

Telechelic Associative Polymers

Many applications of polymer characterization don't require HPLC; in fact, many samples can't be separated due to limitations of the separation technology or of the sample itself. This is exactly the case with telechelic associative polymers. These polymers are hydrosoluble, hydrophobically-modified with hydrophobic groups in the extremities of the hydrophilic chain. Simply put, they cannot be characterized by HPLC in *any* solvent, due to problems of aggregation and absorption. Accordingly, the weight-average molar mass of these polymers must be determined by using the "micro batch" mode of operation for the DAWN.

In this application note, we report the characterization of a telechelic polymer that consists of a polyacrylamide and a hydrophobic initiator "azo" derived of the 4,4'-Azobis(4-cyanopentanoic acid) modified with 12 or 16 carbons. The reported samples were dissolved in formamide to specific concentrations. The DAWN EOS detector was employed, and the samples were injected *directly* to the cell of flow of the instrument. The data were collecting and analyzed using the ASTRA software's Zimm plot module.

The angular dependence—extrapolated to zero angle—yields the root mean square radius; the concentration dependence—extrapolated to zero concentration—gives the second virial coefficient (A_2), and the *intercepts* of both lines determine the absolute weight-average molecular weight (M_w).

In Figures 1 and 2 the results of a micro batch analysis for polyacrylamides with different hydrophobic initiators are shown. The weight-average molar masses were $[2.128 \pm 0.031] \times 10^6$ and $[1.975 \pm 0.031] \times 10^6$, respectively.

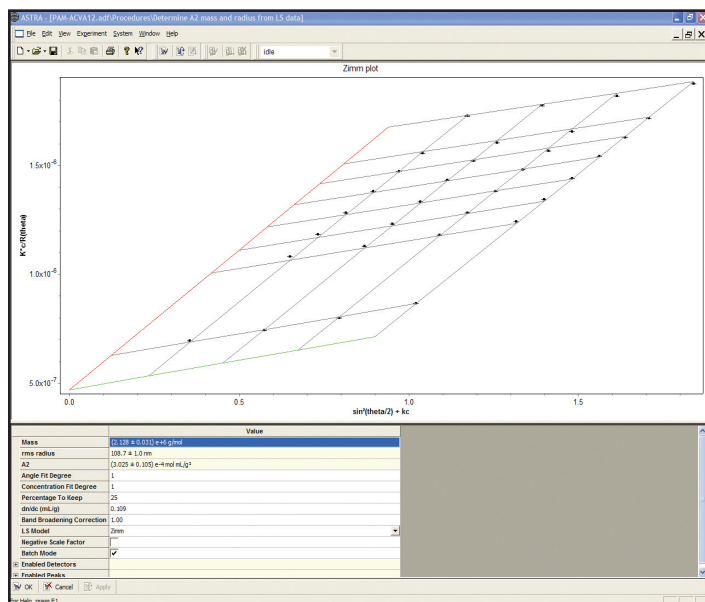


Figure 1 shows the absolute weight-average molar mass computed to be $[2.128 \pm 0.031] \times 10^6$ daltons.

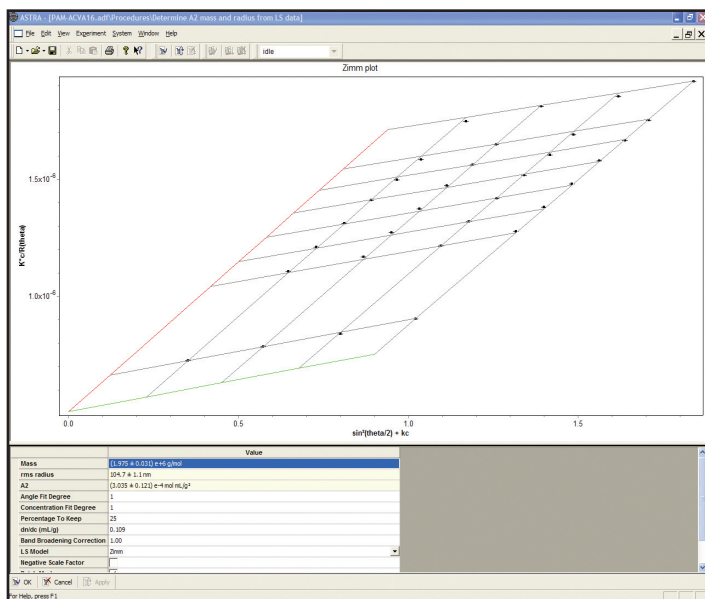
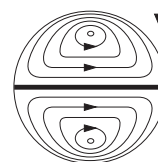


Figure 2 shows the absolute weight-average molar mass computed to be $[1.975 \pm 0.031] \times 10^6$ daltons.

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