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 NaNO₃ + 0.01 M NaH₂PO₄ 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

<table>
<thead>
<tr>
<th>Sample</th>
<th>Viscosity</th>
<th>Mn</th>
<th>Mw</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>9,771</td>
<td>29,470</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>23,339</td>
<td>80,174</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
<td>31,210</td>
<td>102,309</td>
</tr>
</tbody>
</table>

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.