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Introduction to GPC with triple detection and its capabilities

GPC is a ubiquitous tool for the characterization of polymer molecular weight and molecular weight distribution. Historically, molecular weight has been measured by comparison of sample elution time with that of standards of known molecular weight. However, such a technique can only ever be relative as the sample's actual molecular weight will be different based on structural differences between the samples and standards. This 'conventional' technique has utility as a comparative technique but can mask changes in structure and chromatography and incorrectly identify or miss changes in molecular weight. GPC with triple detection has been developed to overcome these limitations through direct measurements of molecular weight and structure. Triple detection is the combination of refractive index, light scattering and intrinsic viscosity detectors. The addition of a UV-Vis detector enables tetra detection where polymers contain a chromophore. Static light scattering detectors (whether RALS, LALS or MALS) measure the intensity of light scattered by the sample as it elutes from the column. This allows direct measurement of sample molecular weight independently of the sample's elution time and also the sample's radius of gyration. 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 molecular weight data to calculate hydrodynamic radius. In combination these data allow detailed structural analysis of the polymer using the Mark-Houwink plot. This workshop will discuss the theory and background around GPC with triple detection. It will briefly cover detector theory and show some examples of how triple detection can generate considerably more information about a sample than conventional GPC alone. A brief software demonstration will be included to show how the latest systems and software make triple detection analysis and data interpretation simpler than ever.

Biography

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