

# Hydrocarbons, $C_1 - C_3$

## Analysis of hydrocarbons in ethylene

### Application Note

Materials Testing & Research

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#### Introduction

Acetylene is an impurity that must be quantified at low levels in high-purity ethylene, often alongside carbon monoxide and carbon dioxide. Agilent CarboBOND elutes acetylene in front of ethylene making it possible to measure low levels. Detection limits as low as 250 ppb for acetylene can be realized.

Ethane is usually analyzed by a multi-valve packed system, see ASTM D 2505. CarboBOND provides excellent single-column separation for all compounds making the analysis very straightforward. The ethane peak is broadened because it elutes on the tail of the large ethylene peak. Analysis time is short: the  $C_3$  hydrocarbons elute in about 12 minutes. 100 mL of sample can be injected directly onto the column without peak distortion.

This set-up also generates a good separation between carbon monoxide and air, see Application note 1431.

If your interest is mainly in trace acetylene and CO is not important, reduced analysis times can be obtained with a 25 m column with a 10  $\mu$ m coating, see Application note 1433.

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



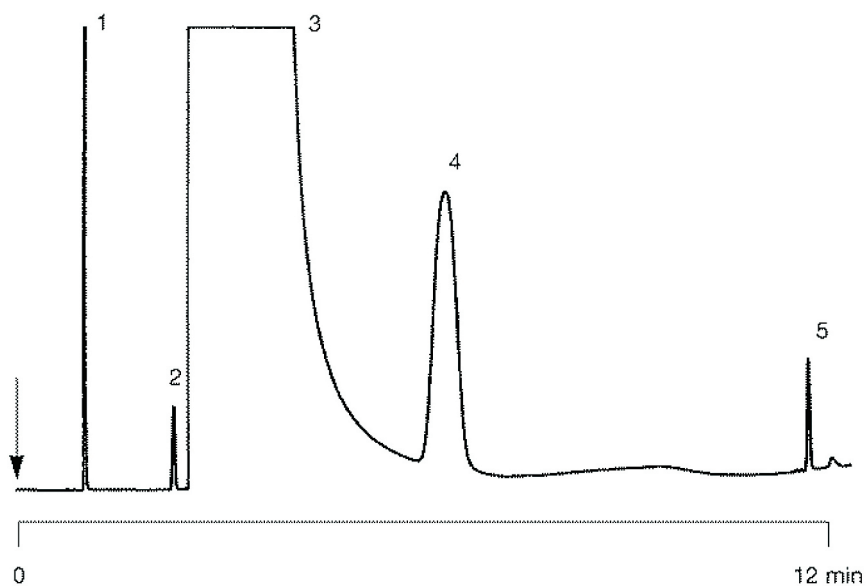
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## Conditions

Technique : GC-wide-bore  
Column : Agilent CarboBOND, 0.53 mm x 50 m, fused silica  
PLOT (df = 5  $\mu$ m) (Part no. CP7372)  
Temperature : 35 °C (7 min)  $\rightarrow$  180 °C, 30 °C/min  
Carrier Gas : He, 60 kPa (0.6 bar, 7.2 psi)  
Injector : Valve into split, split 1:5. T = 30 °C  
Detector : FID, T = 250 °C  
Sample Size : 500  $\mu$ L hydrocarbons in ethylene, synthetic standard  
Concentration Range : 6-200 ppm in ethylene

## Peak identification

1. methane	159 ppm
2. acetylene	6.5 ppm
3. ethylene	bulk
4. ethane	164 ppm
5. propane	6.4 ppm



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