Permanent gases and CO_2

Fast analysis of permanent gases and CO_2 using coupled 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. In this application a short Agilent PoraBOND Q is used to separate the CO_2 (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 CO_2 peak.

This analysis is done isothermally and requires a long CP-Molsieve column to separate peakpairs argon-oxygen and helium-neon. The CO_2 and eventually water that enters the Molsieve column will be adsorbed. If the amount of CO_2 or water accumulated on the CP-Molsieve causes a shift of the retention time of the inert gases out of the integration window, the Agilent Select Permanent Gases/CO_2 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.
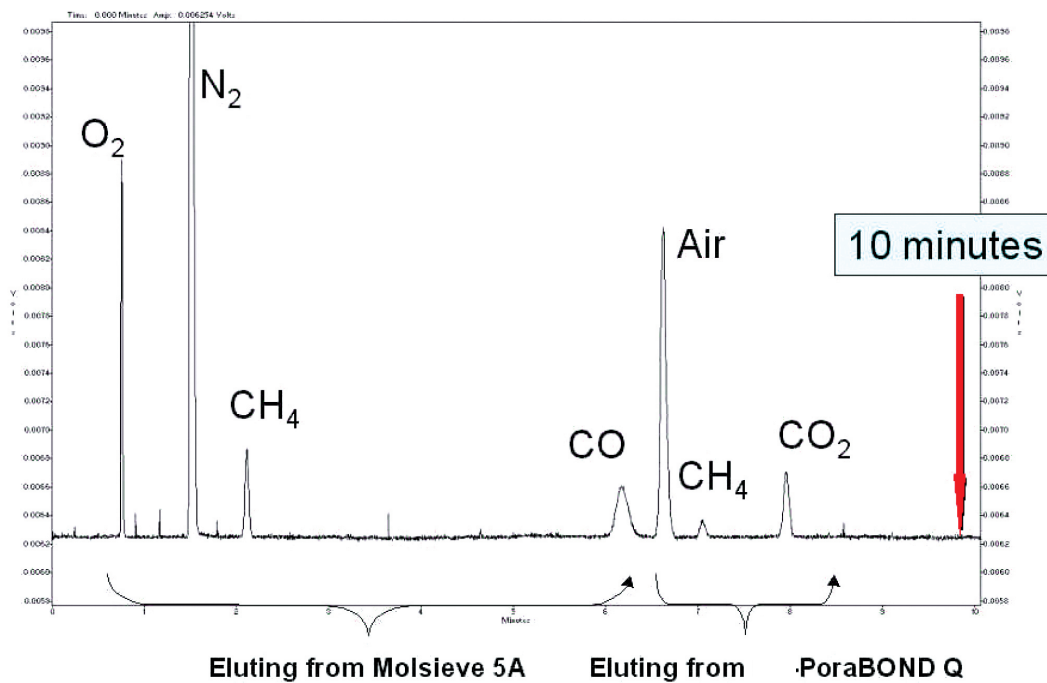
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Conditions

Technique	: GC
Column	: Agilent Select Permanent Gases/CO_2 Part no. CP7429
Temperature	: 35 °C
Carrier Gas	: Helium, 100 kPa
Injector	: Split 50 mL/min
Detector	: TCD
Sample Size	: 20 μL
Concentration Range	: % level
Courtesy	: C. Duvekot, Agilent Application Laboratory, Middelburg, The Netherlands

Peak identification

oxygen
nitrogen
methane
carbon monoxide
carbon dioxide

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