

APPLICATION NOTE

Rapid Analysis of Trace Levels of H₂S in Natural Gas Using the INFICON 3000 Micro GC

INTRODUCTION

Hydrogen sulfide (H₂S) is a naturally occurring sulfur compound often present in natural gas wells. Due to its unpleasant odor, corrosive properties, and high toxicity, natural gas companies remove the harmful H₂S before delivering the gas to consumers. With prolonged exposure, levels of 30 ppm or higher can cause serious vision or olfactory damage, therefore making it necessary to monitor natural gas streams to ensure H₂S levels are acceptable.

The 3000 Micro GC is capable of analyzing H₂S down to 1 ppm in a natural gas matrix.

EXPERIMENTAL

A calibration standard containing H₂S in air was used to calibrate a 3000 Micro GC configured with a 20 m OV-1 column with a large variable volume injector (LVI).

The LVI injector provides the necessary sensitivity to analyze low ppm levels of H₂S on the OV-1 column.

[Table 1](#) displays the component concentrations for the calibration gas standard. The calibration gas standard was introduced using a regulator connected directly to the 3000 Micro GC sample inlet.

Using a gas-tight syringe, H₂S was introduced into a natural gas calibration standard to prepare concentrations of 1 ppm and 5 ppm.

RESULTS

Hydrogen sulfide was successfully separated and analyzed at 1 ppm and 5 ppm in a natural gas matrix. [Figure 1](#) shows the labeled chromatogram of the syringe dilution of 5 ppm H₂S in natural gas. Ten runs of this preparation were conducted, producing an area %RSD value of 3.75%. The retention time and area %RSD values are shown in [Table 2](#).

The syringe dilution of 1 ppm H₂S in natural gas was run to determine the limit of detection (LOD).

Natural gas component concentrations, as well as physical properties such as specific gravity and heating value, can be obtained using a 3000 Micro GC with additional channels. See the [diaf52a1 Rapid Analysis of Natural Gas Composition and Physical Properties Using the INFICON 3000 Micro GC Application Note](#) for more information on natural gas.

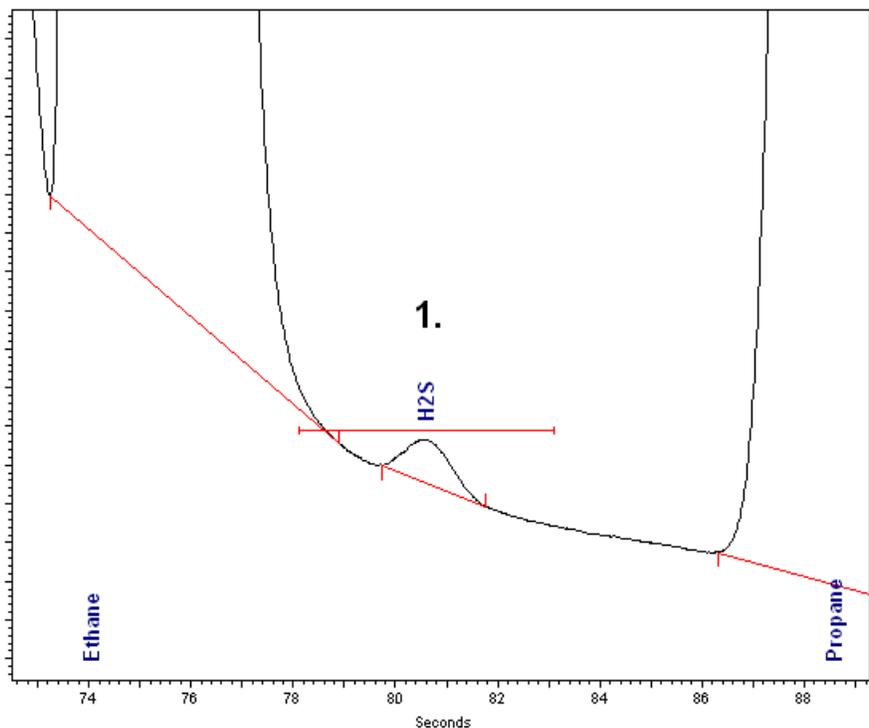
CONCLUSION

With its speed, precision, and sensitivity, the 3000 Micro GC is an ideal instrument to analyze H₂S in a natural gas matrix. The 20 m OV-1 LVI channel allows for the ideal separation of H₂S from natural gas components. H₂S can be analyzed in under 100 seconds with excellent retention time and area repeatability.

Table 1 Component and mole % information for the calibration gas standard

Component	Mole %
H ₂ S	0.01
Air	Balance

Figure 1 Chromatogram of 5 ppm H₂S standard diluted in natural gas



Column: OV-1, 20 m, Large Variable Volume Injector
 Column Temperature: 45°C, Isothermal
 Column Head Pressure: 35 psi

Table 2 Repeatability data for 5 ppm H₂S standard diluted in natural gas

Channel	Number of Analyte	Compound	Retention Time (s)	RT %RSD	Area %RSD
A	1	H ₂ S	80.74	0.076	3.745



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