Melamine Resin Analysis with Agilent PLgel Columns and Gel Permeation Chromatography

Application Note

Materials Testing and Research

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Introduction

Melamine is an organic base produced by heating urea to give cyanic acid, which then polymerizes to form melamine. It contains 66% nitrogen by weight and, if further polymerized with formaldehyde resins, acquires fire retardant properties because it releases nitrogen gas when burned. As a hard, thermosetting resin it has had many uses, such as tableware, laminated boards for kitchen cabinets and worktops, in laminate flooring and for furniture.

Melamine Resin Analysis

The chromatogram in Figure 1 shows a low molecular weight melamine resin with good resolution of individual oligomeric components. Dimethylformamide (DMF) is a polar solvent and therefore suitable for the analysis of polar resins such as these. Elevated temperature is recommended to reduce the eluent viscosity.

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Conditions

Column	2 × Agilent PLgel 5 µm 100Å, 7.5 × 300 mm (p/n PL1110-6520)
Eluent	DMF
Flow rate	1.0 mL/min
Temp	80 °C
System	Agilent 1260 Infinity GPC/SEC Analysis System
Detector	RI

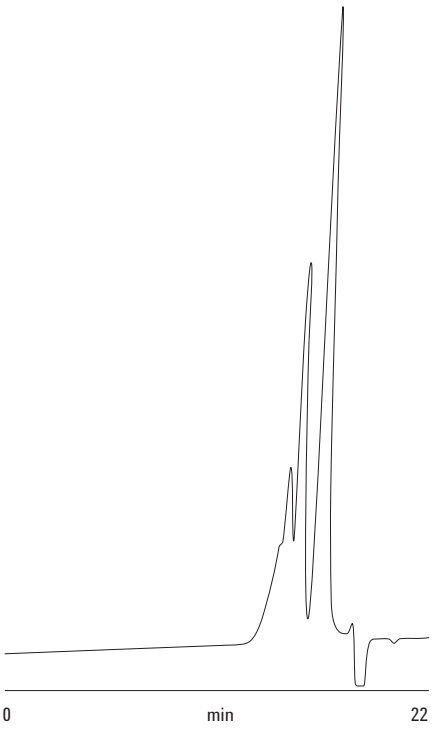

Figure 1. Oligomeric composition of a melamine resin revealed by gel permeation chromatography using an Agilent PLgel 5 µm two-column set.

Conclusion

Gel permeation chromatography using high resolution Agilent PLgel columns allows complex materials such as melamine resins to be analyzed in great detail.

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