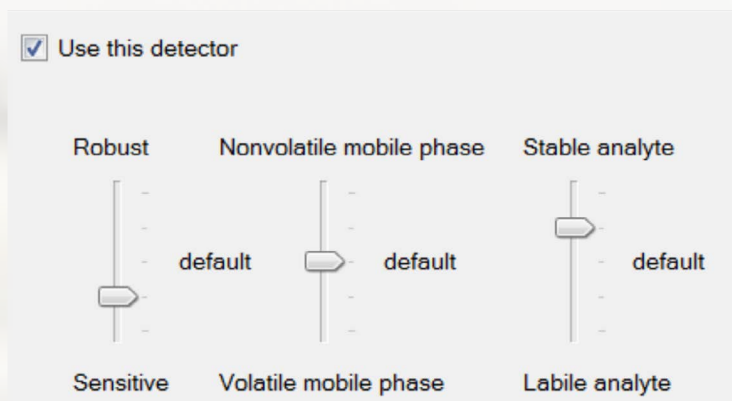


# Easily master MS

The faster you develop your MS skills, the closer you move to expanding your sample knowledge. With the ISQ EC and ISQ EM mass spectrometers, both novice and advanced users can easily master MS.

## Master MS

Quickly access experiment-based knowledge built into the ISQ EC and ISQ EM mass spectrometers' interface controls to quickly obtain quality results. This interface was designed with unique algorithms and two modes. Easy Mode focuses your MS analysis using basic chemical parameters. Advanced Mode provides customizable parameters to further optimize your data acquisition.



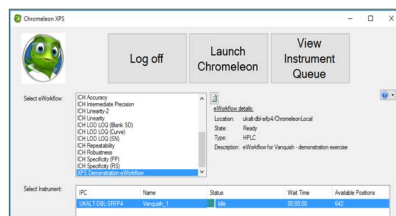
The intuitive ion source technology tool, incorporated into Easy Mode, helps you select suitable MS conditions based on three parameters.

## Gain more time for data analysis

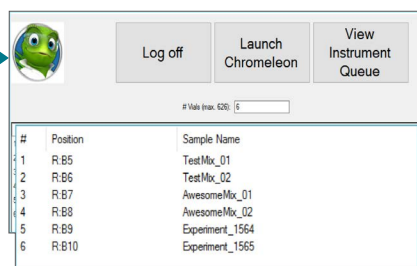
The first step to better understanding your sample is to analyze and report your IC-MS and/or LC-MS data.

The Chromeleon CDS software simplifies this process with embedded control of the ISQ EC and ISQ EM mass spectrometers. The software is not only easy to use, but also regulatory compliant.

## Straightforward analysis with Chromeleon XPS Open Access walk-up solution



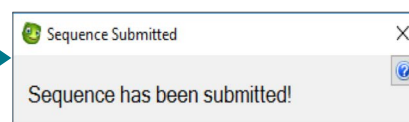
Step 1. Select your eWorkflow and instrument.



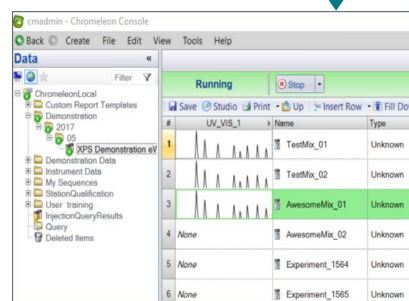
Step 2. Create your sample list.

## In addition:

- Quickly access detailed method information from the Thermo Scientific™ AppsLab Library of Analytical Applications, an online repository
- The Thermo Scientific™ Chromeleon™ XPS Open Access user interface delivers walk-up workflows for straightforward routine analyses
- An Autotune feature automates instrument calibration. Moreover, the Autotune can be scheduled as part of your workflow, at any time and from any place.



Step 3. Submit your sequence.



Step 4. Get your custom analysis report, either printed or via email.

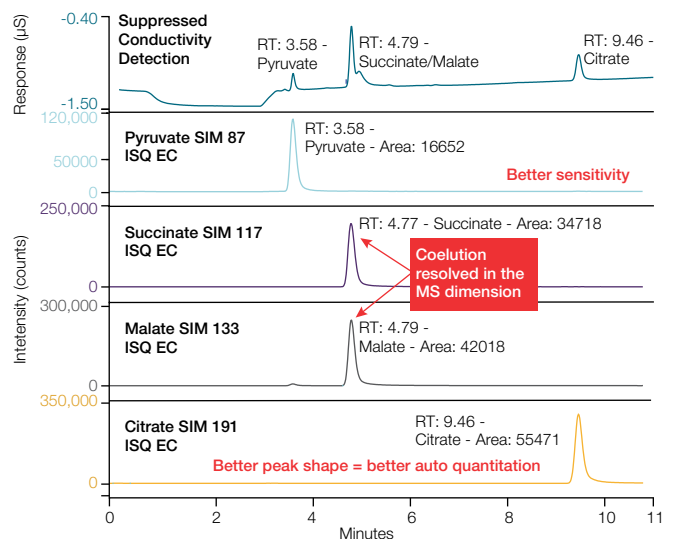
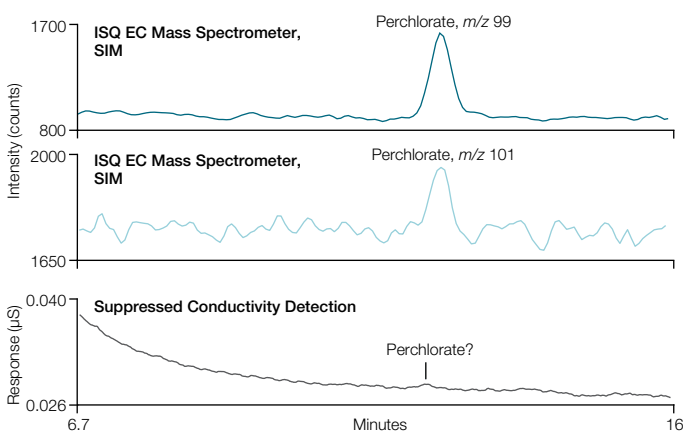
# Optimized for routine IC-MS and LC-MS of small molecules

The power of MS enhances your IC and LC analyses with higher sensitivity and improved selectivity for analytes of interest. The ISQ EC mass spectrometer has exceptional low-molecular-weight performance for the detection and quantification of ions with limits of detection (LOD) in the single-digit-parts-per-billion (ppb) range.

## The ISQ EC mass spectrometer provides:

- Reliable routine analysis of low molecular weight ions using IC and LC
- Durable atmospheric pressure ionization (API) source with high-performing heated electrospray ionization (HESI) probe for challenging sample matrices

## Ion Chromatography – Mass Spectrometry (IC-MS)

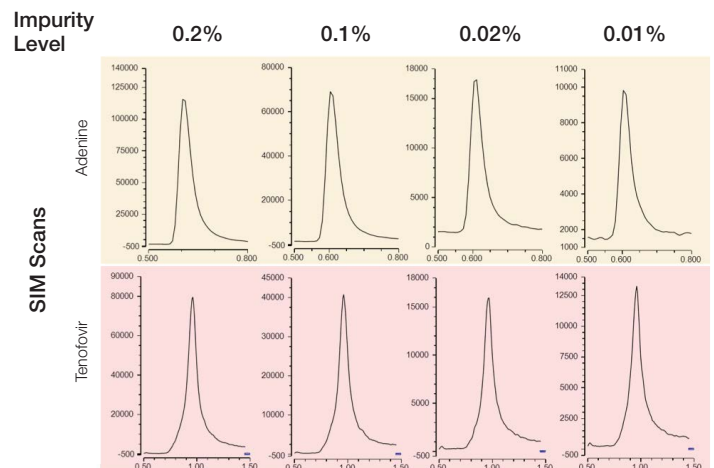
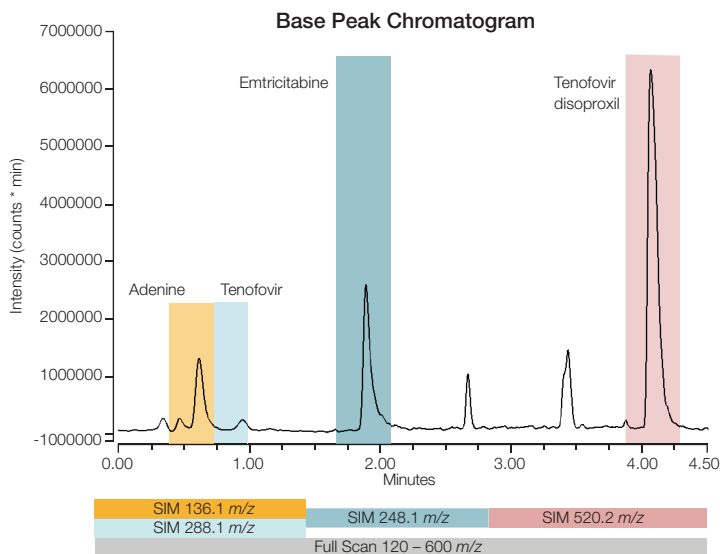


The ISQ EC mass spectrometer offers improved low-mass sensitivity for detecting perchlorate in municipal drinking water. This sensitivity is not possible using IC with conductivity detection alone. Additionally, no organic solvent make-up is required.

Compared to IC with conductivity detection alone, the ISQ EC mass spectrometer provides better selectivity by resolving co-eluting peaks using mass-to-charge ( $m/z$ ) ratio. In this example, succinate ( $m/z$  117) and malate ( $m/z$  133) peaks are co-eluting in an animal feed sample. These peaks are resolved in single ion monitoring (SIM) mode.



## Liquid Chromatography – Mass Spectrometry (LC-MS)



When detecting impurities for both routine and demanding pharmaceutical assays, MS provides reliable and robust quantitation that complements traditional UV/Vis data. The ISQ EC mass spectrometer can perform targeted and untargeted impurity profiling at the same time by employing Full Scan and SIM scans in the same run. This will ensure you do not miss a single peak.

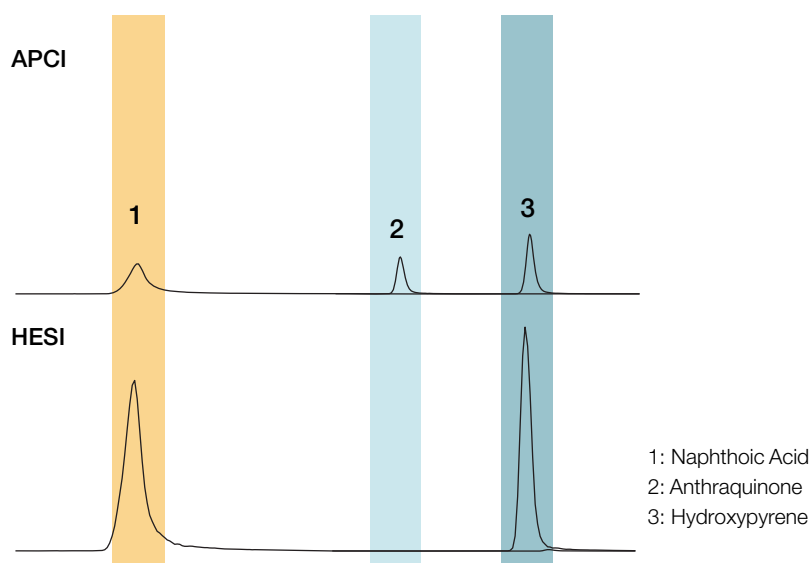
# Flexible and routine small and large molecule LC-MS analysis

Seamlessly integrate your LC system with the ISQ EM mass spectrometer for reliable LC-MS operation. The ISQ EM mass spectrometer is built for greater application flexibility ranging anywhere from drug development to manufacturing support and quality control.

## The ISQ EM mass spectrometer provides:

- Detection and quantification of small and large molecules with an extended mass range
- Measurement of polar and non-polar compounds with HESI and dual HESI/APCI (atmospheric pressure chemical ionization) probe options

## Flexibility with HESI and APCI ionization

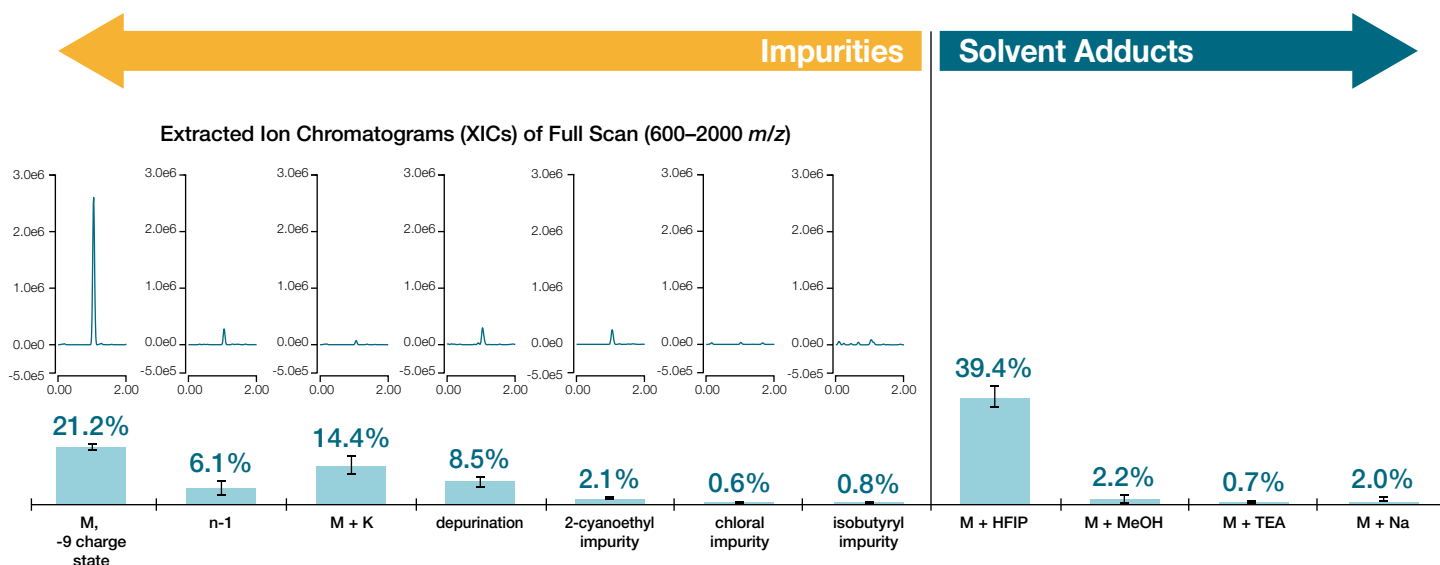


The ISQ EM mass spectrometer has a durable atmospheric pressure ionization (API) source with interchangeable HESI and APCI probes for more flexibility to ionize polar and non-polar molecules even in the most challenging samples matrices. Non-polar compounds (e.g., anthraquinone, naphthoic acid and hydroxypyrene) detection with MS is improved using APCI (top) compared to HESI (bottom).



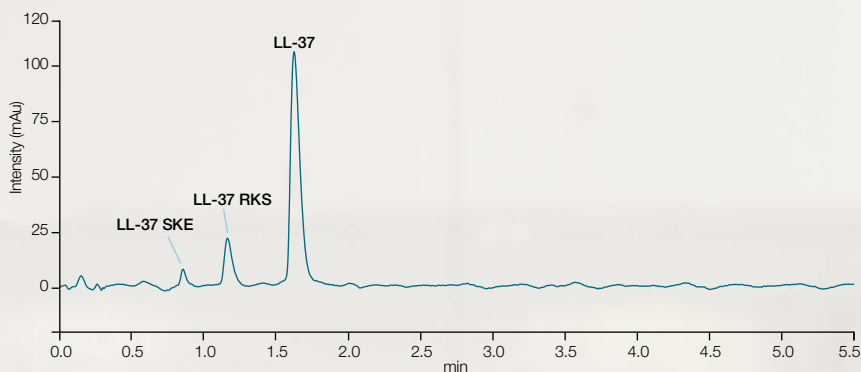


### Routine Impurity analysis

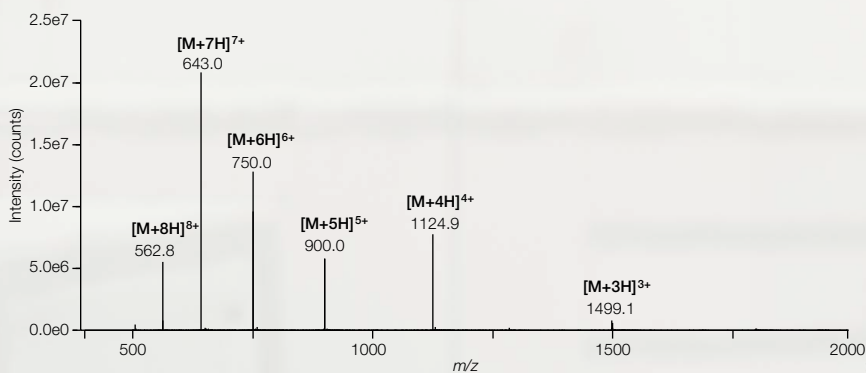


Quantifying the yield of synthesized oligonucleotides can be achieved with UV/Vis detection, but MS expands the assay to not only detect and quantify the target compound, but also impurities. The ISQ EM mass spectrometer allows for easy routine mass confirmation and impurity analysis of large molecules like synthetic oligonucleotides by employing Full Scan for untargeted impurity profiling. The Full Scan data can be processed and the extracted ion chromatogram (XIC) can be used to target one or more  $m/z$  values across the entire data set so you never miss an impurity or a salt adduct. In this example, the XIC from a single oligomer peak obtained using Full Scan mode, shows a variety of distinguishable impurities and adducts in a single run, which is not possible with UV/Vis detection.

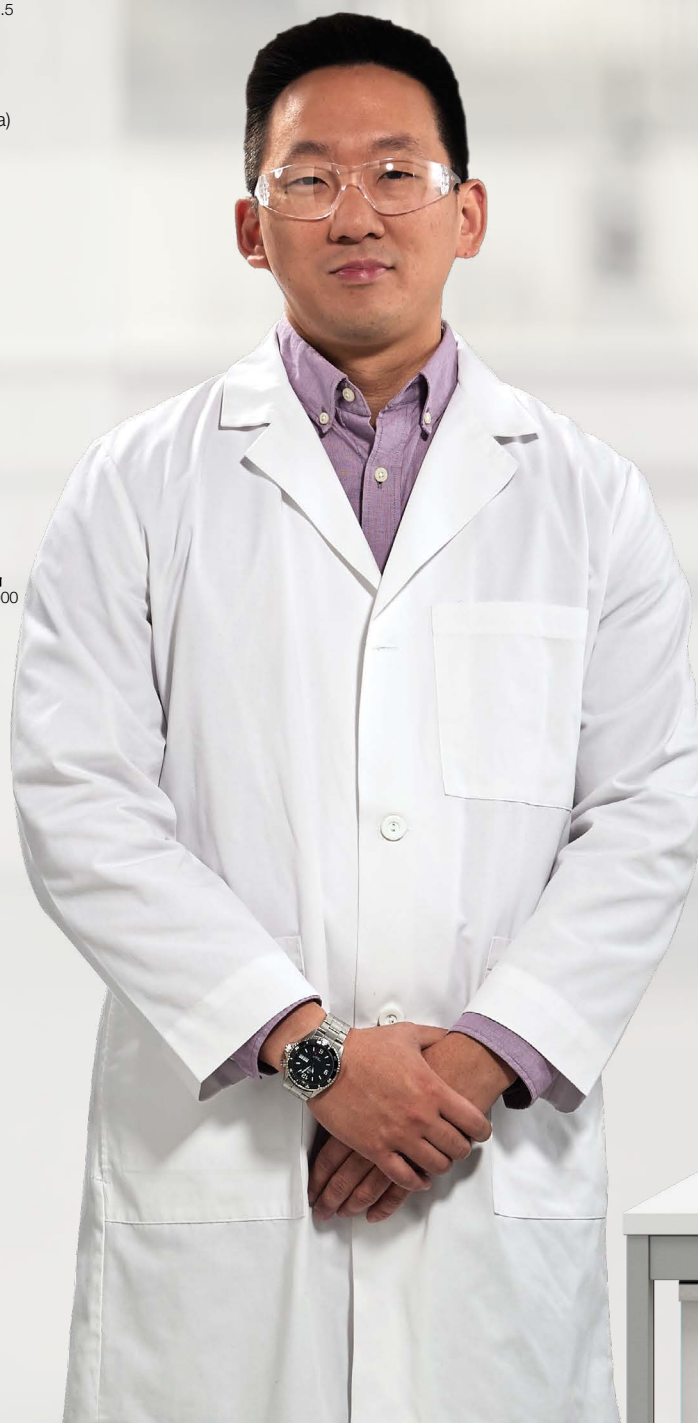
# Fast and reliable with an extended mass range



Quick detection and quantification of target analyte and associated impurities in a single run can be accomplished with the ISQ EM mass spectrometer. In this example, the total ion chromatogram (TIC) trace of the targeted 37 amino acid synthetic peptide LL-37 (active pharmaceutical ingredient, 4500 Da) and two related fragments separated within 2 minutes.



The extended mass range of the ISQ EM mass spectrometer allows the detection of multiple charge states between +3 and +8 for the target peptide. The peak assignment would not have been possible based on the UV signal alone and without additional experiments.



# ISQ EC and ISQ EM mass spectrometers in comparison

The ISQ EC mass spectrometer delivers outstanding robustness and performance for routine single quadrupole MS to integrate with your IC and LC system. The ISQ EM mass spectrometer extends the application range to larger molecules. The ISQ EM mass spectrometer offers HESI and APCI ionization to target polar and non-polar analytes for an easy-to-use, walk-up LC-MS.

	ISQ EC mass spectrometer	ISQ EM mass spectrometer
<b>Performance</b>		
Mass Range ( <i>m/z</i> )	10–1250	10–2000
Supported Modes		Full Scan/SIM
Mass Resolution		Unit ( $\leq 1.0$ Da)
Mass Accuracy		$\leq \pm 0.1$ Da
Scan Rate		Up to 20,000 Da/s
Mass Stability		$\leq 0.1$ Da over 48 h
Digital Dynamic Range		$>10^7$
<b>Source details</b>		
Source Type	HESI	HESI and HESI/APCI
Polarity Switching		Yes, 25 ms
Flow Rate		Up to 2 mL/min
SIM Sensitivity (ESI+)		10 pg Reserpine S/N $\geq 400:1$ (RMS)
SIM Sensitivity (ESI-)		20 pg Nitrophenol S/N $\geq 500:1$ (RMS)
SIM Sensitivity (APCI+)	n/a n/a	10 pg Reserpine S/N $\geq 1000:1$ (RMS)
SIM Sensitivity (APCI-)	n/a	20 pg Nitrophenol S/N $\geq 80:1$ (RMS)

# Providing innovative chromatographic workflow solutions

Thermo Fisher Scientific offers a comprehensive portfolio of IC and LC instruments to help you solve complex analytical challenges. Our leading-edge workflow solutions—from sample preparation, chromatographic separation, seamless integration with mass spectrometry, and data management and analysis help you meet today's increasing demands for analytical performance, productivity, and ease-of-use.



Thermo Scientific™ Dionex™  
ICS-6000 HPIC™ System



Thermo Scientific™ Dionex™  
Integriion™ HPIC™ System



Thermo Scientific™ Vanquish™  
UHPLC Systems



Thermo Scientific™ Chromeleon™  
Chromatography Data Systems



Thermo Scientific™ ISQ™ EC  
and Thermo Scientific™ ISQ™ EM  
Single Quadrupole Mass Spectrometers



Find out more at [thermofisher.com/SingleQuadMS](https://thermofisher.com/SingleQuadMS)

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