Gel Permeation Chromatography and Size Exclusion Chromatography Reference Guide

GPC and SEC are liquid chromatography techniques that separate individual polymer chains on the basis of their size in solution.

**Mechanisms of Gel Permeation Chromatography/Size Exclusion Chromatography**

- Polymer molecules are solvated in an eluent solvent (eluent system).
- Polymer solution is injected into the system (injection). The injection volume is typically 10-20% of the column volume.
- Polymer molecules are solvated in the eluent solvent.
- Polymer molecules are solvated and diffused in the eluent solvent.
- Polymer elution is detected by UV/Vis detectors, refractive index detectors, or viscometers.
- The detected signals are used to calculate the molecular weight and size distribution of the polymer sample.

**Troubleshooting guidelines**

- Establish conditions that provide the best performance for all equipment.
- Use a low molecular weight standard as a control to check the baseline and detector sensitivity.
- Use a high molecular weight standard as a control to check the detector's dynamic range and peak capacity.

**Over 30 years’ experience in GPC/SEC**

- The Agilent GPC/SEC system is designed to provide high-quality data and accurate results.
- The system is equipped with specialized detectors for all types of samples.
- The system is compatible with a wide range of solvents and eluents.

**Selected GPC/SEC column calibrations**

- Polymer sample suitability: Agilent PLgel columns for the analysis of polymers soluble in polar solvents.
- Polymer sample suitability: Agilent PlusPore columns for the analysis of polymers soluble in non-polar solvents.
- Polymer sample suitability: Agilent Bio SEC-50 columns for the analysis of bio-molecules over a broad size range.

**Components of a GPC/SEC system**

- Agilent Technologies provide a comprehensive range of products and solutions for GPC/SEC.
- The system includes a wide range of detectors, columns, and accessories.
- The system is designed to meet the needs of researchers and analysts in the fields of polymer science and materials science.

**Specialist detectors for GPC/SEC**

- UV/Vis detectors: Measure polymer concentration, suitable for polymers with chromophores.
- Refractive index detectors: Measure molecular weight and size distribution.
- Viscometers: Measure accurate molecular weights, independent of polymer chemistry.

**Technical specifications for common polymers**

- Polymer sample: Polystyrene, polyethylene, polypropylene, polyurethane, polystyrene, polysulfone, polyetherketone, polyphenylene, polyetherimide, polyphenylene oxide.
- Polymer standards: Standard materials, such as polystyrene, polyethylene, and polypropylene, are used to calibrate the system.

**Calibration standards**

- To determine the size of the polymer components, a calibration must first be generated from polymer standards of known size. The calibration curve is established by plotting retention time against molecular weight.
- The calibration standards cover a wide range of molecular weights, allowing for accurate and precise determinations.

**Agilent Biocompatibles**

- Agilent Biocompatibles are designed to provide high-quality data and accurate results.
- Agilent Biocompatibles are suitable for analysis of biopolymers and bio-molecules.

**Contact information**

- Agilent’s contact information is available on the website for more details.
- Contact us at info_agilent@agilent.com for any inquiries.
- Visit www.agilent.com/chem/contactus for contact information and a sales representative near you.

**Learn more**

- Learn more about Agilent’s GPC/SEC products and solutions.

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