Application Notes

Nylon

Nylon was discovered in 1938 and has since become one of the most prevalent polymers in existence. Nylon refers broadly any of a number of strong elastic synthetic polyamide materials that can be fashioned into fibers, filaments, bristles or sheets.

Nylon is frequently analyzed by Gel Permeation Chromatography (GPC) using polymer standards and extensive column calibration. But Kolon Corporation of Seoul, Korea wanted *absolute* results instead of relative answers. Kolon, one of the world's leading chemical companies, joined the growing number of companies investing in Wyatt Technology's exclusive multi-angle light scattering technology. In so doing, they *eliminated* column calibration and were able to characterize their nylon more completely than ever before.

The specific refractive index increment, *dn/dc*, was measured off-line using an Optilab Interferometric Refractometer at 488 nm, the *same wavelength* as the light scattering (DAWN DSP with a 10 mW argon-ion laser) instrument. The solvent was meta-cresol in chloroform at a flow rate of 0.916 ml / min.

The absolute weight-average molecular weight and the molecular weight moments of the peak, as well as the uncertainties of each of the quantities calculated—a benefit found in *no other* chromatography package—are shown in the table below.

Peak Range	13.572-19.007 mL
No. of Slices in Peak	357
Injected Mass	1.667 x 10^{-4} g
M_n	(7.59±0.8) x 10^4 g
M_w	(1.13±0.03) x 10^5 g
M_z	(1.611±0.11) x 10^5 g
Polydispersity M_w/M_n	1.49±0.17

†Sample data courtesy of Kolon Corporation, Korea.

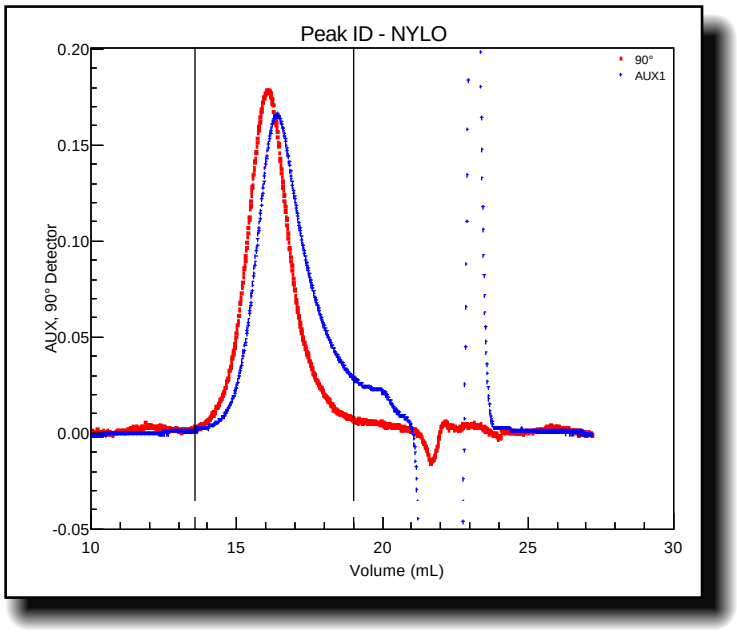

Figure 1. The Peak ID screen in ASTRA. Note the differences in response between the RI and the DAWN instruments which are clearly visible at the extremes of the peak.

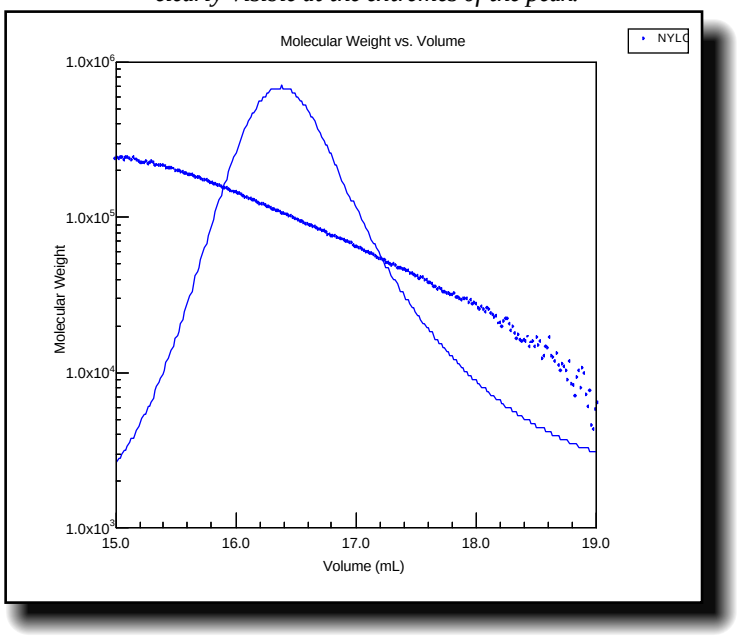

Figure 2. The Molecular Weight vs. Volume plot in ASTRA. This veritible "calibration curve" is generated with every run of the DAWN/GPC system.

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