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 reactions produce two main products, novolacs (under acidic conditions) and resols (under basic conditions with excess aldehyde).

Gel permeation chromatography of both types is simple with 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.

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Analysis of a phenol resins

Chromatograms showing excellent oligomeric detail were produced for acidic and basic phenolic resins (Figure 1), when using ultra high efficiency PLgel 3 µm MIXED-E columns. For more difficult polar resins, Agilent PolarGel columns are preferred, since these are designed for use with polar solvents such as dimethyl formamide and dimethyl sulfoxide, and for solvent combinations such as tetrahydrofuran with water.

Conditions

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

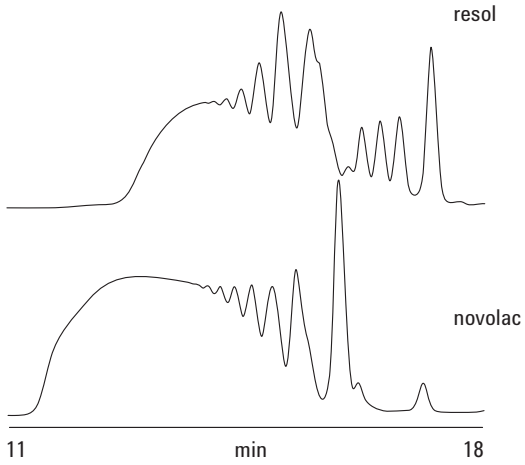

Figure 1. Excellent oligomeric detail in the analysis of phenolic resins produced under acidic and basic conditions on an Agilent PLgel 3 µm MIXED-E two-column set.

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