Calibrating Agilent PLgel 3 µm 100Å Columns with Polystyrene Standards for GPC

Technical Overview

Introduction

Agilent PLgel 3 µm 100Å columns are designed specifically for the analysis of low molecular weight discrete molecules in organic solvents. Molecular weight information of a sample is calculated by reference to a standard calibration curve generated by analyzing a series of narrow distribution polymers of known molecular weight. One of the most widely used combinations of calibrant and eluent uses polystyrene narrow standards in tetrahydrofuran. This example shows typical calibration data for Agilent PLgel 3 µm 100Å columns using this system. The polystyrene narrow standards in the calibration are Mp 30,300, 5,000, 2,450, 1,270, 580, and 162, which are available as part of the polystyrene calibration kit Agilent S-L-10.

Conditions

Calibrants	Agilent S-L-10 polystyrene narrow standards (p/n PL2010-0101)
Columns	2 × Agilent PLgel 3 µm 100Å, 300 × 7.5 mm (p/n PL1110-6320)
Concentration	0.1% (w/v)
Eluent	THF
Flow rate	1.0 mL/min
Injection volume	20 µL
Detector	RI
System	Agilent PL-GPC 50

Agilent Technologies

Figure 1 shows overlaid chromatograms of a series of narrowly dispersed polystyrene standards obtained in THF. The lower molecular weight polystyrene 580 has been resolved into individual oligomers by the high efficiency Agilent PLgel 3 µm 100Å columns.

Figure 2 shows the resulting calibration curve for the Agilent PLgel 3 µm 100Å columns. The calibration is linear up to the exclusion limit of the column (4,000 g/mol).

Agilent PLgel 3 µm Columns

Agilent PLgel individual pore size columns offer high resolution over a specific molecular weight range. The linear portion of the calibration curve, where the slope is at its shallowest, defines the molecular weight region over which optimum resolution is achieved. The Agilent PLgel 3 µm 100Å column is ideal for high resolution GPC separations of low molecular weight compounds. Column efficiency increases as the particle size of the packing is reduced. The resolution of individual species is dramatically improved for low MW separations. For these columns, the effective molecular weight range extends to 4,000, with a guaranteed efficiency greater than 100,000 plates per meter.

GPC/SEC Columns and Calibrants from Agilent

Agilent offers a comprehensive portfolio of GPC/SEC columns and calibrants for high-performance separations based on molecular size in solution. Agilent delivers leading solutions for characterizing and separating polymers by GPC/SEC, and manufactures all components for accurate polymer analysis.

Look at the Agilent Literature Library on www.agilent.com/chem/gpc-sec for a comprehensive range of application notes and technical overviews to get the best from your Agilent GPC/SEC columns and instruments.

KEY Mp

1. 30,300
2. 5,000
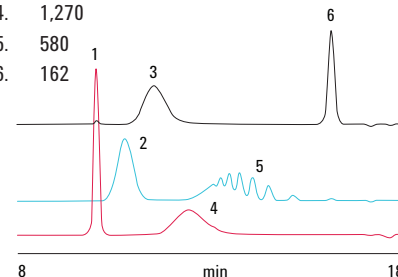3. 2,450
4. 1,270
5. 580
6. 162

Figure 1.   Overlaid chromatograms of narrow dispersity polystyrene standards. The lower molecular weight polystyrene 580 is resolved into individual oligomers by an Agilent PLgel 3 µm 100Å two-column set.
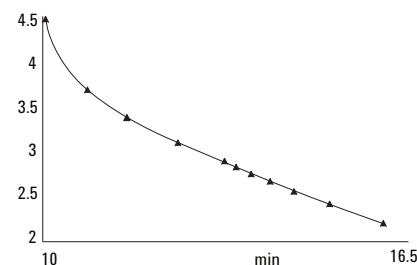

Figure 2.   The Agilent PLgel 3 µm 100Å calibration curve, linear up to the 4,000 g/mol exclusion limit of the column.

www.agilent.com/chem

Agilent Technologies