Agilent 7890 GC/6540 QTOF LC/MS System with GC-APCI Interface

Technical Overview

Summary

The Agilent 7890 GC/6540 QTOF LC/MS system with GC-APCI interface technology provides you with the highest GC chromatographic peak resolution and best mass accuracy in a robust and easy to use platform. The unique design of the GC-APCI ion source enables rapid switching between GC/MS and LC/MS operation and the flexibility to handle a wide range of your most challenging qualitative applications.

Enhanced utility from your TOF or QTOF LC/MS

The analysis of compounds in a wide diversity of matrices for applications such as environmental analysis, pesticides, and metabolomics is extremely complex and often requires two or more analyses on different mass spectrometers. While the non-volatile relatively polar components are usually separated by LC/MS, the more volatile non-polar components require GC/MS analysis. Adding GC-APCI capability to the QTOF LC/MS system provides the flexibility to perform high mass accuracy and high resolution quantitative and qualitative analysis of both semi-volatile and volatile compounds on a single instrument, saving time, money and bench space.

The GC-APCI technology delivers:

- Very narrow chromatographic peak widths, especially for high boiling compounds, providing greater sensitivity and compound separation
- Improved flexibility and productivity for analysis of a broad variety of sample types
- Up to 3-fold faster analysis times
- Enhanced compound ionization, sensitivity and structural characterization for a wide range of analytes, due to easy access to a selection of makeup gases

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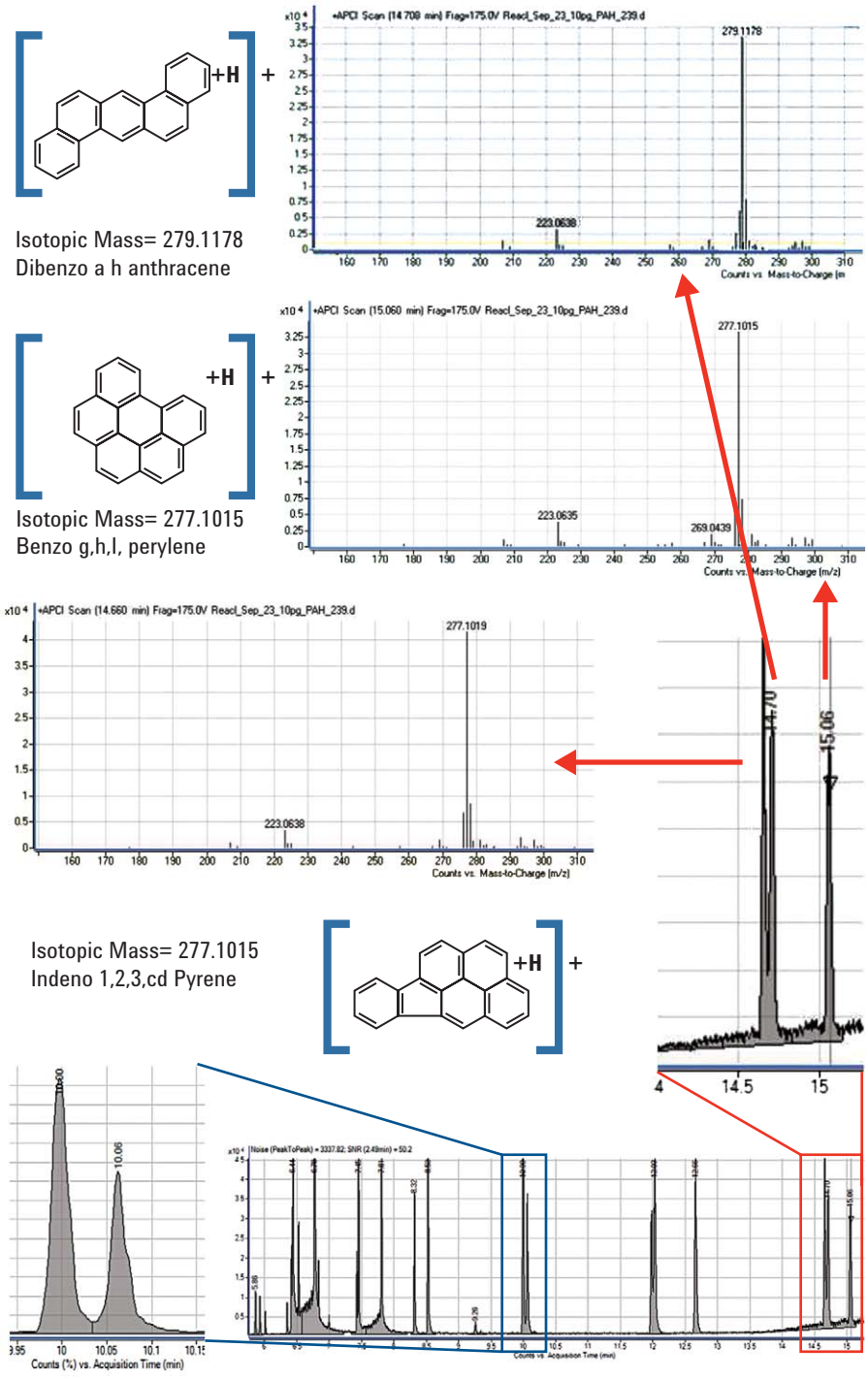
Superior GC/MS performance

Linking a GC to an existing TOF or QTOF LC/MS having high mass accuracy provides very high confidence compound identifications. The 6540 QTOF mass analyzer is an ideal choice for GC, as its fast scan speed takes full advantage of the rapid 12 Hz full scan capability, providing 10 to 20 high resolution mass scans over the narrow 2 to 3 second GC capillary peaks. The unique heated design of the short GC-APCI transfer line maintains uniform high temperature for the GC separation, preserving high resolution and sensitivity for high boiling compounds.

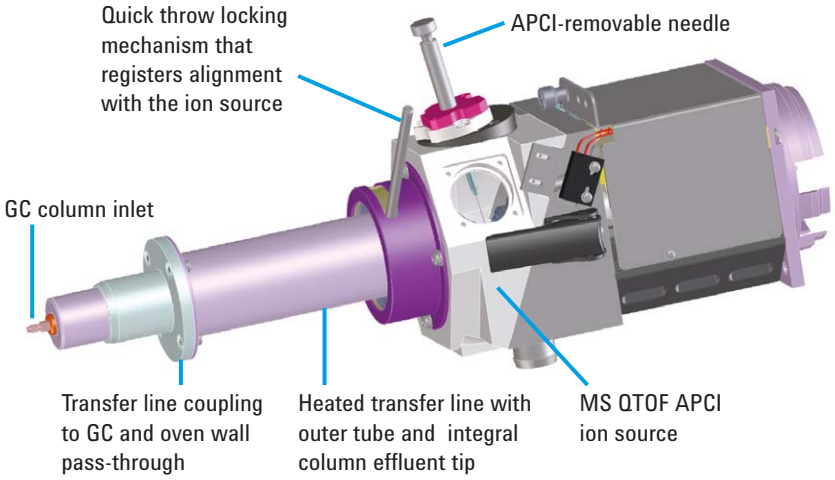
This performance advantage is most obvious when dealing with samples that contain a large number of compounds having long retention times and high boiling temperatures, such as polycyclic aromatic hydrocarbons (PAHs). If transfer line heating is inadequate or non-uniform, these PAH compounds may be poorly resolved or not elute at all. Using the Agilent GC-APCI technology, even the late eluting PAHs are well resolved, giving sharp peaks. The mass accuracy of the QTOF generates highly confident compound identification from the spectra of each peak. This mass accuracy advantage is also useful for providing identification of unknowns, when screening samples for compounds such as pesticides. The APCI process is designed to be used with compounds having a proton affinity greater than water.



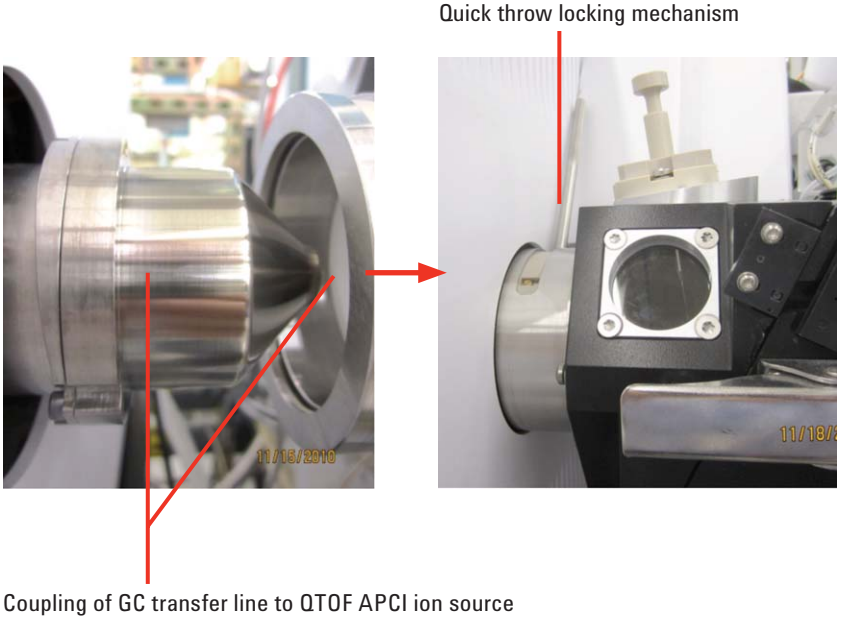
Well-resolved, sharp GC peaks and confident compound identification for high boiling temperature compounds. *50 pg each of a mix of 14 PAH compounds were separated using a DB-5MS, 30 m x 0.25 diameter column with a 0.1 mm film on the GC- APCI on an Agilent 6540 Accurate-Mass QTOF LC/MS System. The spectra for three high-boiling compounds are shown along with their true isotopic masses and ion structures (above TIC chromatogram). Two compounds that elute near 10 minutes are shown in an expanded view to the left of the chromatogram to illustrate the ability of the system to separate peaks that are only 2-3 seconds wide.*

Simple and secure coupling device provides fast switching between GC and LC/MS operation

The unique design of the GC-APCI interface enables switching between GC and LC operation within a few minutes. A short, heated transfer tube with an outer tube for extra protection connects the GC capillary to the APCI source, which provides the corona discharge for ion generation. The "quick lock" connection between the APCI interface housing and APCI source registers alignment with the ion sources, eliminating the need for adjustments to either column positioning or corona needle positioning, and providing very robust switching to GC-operation. Combining both GC and LC capability with the TOF or QTOF mass analyzer provides the flexibility to handle a wide variety of sample types, from neutral to highly polar, and significantly increases the productivity of existing MS instrumentation.



GC-APCI interface for the Agilent 6500 Series QTOF and 6200 Series TOF LC/MS systems



Faster analysis times

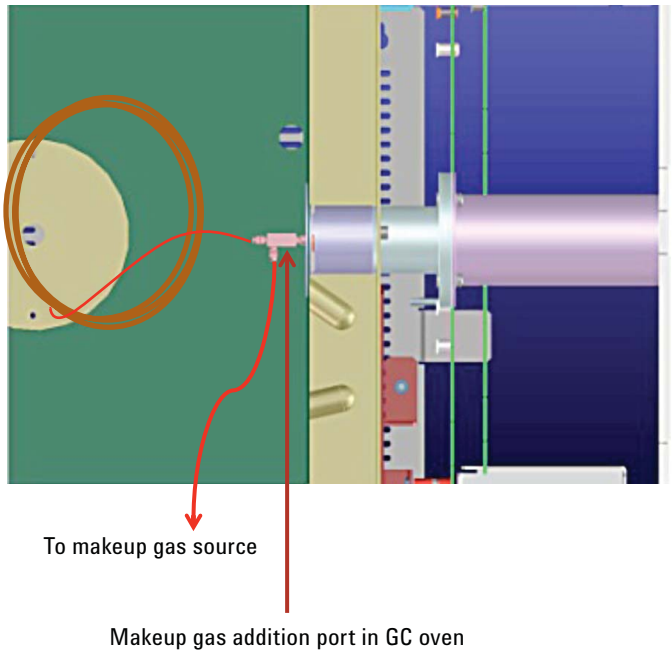
The outlet of the GC column and the inlet to the MS are at atmospheric pressure, allowing as much as five times higher column gas flow than dedicated GC systems. The higher flow rates enable faster analysis times and loading of larger amounts of sample for improved detection.

Flexibility for improved compound ionization and sensitivity

A wide range of makeup gases (such as CO_2, N_2 and N_2O) is required to assure efficient ionization for a wide variety of samples. The GC-APCI design has a reagent addition port to accommodate the delivery of selected makeup gases into the APCI source to assist in ionization. This is accomplished by simply connecting a reagent bottle to the makeup gas port in the GC oven.

Ordering information

GC APCI interface bundle G3212A



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