

Phenolic Resin Analysis on Agilent PLgel MIXED-E with Gel Permeation Chromatography

Application Note

Materials Testing and Research, Polymers

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Introduction

Phenol formaldehyde resins are manufactured by reacting phenol with formaldehyde, though precursors occasionally include other phenols or aldehydes. These resins are mainly used to make printed circuit boards, or for adhesives, coatings and lab bench tops. The earliest commercial phenol formaldehyde resin was Bakelite, developed by the Belgian chemist Leo Baekeland in 1909.

The gel permeation chromatography of phenolic resins is easily accomplished using Agilent PLgel 3 μm MIXED-E columns. These columns are ideal for low molecular weight samples that contain oligomeric fractions, as well as polymers, up to 30,000 MW.





Analysis of a phenolic resin

Excellent oligomer resolution is obtained using the Agilent PLgel MIXED-E 3 μ m packing for the analysis of phenolic resins (Figure 1). The sample is partially excluded when lower pore size columns were used. However, the higher exclusion limit of the PLgel MIXED-E column (30,000) fully resolves all the sample components.

Conditions

Column	Agilent 2 × PLgel 3 μm MIXED-E, 300 × 7.5 mm (p/n PL1110-6300)
Eluent	THF
Flow rate	1.0 mL/min
Detector	UV, 254 nm
System	Agilent PL-GPC 50



Figure 1. All components of a phenolic resin are resolved on an Agilent PLgel 3 μ m MIXED-E two-column set.

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