Gases, hydrocarbons, $C_1 - C_3$

Application Note

Energy & Fuels

Authors

Agilent Technologies, Inc.

Introduction

Agilent CarboBOND elutes acetylene in front of ethylene, allowing accurate quantification of ppm levels of acetylene in high-purity ethylene. This analysis is usually done on a multi-valve packed system, see ASTM D 2505. The acetylene peak, however, is broad and detection limits depend strongly on the quality of the system, but are typically around 1 ppm. With CarboBOND, the analysis can be done on one column while improving the detection limit significantly.

If interest is mainly in trace acetylene and the separation of CO from air is not important, a 25 m column cannot be chosen with a 10 µm coating. This column allows acetylene measurements below 100 ppb with 7 - 8 minute analysis times.

The large injection volume will make trace analysis of acetylene possible, but will also cause a coelution between air and CO. If CO and acetylene have to be measured at lowest level, a 0.53 mm x 50 m CarboBOND with a 10 µm layer is recommended (Part no. CP7375).

All CarboBOND columns can be conditioned at 300 °C for a quick bake-out. Due to the bonded layer, the CarboBOND can be used with switching systems.
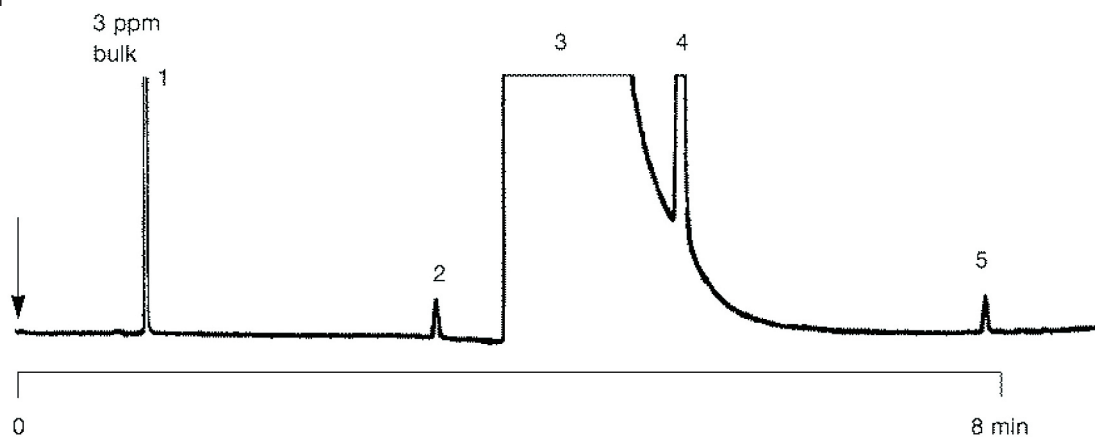
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Conditions

Technique	:	GC-capillary
Column	:	Agilent CarboBOND, 0.53 mm x 25 m fused silica PLOT (df = 10 μm) (Part no. CP7374)
Temperature	:	35 °C (4 min) → 180 °C, 30 °C/min
Carrier Gas	:	He, 40 kPa (0.4 bar, 6.6 psi)
Injector	:	Valve into split, split 1:5, T = 30 °C
Detector	:	FID, T = 250 °C
Sample Size	:	1000 μL
Concentration Range	:	3 ppm acetylene in ethylene synthetic standard
Courtesy	:	Jim Luong and Lyndon Sieben, Dow Chemical Canada Western Canada Operations

Peak identification

1. methane
2. acetylene
3. ethylene
4. ethane
5. propane

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