



Why GC-Alpha

When Conventional GC-MS Isn't Enough

Analytical laboratories are increasingly challenged to identify unknown compounds, analyze complex mixtures, and differentiate materials with similar chemical compositions.

These investigations often require molecular information beyond what conventional electron ionization (EI) and mass spectral library searching alone can provide.

GC-Alpha combines high-resolution accurate mass, multiple ionization techniques, comprehensive GC×GC capability, and AI-assisted structural analysis to help scientists identify unknown compounds and better understand complex samples with speed and confidence.

How GC-Alpha Solves These Challenges

High-Resolution Accurate Mass

Improve confidence in compound identification by providing accurate mass information to distinguish compounds with similar fragmentation patterns and reliably determine elemental composition.

AI-Assisted Structural Analysis

msFineAnalysis AI combines accurate mass data with AI-assisted interpretation to streamline unknown compound identification, assist structural elucidation, compare similar samples, and reduce time spent interpreting complex data.

Direct MS Capabilities

High-boiling, high-molecular-weight, and low-volatility compounds are not suitable for GC analysis. With GC-Alpha's direct MS capabilities, these compounds can now be analyzed, giving scientists access to information that would otherwise be difficult to obtain. Field Desorption (FD) further expands these capabilities by enabling the analysis of thermally labile compounds, metal complexes, and high-molecular-weight materials such as polymers.

Multiple Ionization Techniques

GC-Alpha combines multiple ionization techniques to provide additional molecular information for confident compound identification. In addition to conventional EI and chemical ionization (CI), GC-Alpha offers field ionization (FI), field desorption (FD), and photoionization (PI), expanding the information available for challenging analytical investigations. FI and FD help preserve molecular ions, supporting molecular weight determination and characterization of difficult compounds.

Integrated Analytical Workflow

Acquire, compare, interpret, and identify complex samples in a single streamlined workflow to improve laboratory efficiency and accelerate decision-making.

Applications

Designed for analytical challenges such as:

- Unknown Characterization
- Complex Mixture Analysis
- Failure Analysis
- Deformulation / Reverse Engineering
- Differential Analysis

Supporting laboratories across:

Energy & Petroleum

Chemicals

Materials

Environmental

Polymers & Plastics

Industrial R&D

Academic Research

And more

Technology Behind GC-Alpha

High-Performance GC-MS

GC-Alpha is designed to simultaneously deliver:

30,000 FWHM
MASS
RESOLUTION

< 1 ppm
MASS
ACCURACY

50 Hz
DATA
ACQUISITION

4 orders
DYNAMIC
RANGE

4-6,000 u
MASS
RANGE

High
SENSITIVITY

Designed for advanced material characterization, comprehensive two-dimensional GC (GCxGC), and the analysis of complex samples. By combining enhanced chromatographic separation with high-resolution accurate mass measurements, GC-Alpha provides exceptional resolving capability for identifying compounds in highly complex mixtures.

Going Beyond EI

While EI is the most widely used ionization technique for GC-MS, its extensive fragmentation can make molecular ion detection difficult for some compounds. Without a clear molecular ion, determining molecular weight and confidently identifying unknown compounds can become much more difficult.

GC-Alpha extends analytical capabilities by offering additional soft ionization techniques beyond conventional EI and CI, including FI, FD and PI.

FI and FD preserve molecular ions through extremely soft ionization, supporting molecular weight determination. Combined with accurate mass measurements, these techniques enable elemental composition determination and strengthen unknown compound identification. PI provides an additional complementary ionization option for selected applications.

Practical Advantages

- Simple and rapid switching between EI and FI, FD, or PI
- No need to break the vacuum
- No need to replace the ion source
- No reagent gases required for FI or PI

These capabilities allow laboratories to obtain additional information from the same sample using different ionization techniques, supporting more confident compound identification while minimizing workflow interruptions.

msFineAnalysis AI - From Data to Structural Insight

msFineAnalysis AI integrates:

- AI-Assisted Structure Analysis
- Differential Analysis
- Target Analysis
- GCxGC Data Analysis
- Peak Deconvolution
- Integrated EI and Soft Ionization Interpretation

206M
SPECTRAL LIBRARY

A 206 million predicted EI spectral library with molecular structures focusing on the PubChem database, polymer pyrolyzates, and metabolites.

By combining accurate mass measurements with AI-assisted analysis, msFineAnalysis AI enables laboratories to interpret complex data more efficiently, identify unknown compounds with greater confidence, and spend less time processing results.

Why Scientists Choose GC-Alpha

- Characterize unknown compounds beyond what conventional EI and mass spectral library searching alone can provide.
- Obtain additional evidence to support unknown compound identification.
- Analyze complex mixtures with high-resolution accurate mass.
- Compare similar samples using differential analysis.
- Accelerate data interpretation with AI-assisted workflows.
- Support confident scientific decision-making.



Learn more about GC-Alpha

JMS-T2000GC AccuTOF™ GC-Alpha 2.0
High-Resolution GC-TOFMS

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