Hydrocarbons, $C_1$ - $C_6$

Analysis of reference standard for impurities in 1,3-butadiene for ASTM method

Application Note

Materials Testing & Research

Authors

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Introduction

Hydrocarbon impurities can be very well measured using Agilent Al$_2$O$_3$ PLOT columns, which provide the best separation. For impurity analysis in $C_2$-$C_4$ hydrocarbon streams Al$_2$O$_3$ is preferred. All hydrocarbons are resolved. The starting temperature is 60 °C which is high and easy to control, due to the high retentivity of the alumina. Aluminium oxide capillary columns are very stable. The retention is influenced by any moisture in the sample or the carrier gas. Wet samples can be analyzed by using a temperature program up to 200 °C and removing the water after each run. It is also possible to use a precolumn and switch the (retained) water peak to vent. Water will never harm a Al$_2$O$_3$/KCl or Al$_2$O$_3$/Na$_2$SO$_4$ coated capillary.
Conditions

Technique: GC-capillary

Column: Agilent CP-Al,O,/KCl, 0.32 mm x 50 m fused silica PLOT (df = 5 μm) (Part no. CP7515)

Temperature: 40 °C (6 min) → 160 °C, 5 °C /min; 160 °C (0 min) → 220 °C, 10 °C /min

Carrier Gas: He, 75 kPa (0.75 bar, 10 psi)

Injector: Split, via 4-port valve 1:100, T = 200 °C

Detector: FID, T = 250 °C

Sample Size: 1 μL, liquid

Concentration Range: 20 - 2000 ppm in 1,3 butadiene

Courtesy: L. d’Agostaro, H. Zhou and R. Cook, DCG Partnership, Pearland, Texas

Peak identification

1. acetylene
2. cyclopropane
3. propane
4. propylene
5. propadiene
6. methylacetylene
7. 1-butyne
8. 1,2-butadiene
9. isobutane
10. butane
11. butene-1
12. isobutylene
13. trans-2-butene
14. cis-2-butene
15. isoprene
16. pentene-1
17. cis-1,3-pentadiene
18. trans-1,3-pentadiene
19. cis-2-pentene
20. trans-2-pentene
21. 3-methyl-1-butene
22. isopentane
23. pentane
24. benzene
25. toluene
26. 1,3-butadiene

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