Hydrocarbons, C$_1$ – C$_4$
Separation of impurities in high purity propylene for proposed ASTM method

Application Note

Energy & Fuels

Authors
Agilent Technologies, Inc.

Introduction
Because of the low polarity the Agilent Al$_2$O$_3$/KCl deactivated PLOT column provides highest separation factor between propylene and butanes, making quantification possible at ppm levels. Also, pentanes do not interfere with cis-2-butene, which may happen on more polar Al$_2$O$_3$ PLOT columns.

Moisture present in the sample will cause a shift of retention times. Retention times will be highly reproducible when a temperature programmed analysis is used. Usually a final temperature of 200 °C is employed; for high purity samples such as high purity propylene, 160 °C is sufficient.
Conditions

Technique : GC-cappillary

Column : Agilent CP-Al2O3/KCl, 0.53 mm x 50 m fused silica PLDT (df = 10 μm) (Part no. CP7518)

Temperature : 40 °C (10 min) → 160 °C, 5 °C/min

Carrier Gas : He, 80 kPa (0.8 bar, 12 psi).

Injector : Valve into splitter, 20:1

T = 200 °C

Detector : FID,

T = 200 °C

Sample Size : 0.2 μL (liquid)

Concentration range : 10-20 ppm

Peak identification

1. methane
2. ethane
3. ethylene
4. propane
5. propylene
6. isobutane
7. acetylene
8. butane
9. propadiene
10. trans-2-butene
11. 1-butene
12. isobutane
13. cis-2-butene
14. isopentane
15. propyne (methylacetylene)
16. pentane
17. 1,3-butadiene