Hydrocarbons, $C_6 - C_7$, aromatic hydrocarbons, $C_6 - C_8$
Analysis of impurities in benzene

Application Note

Materials Testing & Research

Authors

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Introduction

The fast analysis of impurities in ethanol can be done very well using 0.15 mm id capillary columns in combination with split injection and FID detection. The 0.15 mm capillary offers a high plate number (ca. 150,000/25 m), can be operated at practical pressures (150 - 250 kPa) and can be used for a wide range of different applications. The problem of reduced loadability has been fully overcome by using a thick film Agilent CP-Sil 5 CB (1.2 µm) column. This allows accurate trace analysis of impurities in many chemical products.

The reproducibility of the analysis is within 3% standard deviation, even for compounds which are present at 5 - 500 ppm. Despite split injection, impurities can be measured at 1 - 5 ppm. Typically, a 100% method is used for integration, with hydrogen as the carrier gas as analysis time. Helium can also be used. Typical analysis times are within 10 - 15 minutes.
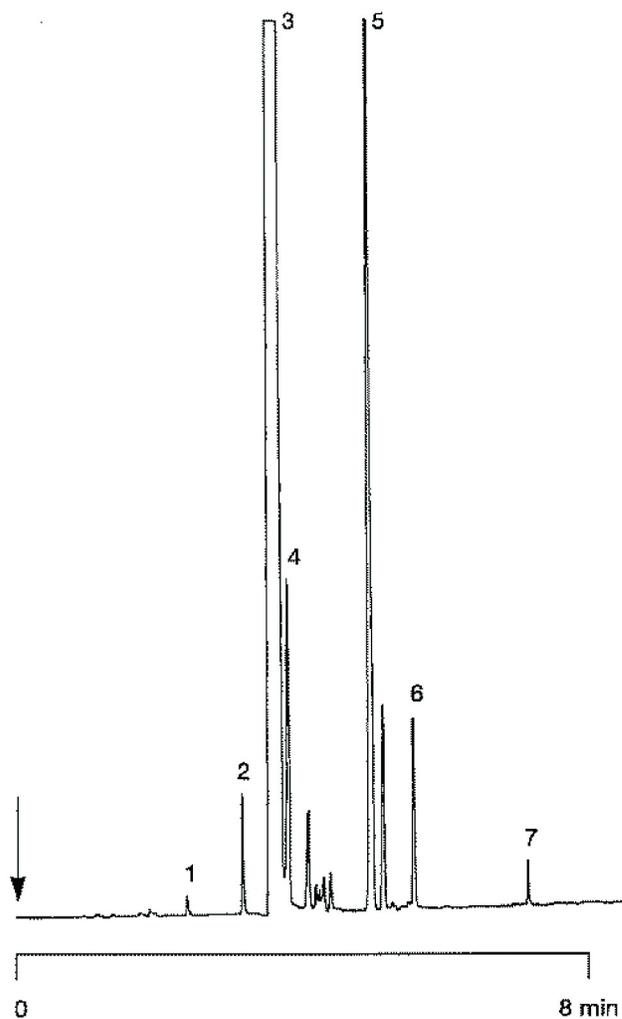
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Conditions

Technique	:	GC-capillary
Column	:	Agilent CP-Sil 5 CB, 0.15 mm x 25 m, fused silica WCOT (df = 1.2 µm) (Part no. CP7693)
Temperature	:	70 °C (2 min) → 200 °C, 20 °C/min 200 °C (5 min)
Carrier Gas	:	H_2, 150 kPa (1.5 bar, 21 psi)
Injector	:	Split, T = 250 °C
Detector	:	FID, T = 250 °C
Sample Size	:	2.0 µL
Concentration Range	:	1-200 ppm
Solvent Sample	:	benzene balance

Peak identification

1. impurity — 5 ppm
2. methylcyclopentane — 37 ppm
3. benzene
4. cyclohexane — 96 ppm
5. methylcyclohexane — 427 ppm
6. toluene — 49 ppm
7. ethylbenzene — 11 ppm

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