

## Hydrocarbons, C<sub>1</sub> – C<sub>2</sub>

# Analysis of carbon monoxide and carbon dioxide in hydrocarbon streams

## Application Note

Energy & Fuels

### Authors

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### Introduction

The Agilent CarboBOND column has a high retention for CO and CO<sub>2</sub>. The CO is separated from the air peak, but only if the air peak is not too big.

Separation between CO and oxygen (air) is sufficient (Chromatogram 2) to measure CO and CO<sub>2</sub> at low ppm levels by converting them to methane and detection with FID (Chromatogram 1). If there was coelution, response would be non-linear.

Therefore, this can only be done if the oxygen concentration is of the same order as CO. Here we were able to inject up to 100 µL of ethylene, keeping the response on carbon monoxide reproducible. When using shorter columns, the sample size has to be much smaller to achieve the separation. A 0.53 mm x 50 m CarboBOND with a 10 µm film will improve capacity, but will also require more time for higher boiling material to elute.

To elute any high boiling material, the CarboBOND column can be conditioned at 300 °C for quick bake-out. Due to the bonded layer, 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	: H <sub>2</sub> , 60 kPa (0.6 bar, 7.2 psi)
Injector	: Valve via split. 1:5, T = 30 °C
Detector	: Chromatogram 1:FID with a Ni-catalyst methanizer Chromatogram 2: TCD T = 250 °C
Sample Size	: 100 $\mu$ L
Courtesy	: Jim Luong and Lyndon Sieben, Dow Chemical Canada, Western Canada Operations

## Peak identification 1

Concentration range: 100 ppm in N<sub>2</sub>

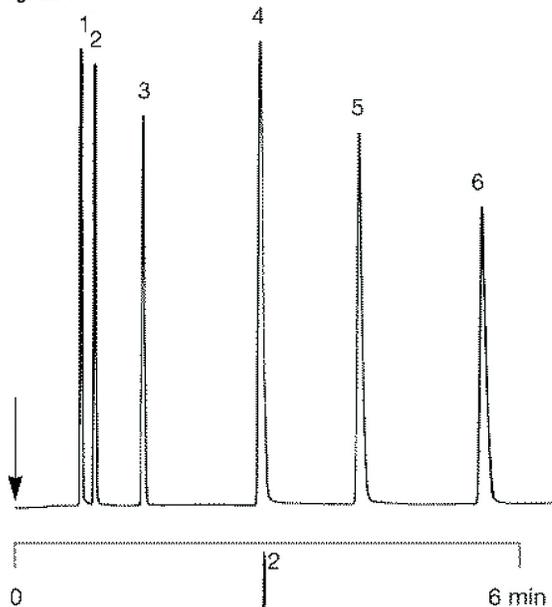
1. carbon monoxide
2. methane
3. carbon dioxide
4. acetylene
5. ethylene
6. ethane

## Peak identification 2

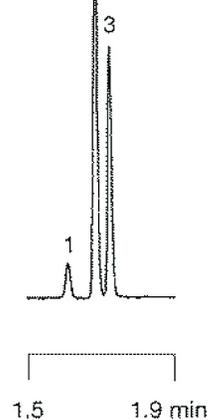
Concentration range: equal concentrations

1. helium
2. air
3. carbon monoxide

**Chromatogram 1**



**Chromatogram 2**



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