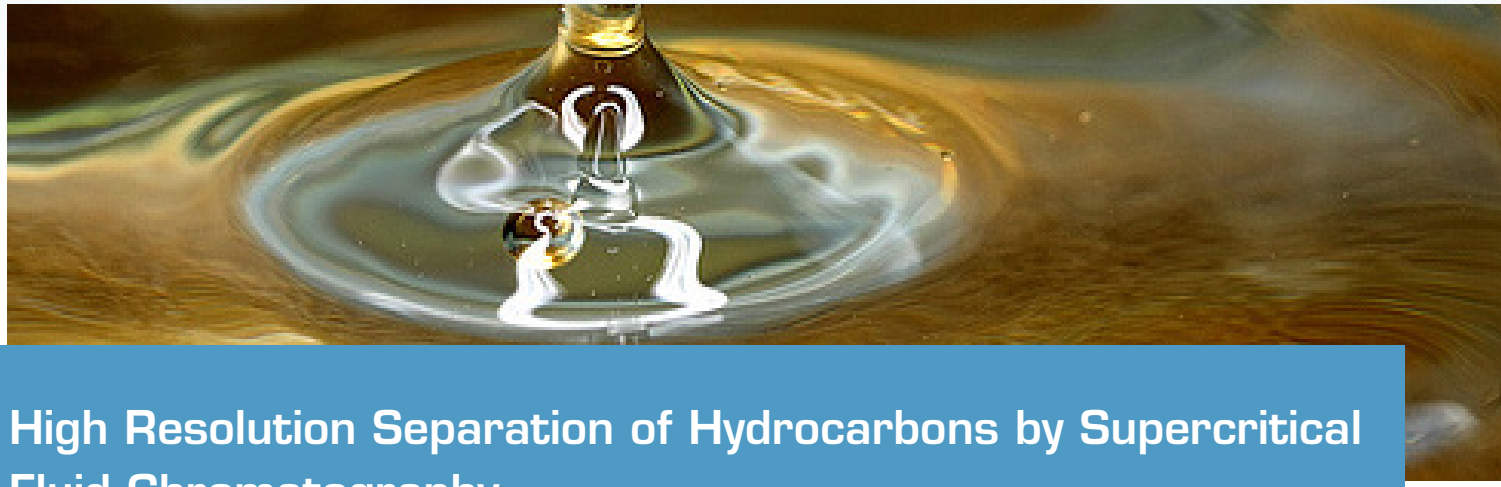
Application Note



High Resolution Separation of Hydrocarbons by Supercritical Fluid Chromatography

Introduction

It is fairly well known that SFC is used for fuel analysis of olefin determination in gasoline and non-aromatic and aromatic content in diesel among other fuel separations. In those applications the individual components within each class (non-aromatics, mono-aromatics, poly-aromatics) are not identified, but simply grouped to determine the percentage of each group. Recent interest in further separation and identification of the components within those compound classes has led to additional research.

Jasco CO2 Delivery Pump:PU-2080-CO2

Non-aromatic hydrocarbons are very difficult to retain as seen in the above mentioned fuel applications. In order to identify the components in the non-aromatics, a significant increase in retention will be required. Unique to SFC is the ability to join columns inline to increase the effective length of the separation column. Using two columns inline, the required retention was successfully achieved and the individual hydrocarbons were determined.

Keywords: SFC, Non-aromatic hydrocarbons, Fuel analysis, Silica column, Flame Ionization Detector

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Experimental Equipment:

CO2 Delivery Pump:	PU-2080-CO2
Autosampler:	AS-2059-SF
Column/FID Splitter Oven:	GC-FID
Back Pressure Regulator:	BP-2080

Conditions:

Column:	C18 (4.6 mmID x 150 mmL, 5 µm) Qty. 2
CO2 Flow rate:	2.5 mL/min
Column/FID Splitter Temp.:	200°C
Back Pressure:	300 bar
Flow rate:	350°C
Injection volume:	1 µL
Sample:	BP Calibration Standard diluted in Hexane

Results

The chromatogram (figure 1) of the non-aromatic hydrocarbon standard mixture is shown below. Besides C5-C9 which co-eluted, all of the hydrocarbons were successfully separated and identified. As the BP Calibration standard was diluted in hexane in order to have the FID signal on scale, the strong hexane signal likely contributed to the co-elution of C5-C9.

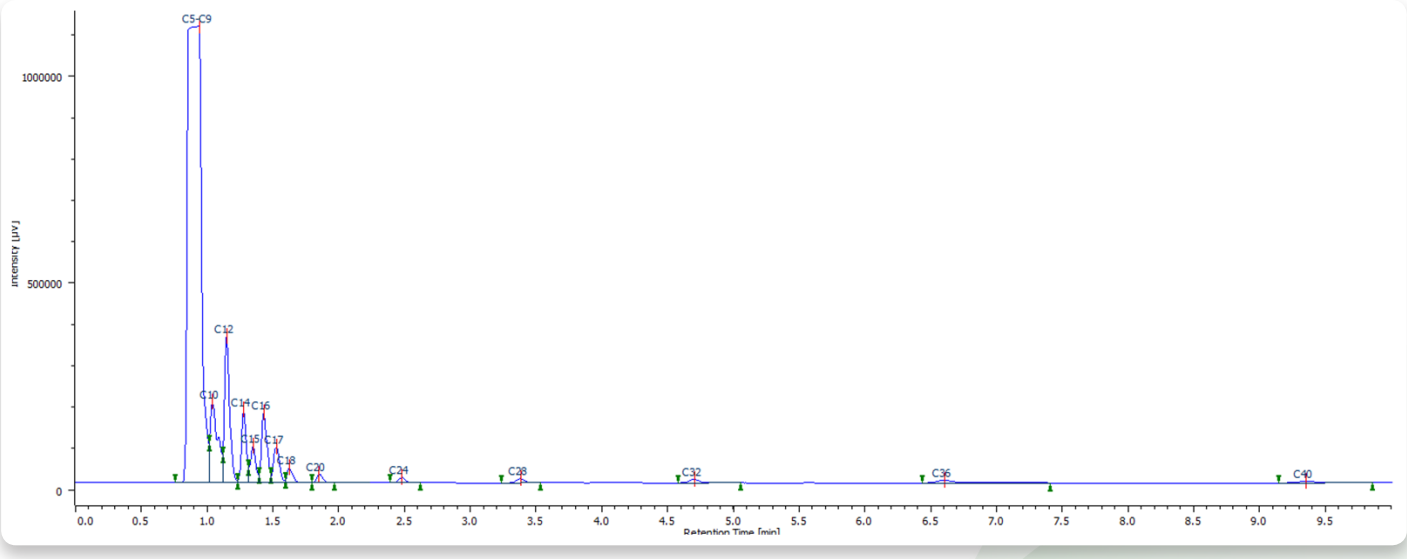

Figure 1. Chromatogram of the BP Calibration standard mixture of hydrocarbons (diluted in hexane before injection). The mixture contained C5-C10, C12, C14-C18, C20, C24, C28, C32, C36, and C40, all of which were identified.

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