

# Analysis of Polyesters by GPC with Light Scattering Detection

## Application Note

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### Introduction

Polyesters are a class of polymer containing ester linkages in the backbone. A wide range of polyesters are available and they are used in many common consumer products, from plastic bottles to polished coatings for wide-grained wood. Typically synthesized from condensation esterification and transesterification reactions or from ring opening polymerizations, polyesters are an important class of synthetic materials. Some natural polyesters do exist, however, such as the cutin found in plant cuticles.

The accurate molecular weight distributions of two different samples of polyester were investigated by gel permeation chromatography with light scattering detection, using an integrated GPC system.



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## Instrumentation

The polyesters were analyzed by an Agilent PL-GPC 50 Plus with differential refractive index detector, Agilent PL-LS 15/90 dual angle light scattering detector and Agilent PLgel 5  $\mu\text{m}$  MIXED-C columns, which provide high resolution of polymers with high molecular weights, even in demanding eluents.

Columns: 2 x PLgel 5  $\mu\text{m}$  MIXED-C, 300 x 7.5 mm  
(p/n PL1110-6500)

### Materials and Reagents

Samples: 2 x Polyester  
Eluent: Tetrahydrofuran

### Conditions

Flow Rate: 1 mL/min  
Temperature: 50 °C

## Results and Discussion

Figure 1 is a chromatogram of one of the polyester samples. It is apparent from Figure 2 that the two samples had very different molecular weight distributions, indicating that they would perform very differently in final application.

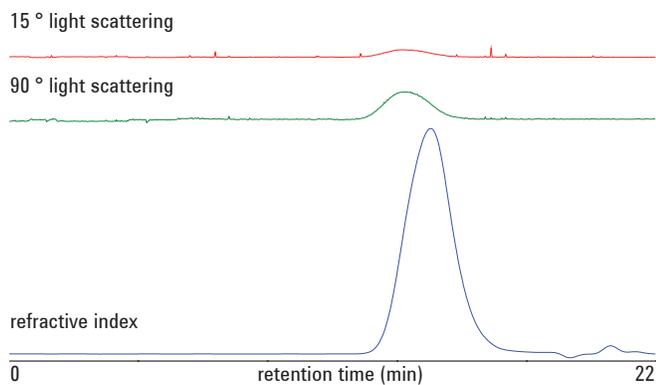


Figure 1. Chromatograms of a polyester sample

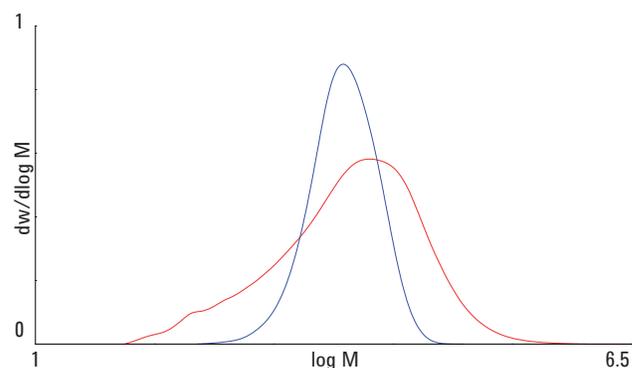


Figure 2. Overlaid molecular weight distributions for two polyester samples

## Conclusion

The PL-GPC 50 Plus is a high resolution, cost effective integrated GPC system designed for operation from ambient to 50 °C. The standard system comprises precision solvent delivery, sample injection, high performance differential refractive index detection and a column oven, with fully integrated software control. When coupled with PLgel MIXED-C columns and a PL-LS 15/90 dual angle light scattering detector, the PL-GPC 50 Plus is ideal for the accurate determination of polymer molecular weights.

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