Permanent gases and CO_2

High resolution separation of permanent gases and CO_2 using tandem PLOT columns and FID

Application Note

Environmental

Authors

Agilent Technologies, Inc.

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_2 and methane. If water is present, it will be apparent 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 peak pairs 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 Select Permanent Gases/CO_2 column can be regenerated by 30 minutes at 300 °C. In practice we found that 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.

Agilent Technologies

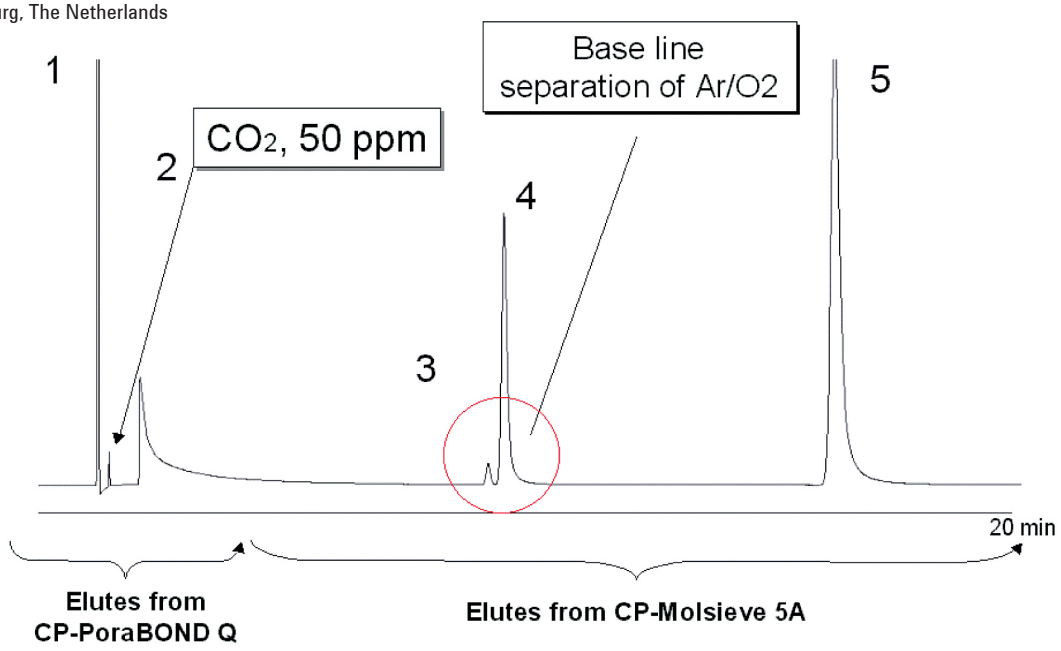
Conditions

Technique	:	GC
Column	:	Fused Silica, Agilent Select Permanent Gases/CO_2 HR Part no. CP7430
Temperature	:	50 °C
Carrier Gas	:	He, 100 kPa
Injector	:	Split 50 mL/min
Detector	:	TCD
Sample Size	:	50 µL
Concentration Range	:	CO_2 at ca. 50 ppm level

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

Peak identification

1. air (from PBQ)
2. CO_2 (from PBQ)
3. argon (from Ms5A)
4. O_2 (from Ms5A)
5. N_2 (from Ms5A)



www.agilent.com/chem

This information is subject to change without notice.
© Agilent Technologies, Inc. 2011
Printed in the USA
31 October, 2011
First published prior to 11 May, 2010
A02031

Agilent Technologies