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Latest developments in hardware and applications for advanced, multi-detector GPC/SEC

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Gel-Permeation Chromatography (GPC) is the most widely used tool for the measurement of molecular weight and molecular weight distribution of polymers. Static light scattering detectors (like RALS, LALS or MALS) measure the intensity of light scattered by the sample as it elutes from the column. Since the intensity of the scattered light is proportional to the sample's molecular weight and concentration, they allow the direct measurement of the sample molecular weight which is independent of its elution volume. Furthermore, the angular dependence of the scattered light is also related to the radius of gyration of the molecule which can also be measured concurrently using a light scattering detector. The latest developments around light scattering detectors offer a significant improvement in sensitivity to scattered light. This can be seen in the ability to measure samples with low molecular weight, low concentration and low dn/dc . Such performance opens up the application areas which were previously difficult including low concentrations of novel polymers, low molecular weight samples such as epoxies, and low dn/dc samples such as the drug delivery molecules, PLA and PLGA. An intrinsic viscosity detector can also be used as part of a GPC system to measure the parameter of intrinsic viscosity which can be combined with the molecular weight data to calculate hydrodynamic radius. In combination, these data allow detailed structural information of a polymer to be generated in a single GPC measurement which can be compared with other samples in Mark-Houwink or Conformation plots. Viscometers have occasionally been treated with caution by researchers as their maintenance can be expensive but the latest developments in viscometer technology make these concerns a thing of the past. Disposable capillary bridges and delay columns and automated bridge balancing combine to make viscometers more robust and significantly easier to maintain. This presentation will introduce OMNISEC, the latest multi-detector GPC/SEC system from Malvern. It will describe the advances in system design to improve its performance and discuss the real-world applications such as those described above, which are benefitting from this performance.

Biography

Carrie Schindler is currently a Technical Specialist with Malvern Instruments, specializing in the Separations and Nano metric product lines. She joined Malvern Instruments in the year 2014 from the University of Alabama at Birmingham where she received her PhD (2014) in Materials Engineering. Her doctoral research focused on absorbable polymer blends and nanolithography on various polymer films.

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