HPLC Analysis of Epikote 828 & 1001

Application Note

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Introduction

Epikote is a trade name for a family of epoxy resins, a thermoset polyadduct, used for moulding compounds and adhesives. There are many different types which correspond to variation in molecular weight and distribution and oligomeric profile. These characteristics relate to the physical properties of the epoxy resin and, thus, are important for industrial control.

Oligomeric separations of resins can be achieved by GPC or by HPLC. PLRP-S is a rigid macroporous styrene/divinylbenzene (PS/DVB) HPLC phase. It has outstanding chemical and physical stability. PLRP-S HPLC media are inherently hydrophobic and reproducible, and do not require a bonded alkyl chain, such as C8 or C18, to confer hydrophobicity. The columns are widely used in separations of synthetic oligomers, synthetic polymer compositional analysis, gigaporous biomolecules, peptides, proteins and oligonucleotides.

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Conditions

Sample: 1.3 mg/mL
Column: PLRP-S 300Å 8 µm, 250 x 4.6 mm (p/n PL1512-5801)
Eluent A: 100% water
Eluent B: 90% ACN, 10% THF
Gradient: see Table 1
Detection: UV, 254 nm

Table 1. Gradient for epikote analysis.

Time (min)	% A	% B
0	45	55
5	45	55
25	2	98
28	2	98
33	45	55
35	45	55

Results and Discussion

Reversed phase HPLC allows for separation on the basis of chain length. The longer the component chain length, the stronger the interaction and hydrophobicity for that oligomer of the same chemical type, therefore, the longer the retention time (Figures 1 and 2).

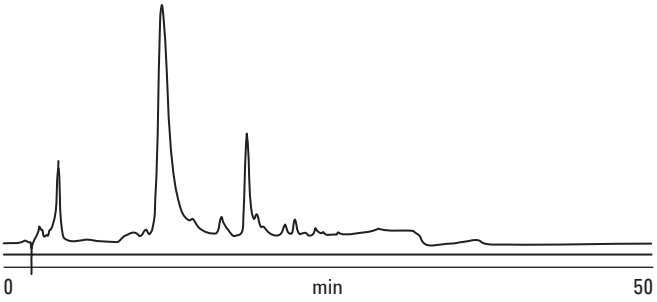

Figure 1. 50 µL injection of epikote 828.

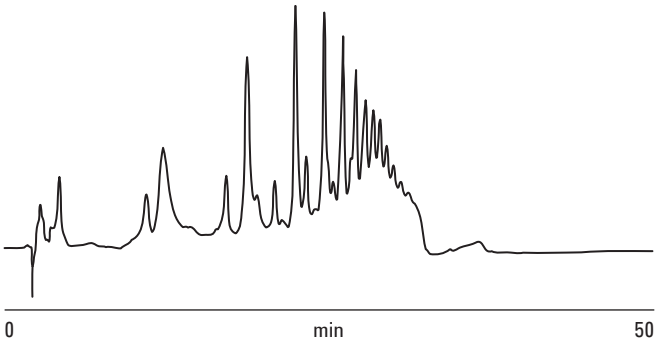

Figure 2. 50 µL injection of epikote 1001.

Figure 3 shows that epikote 828 contains greater quantities of the smaller oligomers than epikote 1001. On the other hand, epikote 1001 contains larger quantities of the higher oligomers.

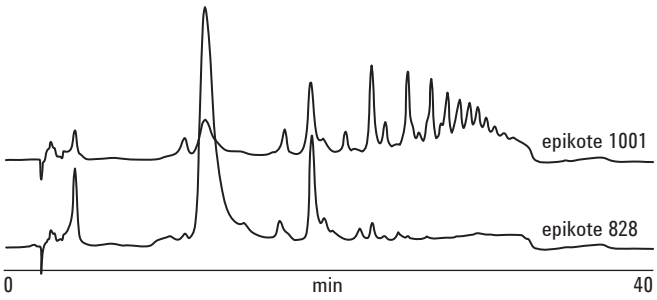

Figure 3. Comparison of epikote 1001 and 828.

Conclusion

PLRP-S is ideal for the assessment of the oligomeric compostion of epoxy resins. As a single column, PLRP-S operates across the entire range of HPLC eluents. It is chemically stable and physically robust, and so it is possible to switch between organic modifiers, such as methanol and tetrahydrofuran, and eluent pH 0 to 14.

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