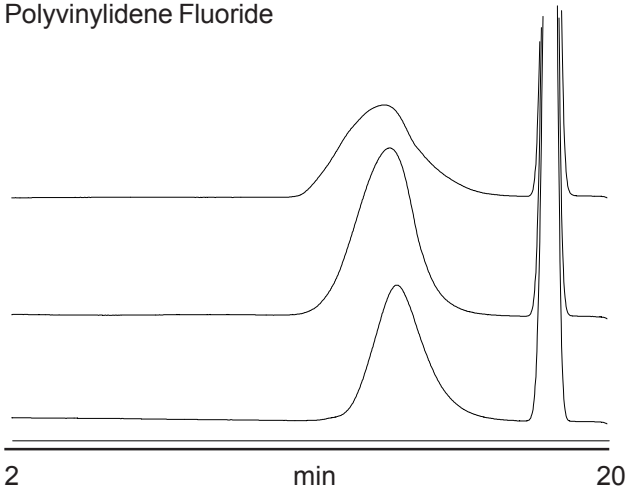
TECHNICAL BULLETIN

TB245: GPC Analysis of Polyvinylidene Fluoride (PVDF) on the PL-GPC 220

Keywords
GPC, PL-GPC 220, PLgel, Polyvinylidene Fluoride, DMSO

Fluoropolymers are important materials with a wide range of uses from non-stick coatings to inert packaging materials. However, fluoropolymers can be difficult to analyse by GPC due to their low solubility in common solvents. This technical bulletin outlines the analysis of three samples of polyvinylidene fluoride in dimethyl sulfoxide (DMSO) at 95°C using the PL-GPC 220 with two PLgel 10µm MIXED-B, 300x7.5mm columns. For this application, elevated temperatures are required to dissolve the samples and to reduce the viscosity of the solvent that would otherwise result in high back pressures at flow rates of 1.0ml/min and poor chromatography. The samples were prepared at nominally 3mg/ml. An appropriate amount of each sample was weighed into a vial, the eluent added and the solution heated at 95°C for 4 hours in the PL-SP 260 sample preparation unit.

Figure 1 - Chromatograms of the three samples of Polyvinylidene Fluoride



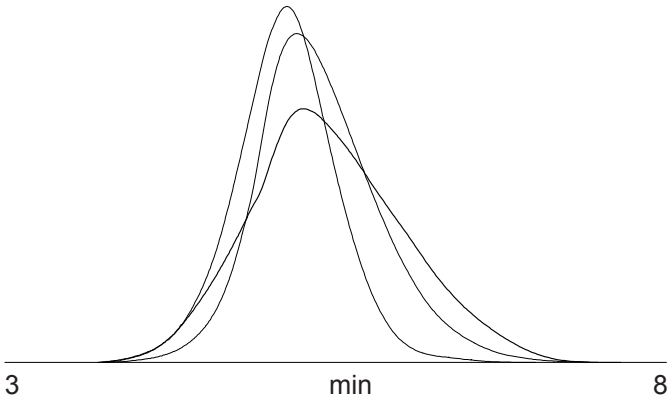
The solutions were then filtered and dispensed into the PL-GPC 220 autosampler vials. The samples were analysed on the PL-GPC 220 with the autosampler carousel temperature at 95°C and 40°C in the hot and warm zones respectively.

The system was calibrated using narrow polydispersity polymethyl methacrylate (PMMA) standards. When using polar organic solvents, polystyrene standards may be soluble but they exhibit hydrophobic interactions with the column, resulting in non-meaningful molecular weight assignments.

Figure 1 shows raw data chromatograms of the three samples. The positive peaks that elute after the samples are due to imbalances between the solvent in which the sample is prepared and the eluent. Figure 2 shows overlaid molecular weight distributions of the three samples based on polymethyl methacrylate standards.

Samples:	Polyvinylidene Fluoride
Columns:	2xPLgel 10µm MIXED-B, 300x7.5mm
Eluent:	Dimethyl sulfoxide
Flow Rate:	1.0ml/min
Inj Vol:	100µl
Temp:	95°C
Detector:	PL-GPC 220

Figure 2 - Molecular weight distributions of the three samples of polyvinylidene fluoride based on polymethyl methacrylate calibration



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