Gel Permeation Chromatography - Keep the Method but Change the Column

Application Note

Materials Testing and Research, Polymers

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Introduction

Chromatographers can be wary of using a column of different dimensions because they fear it could disrupt a standard method. However, an alternative column may offer significant performance or economic advantages that may outweigh any changes that result from the move to a new in column dimension. This note shows how the Agilent PLgel 5 µm gel permeation chromatography column matches the performance of another leading column, even though it has slightly different dimensions. Polycarbonate is used as the test analyte to demonstrate the indistinguishable performance of the columns.

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Conditions

Columns	Agilent PLgel 10^4Å, 300 x 7.5 mm, 5 µm (p/n PL1110-6540) Competitor 300 x 7.7 mm, 5 µm
Eluent	THF
Flow Rate	1.0 mL/min
Inj Vol	100 µL
Temp	Room temperature
Detector	RI
System	PL-GPC 50

Results

The identical results (within the 3-5% run-to-run reproducibility of gel permeation chromatography) are evident from the overlaid chromatograms in Figure 1 and the data in Table 1. There is slightly later elution of the peak on the 7.7 mm column, but once calibrated the difference disappears and the calculated results are indistinguishable.

Table 1. Polycarbonate Analysis - Molecular Weight Averages on Columns of Different Dimensions

Column	Dimensions	Mp	Mn	Mw	Mz	Pd
Agilent PLgel 10^4Å, 5 µm	300 x 7.5 mm	51,154	33,709	54,682	77,175	1.62
Competitor 5 µm	300 x 7.7 mm	49,778	34,215	52,555	71,295	1.53

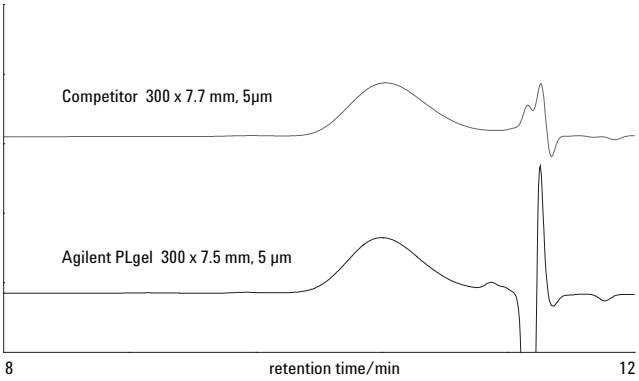

Figure 1. Overlaid chromatograms showing indistinguishable performance in the analysis of polycarbonate on an Agilent PLgel 7.5-mm diameter column compared to a 7.7-mm diameter column.

Conclusion

It is evident that analysts working with gel permeation chromatography can interchange 7.5 mm columns for 7.7 mm columns without changing the method, as the results will be indistinguishable. This expands column options and lets analysts take advantage of Agilent columns that deliver performance or economic advantage, or both, with no risk to established methods.

For More Information

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