

GPC Application Note #5

Advanced GPC Analysis of Polyethylene Glycol & Polyethylene Oxide

Poly(ethylene glycol) (PEG), or poly(ethylene oxide) (PEO), is a synthetic polyether that is readily available in a wide range of molecular weights. These polymers are amphiphilic and soluble in water, as well as in many organic solvents (e.g., methylene chloride, ethanol, toluene, acetone, and chloroform). PEO offers relatively high solution viscosity and good water solubility. Hence, one truly novel application is found in the razor lubrication strip. The HMW PEO polymer slowly releases (dissolves) while shaving, providing excellent skin protection. Excellent dispersing effect can also be achieved with only a small amount of PEO, which is important for certain applications (e.g., paper manufacturing). The samples were analyzed using a Malvern Triple Detector GPC System. The analysis conditions are listed below.

Solvent	0.05M Na ₂ SO ₄		Sample Conc	2 mg/mL	
Columns	2 X Shodex SB-806M HQ		Dissolution Temp	25C	
Flow Rate	1 mL/min		Dissolution Time	60 Minutes	
Column Temp	30C		Sample Filtration	0.2 um Nylon	

Figure: Triple Chromatogram of PEO24K



Table: Summary of Analysis of PEO24K

	Mw	Mn	IV (dL/g)			Mw	Mn	IV (dL/g)		
PEO-1	24,189	23,433	0.405		PEO-5	24,287	23,622	0.405		
PEO-2	24,013	23,289	0.400		PEO-6	24,281	23,574	0.403		
PEO-3	24,161	23,516	0.402		PEO-7	24,274	23,545	0.407		
PEO-4	24,292	23,696	0.402		PEO-8	24,424	23,651	0.406		
MW = 24,240 +/- 121 Mn = 23,541 +/- 131 IV = 0.404 +/- 0.002										

The results show consistent MWD and IV data for of a PEO24k narrow MW standard.