

Permanent gases and CO₂

High resolution separation of permanent gases and CO₂ using tandem PLOT columns

Application Note

Environmental

Authors

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Introduction

A parallel setup of two PLOT columns is tuned for separation of permanent gases in a short time. The sample is injected via a normal injection port and is split into the parallel setup of two columns. A short Agilent PoraBOND Q is used to separate the CO₂ (and methane) from the permanent gases (first peak composite) before the first peak (helium) elutes from the Agilent CP-Molsieve PLOT column. After helium, all other permanent gases will be separated which include helium, argon, oxygen, xenon, CO and methane. If water is present, it will appear on the PoraBond and will elute after the CO₂ peak.

This analysis is done isothermally and requires a long CP-Molsieve column to separate peak pairs argon-oxygen and helium-neon. The CO₂ and eventually water that enters the Molsieve column will be adsorbed. If the amount of CO₂ or water accumulated on the CP-Molsieve causes a shift of the retention time of the inert gases out of the integration window, the Select Permanent Gases/CO₂ column can be regenerated by 30 minutes at 300 °C. In practice, we found that CO₂ and water adsorption has very little impact on the retention and many analysis can be done before regeneration is required. As methane elutes from both systems the split ratio between the columns can be calculated by the ratio of the methane peaks. If heavier compounds are present, for instance ethane, ethylene, propane, these components will elute later between the peaks that elute from the CP-Molsieve column. If such a component interferes with a compound that elutes from the Molsieve, the oven temperature must be changed by a few degrees.



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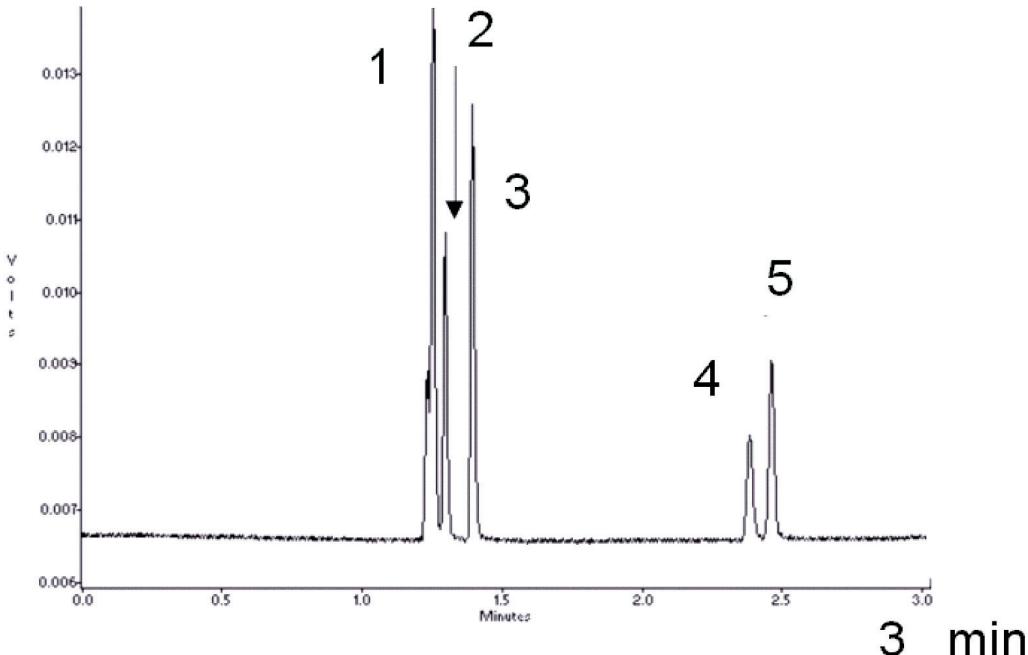
Conditions

Technique : GC
Column : Fused Silica, Agilent Select Permanent Gases/
CO₂ HR (Part no. CP7430)
Temperature : 50 °C
Carrier Gas : H₂, 60 kPa
Injector : Split 50 mL/min
Detector : TCD
Sample Size : 50 µL
Concentration Range : CO₂ at ca. 50 ppm level

Courtesy : C. Duvekot, Agilent Application Laboratory,
Middelburg, The Netherlands

Peak identification

- | | |
|--------------------|--------|
| 1. air | (PBQ) |
| 2. methane | (PBQ) |
| 3. CO ₂ | (PBQ) |
| 4. helium | (Ms5A) |
| 5. neon | (Ms5A) |



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This information is subject to change without notice.

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