Agilent Technologies
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Gulf Shores, AL

Real Time GCMS Analysis of Powders, Solids and Liquids using Agilent's QuickProbe™ Technology

Abstract:
This presentation demonstrates the capabilities of performing fast GCMS analysis in under 1 minute, requiring minimal to no sample preparation prior to analysis, and utilizes classical EI commercial libraries. This work seeks to illustrate how Agilent's QuickProbe™ can be used as a fast-qualitative forensic screening tool on an existing 5977A/B/C/7890B or 5977A/B/C/8890 GCs, while allowing for the continued use of a co-resident split/splitless GC inlet for routine conventional capillary confirmational GCMS analysis.

Understanding the Science and Concerns Behind the Possible Conversion of Helium to Hydrogen Carrier Gas for EI GCMS systems

Abstract:
Helium has historically, with valid scientific reasons, been the preferred carrier gas for GCMS and the majority of GC analysis. Within the last decade there has been an increase in the difficulties to procure UHP helium in the quantities required for full laboratory operations and or a drastic increase in the overall cost of UHP helium tanks. Due to its chemical and physical characteristics, high resolution chromatographic separations can be achieved with minimal analyte interactions. GCs with atmospheric detectors often utilize alternative carrier gases such as nitrogen, argon, and hydrogen. However, when the GC is coupled to a mass spectrometer under high vacuum, parameters based on a mean free pathway of ion molecules, vacuum, low background, and high sensitivity come into play. Based on these parameter limitations, of the previously mentioned carrier gases, hydrogen is the practical alternative. Nonetheless, hydrogen does have disadvantages that may cause a GCMS analyst to re-evaluate the urgency to convert to hydrogen carrier based on its reactivity with some analytes, reduced sensitivity, increased peak tailing, and reduced spectral fidelity when compared to helium generated reference spectra.

Ultimately, helium is the preferred carrier gas choice, but if not available, hydrogen may be considered. The purpose of this presentation is to help analysts determine if hydrogen can be used as a carrier gas for their specific analysis. Furthermore, the illustration of best practices, specific MS source configurations, forensic drug data examples, and the acquisition parameters necessary to help determine if the transition of a specific application is or is not compatible for hydrogen carrier gas on a GCMS system, will be discussed.

Title: GCMS Analysis of Street Drugs Utilizing Hydrogen Carrier Gas in Combination with a Hydroinert EI Source

Abstract:
Analysis of street drugs in the forensic realm has routinely utilized capillary chromatography with mass selective detectors (MSD). The MSD provides sensitivity, selectivity, and permits structural identification of the specific compounds found in forensic street drug samples. The purpose of this research is to demonstrate that several recent advances in inert coatings on the mass spec source assembly, found in the Agilent Technologies Hydroinert™ Source, can be successfully incorporated into utilizing hydrogen as an alternative carrier gas in the current screening methods involving street drug samples. This work seeks to demonstrate the improvements in source reactivity, increases in analyte response, spectral fidelity, and speed of analysis when using the Hydroinert™ source in combination with hydrogen as the carrier gas. This study applied Method Translation software to convert a conventional street drug screening method without changing peak elution patterns or negatively affecting peak resolution. The advancement of the Hydroinert™ Source design facilitates the GCMS solution, utilizing hydrogen as the carrier gas, and generating spectral library matches from commercial libraries and or the generation of custom libraries for targeted drug compounds.

Title: GCMS Analysis of Explosives in Soil Utilizing Hydrogen Carrier Gas in Combination with a Hydroinert EI Source

Abstract:
Analysis of explosives and explosive residues has routinely utilized capillary chromatography with mass selective detectors (MSD). The MSD provides sensitivity, selectivity, and permits structural identification of the specific compounds found in explosives and residue matrices. The purpose of this research is to demonstrate that several recent advances in inert coatings on the mass spec source assembly, found in the Agilent Technologies Hydroinert™ Source, can be successfully incorporated into utilizing hydrogen as an alternative carrier gas in the current proven methods of explosive analysis. This work seeks to show that this can be done with minimal disruption to the established practices of data acquisition and analysis while demonstrating the improvements in source reactivity, increases in analyte response, spectral fidelity, and speed of analysis when using the Hydroinert™ source. This study utilized an existing conventional explosives GC method and applied Method Translation software to translate method parameters from helium carrier to hydrogen carrier gas, without changing the peak elution patterns or negatively affecting peak resolution.

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