

Sensitive Analysis of Polystyrene 960 and 580 by Reversed Phase HPLC with ELSD

Application Note

Author

Stephen Ball
Agilent Technologies, Inc.

Introduction

Polystyrene 960 is a high impact polystyrene extruded or thermoformed into containers for foodstuffs, such as salad dressing, because it is highly resistant to degradation from fats and oils. Polystyrene 580 is designed for injection molding. It is used for high quality electrical components, and medical and office supplies since it has very good sparkle and stiffness. The physical characteristics are related to the molecular weight of the polymers.

Using reversed phase chromatography, it is possible to separate individual oligomers of these low molecular weight polystyrenes. The combination of PLRP-S columns and the 380-LC evaporative light scattering detector is ideal for this analysis. The 380-LC detector evaporates the mobile phase before it reaches the detection chamber, eliminating problems of baseline drift, which would be observed with a UV detector due to changes in the UV absorbance of the eluent during the THF gradient. The 380-LC offers greater sensitivity than UV detection with no solvent peaks. It is also renowned for its rugged design and ability in delivering high performance for demanding HPLC or GPC applications. PLRP-S columns are ideally suited to the analysis of low molecular weight polymers because the small pore sizes have extremely high surface areas available to the solutes.



Agilent Technologies

Instrumentation

Column

Figure 1: PLRP-S 300Å 8 µm, 250 x 4.6 mm (p/n PL1512-5801)

Figure 2: PLRP-S 100Å 8 µm, 250 x 4.6 mm (p/n PL1512-5800)

Detector: 380-LC (neb=80 °C, evap=75 °C, gas=1.0 SLM)

Materials and Reagents

Eluent A: Water

Eluent B: THF

Conditions

Flow Rate: 0.5 mL/min

Gradient: 65-85% B in 20 min

Results and Discussion

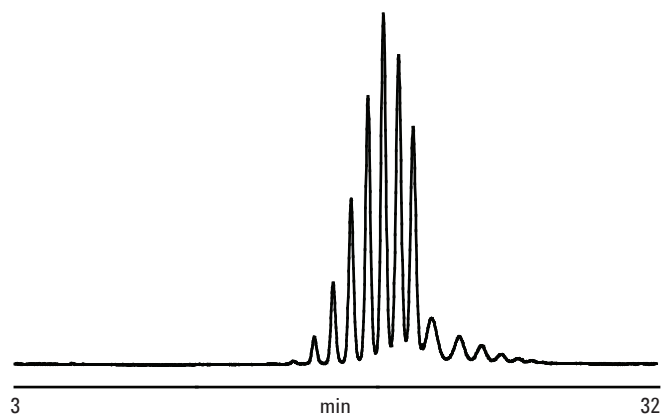


Figure 1. Separation of individual oligomers in polystyrene 960 with a PLRP-S column and 380-LC ELSD.

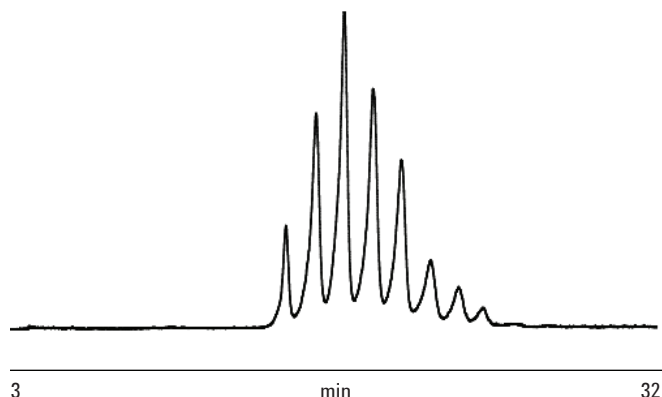


Figure 2. Separation of individual oligomers in polystyrene 580 with a PLRP-S column and 380-LC ELSD.

Conclusion

The 380-LC evaporative light scattering detector and PLRP-S columns successfully separated individual oligomers in two, low molecular weight polystyrenes.

PLRP-S columns are the preferred choice for the analysis of many small molecules. These columns are more retentive for small molecules than the majority of alkyl bonded silicas. PLRP-S media possess a much greater surface area than alkyl bonded silicas and therefore even polar molecules may be retained for much longer, resulting in greater resolution.

PLRP-S columns used with the 380-LC is an ideal combination for the accurate and sensitive separation of small molecule components.

www.agilent.com/chem

This information is subject to change without notice.

© Agilent Technologies, Inc. 2011

Published in UK, May 17, 2011

5990-8198EN



Agilent Technologies