



Characterizing Polyvinyl Alcohol by SEC

Application Note

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Introduction

Fully or partially hydrolyzed grades of polyvinyl alcohol (PVA) are normally specified according to their viscosity in solution. Aqueous SEC can be used to characterize these polymers in terms of molecular weight distribution. Three samples with the same degree of hydrolysis were compared by overlaying their molecular weight distributions. This is a convenient method of fingerprinting materials for quality control, and is more informative in production control and end-use performance evaluation than single point viscosity measurements. Agilent PL aquagel-OH columns are ideal for characterizing PVA because they combine low exclusion limit, high pore volume and high column efficiency (>35,000 plates/meter) for maximum resolution. Column calibration was done using pullulan standards.



Conditions

Samples: Three polyvinyl alcohols
Columns: 2 x PL aquagel-OH 40 8 μm ,
300 x 7.5 mm (p/n PL1149-6840)
Eluent: 0.25 M NaNO_3 + 0.01 M NaH_2PO_4 at
pH 7
Flow Rate: 1.0 mL/min
Detection: RI

Results and Discussion

Figure 1 shows the raw data chromatogram of Sample A, with the calculated molecular weights of all three samples in Figure 2. A correlation of the SEC results with the polymer specification is shown in Table 1.

Table 1. Correlation of the SEC results with the polymer specification

Sample	Viscosity	Mn	Mw
A	4	9,771	29,470
B	10	23,339	80,174
C	20	31,210	102,309

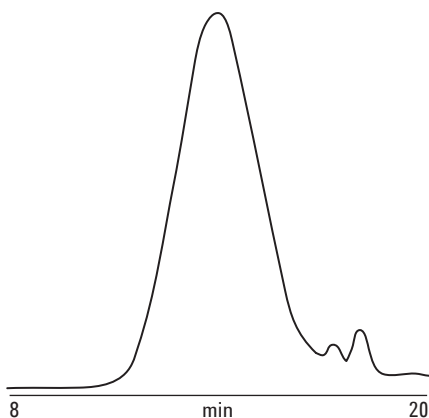


Figure 1. Chromatogram of a polyvinyl alcohol

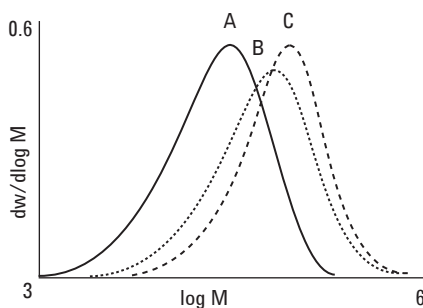


Figure 2. Overlaid molecular weights of three polyvinyl alcohols

Conclusion

SEC and PL aquagel-OH columns successfully fingerprinted three polyvinyl alcohols. The 'neutral' surface and ability to operate across a wide range of eluent conditions equip PL aquagel-OH for the high performance analysis of analytes with neutral, ionic and hydrophobic moieties, singly or combined.

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