

# GPC-IR<sup>®</sup>

HT GEL PERMEATION CHROMATOGRAPHY



## Fully-automated high-temperature GPC/SEC system with multi-detector platform.

With over 30 years of experience in the development of high-temperature chromatography systems, Polymer Char offers the GPC-IR<sup>®</sup>: a fully automated, multi-detector Gel Permeation Chromatography / Size Exclusion Chromatography system designed for the advanced characterization of polyolefins and other polymers requiring high-temperature analysis.

The system supports multiple detector configurations, including high-stability Infrared (IR) detectors and Polymer Char's high-temperature differential Refractive Index (dRI) detector, enabling accurate molar mass distribution measurements across a wide range of polymer types.

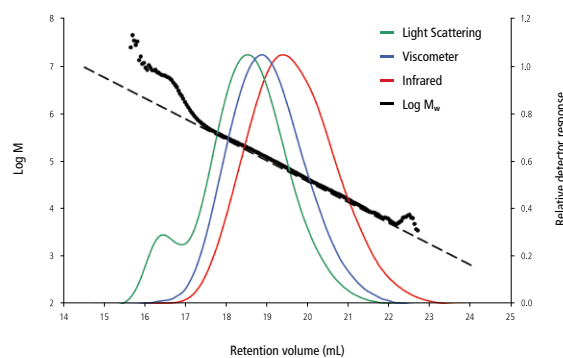
The IR detectors provide simultaneous measurement of total concentration and chemical composition of polyolefins, delivering comprehensive characterization of materials such as HDPE, PP, LDPE, LLDPE, EP copolymers, EVA, EBA, and related polymers. Two infrared detector options are available: the classic IR4 and the advanced IR6, offering enhanced sensitivity and baseline stability. Both IR detectors measure concentration, short-chain branching (SCB/1000TC), and carbonyl content.

The high-temperature dRI detector enables molar mass distribution analysis of polymers not detectable by IR, extending the applicability of this HT-GPC system to additional polymer families. When non-pure polyolefins are analyzed, the use of dRI alongside the IR detector provides a synergistic effect improving molar mass averages and distribution accuracy.

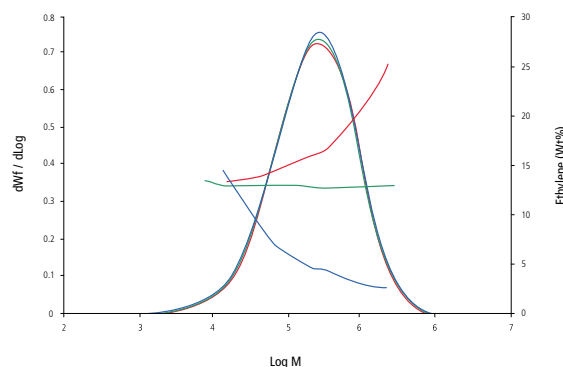
Additional detector options can be integrated into the GPC-IR<sup>®</sup> platform, including Polymer Char's four-capillary bridge viscometer for Long Chain Branching (LCB) analysis and Multi-Angle Light Scattering (DAWN<sup>®</sup> HELEOS II<sup>™</sup> by Wyatt Technology<sup>®</sup>) for absolute molar mass determination.

The GPC-IR<sup>®</sup> system fully automates sample preparation, including solvent dispensing, dissolution, and in-line filtration, eliminating manual solvent handling and vial transfer. Advanced automation features address traditional challenges of high-temperature GPC/SEC, and propriety Sample Care protocols preserve sample integrity throughout the analytical workflow.

Find out more at [www.polymerchar.com/GPC-IR](http://www.polymerchar.com/GPC-IR)  
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Triple Detection Analysis. The triple detector GPC-IR<sup>®</sup> results of a 1476 LDPE resin.



Molar Mass-Composition interdependence of three different Ethylene-Propylene copolymers with similar MWD.

## GPC-IR® Features

### Comprehensive Detection for Polyolefins:

The full characterization of polyethylene and polypropylene polymers demands HT GPC/SEC analysis with specific detectors. GPC-IR® incorporates infrared detectors, demonstrated to be the best option for this kind of polymers. The two models available, IR4 and IR6 (for high sensitivity), can measure polymer concentration, chemical composition (SCB/1000TC), and carbonyl groups. Triple detector configuration is completed by a four capillary bridge built-in Viscosimeter (developed by Polymer Char) and a multi-angle Light Scattering (DAWN® HELEOS™ II 8 or 18 angles by Wyatt Technology®).

Polymer Char's high-temperature dRI detector enables the analysis of polymers not detectable by IR while maintaining full IR performance for polyolefins within the same system.

### Automated Sample Preparation:

Every step needed from sample preparation to the injection into the columns is automated with GPC-IR®: vials filling, dissolution with shaking, and in-line filtration with backflush cleaning. Therefore, analyzing samples with GPC-IR® only requires weighing the sample and starting the software. Neither vial transfer nor manual solvent handling will be needed throughout the entire process.

### Sample Care:

Sample degradation has been present historically in SEC analyses due to long dissolution times, the use of stirrers, and the presence of oxygen in the vials. However, when using GPC-IR®, sample degradation is significantly minimized thanks to the exact time of dissolution for each sample, gentle shaking, and a purge with nitrogen into the vials. Furthermore, dissolution time can now be shorter due to an efficient and homogeneous heat transfer to the vials.

### Comprehensive Calculations Software:

The One Software Calculations platform was developed with the leaders in the industry in order to meet the needs of both, highly experienced users and new ones as well. All the detectors' signals are integrated to become the most comprehensive calculations software package available in the market. The One Software is complemented with built-in customizable reports and statistical quality control tools.

## About Polymer Char

Polymer Char offers the broadest and most modern range of instruments and services for polymer analysis and more specifically, for the structural characterization of Polyolefins, such as Molar Mass Distribution (GPC-IR®, GPC-QC), Chemical Composition Distribution (CRYSTAF, CEF), Bivariate Distribution by Cross-Fractionation Chromatography (CFC), High Temperature HPLC (TGIC, SGIC 2D), Soluble Fraction Determination (CRYSTEX® QC and CRYSTEX® 42), Preparative Fractionation (PREP mc<sup>2</sup>, PREP C20), Intrinsic Viscosity (IVA, IVA Versa) and integrated Infrared Detection (IR4, IR6).

With installations in leading petrochemical companies, government laboratories and universities in over 35 countries and analytical services provided to more than 40 countries, Polymer Char has clearly become the leader in research, engineering, software and service in polyolefin characterization. A close collaboration with the most advanced laboratories in the world during the last two decades has made this possible.

### Columns Care:

GPC/SEC columns are particularly sensitive to temperature changes, which can negatively impact separation efficiency and column lifetime.

The GPC-IR® system is designed with a dedicated and precisely controlled column oven that thermally isolates the columns from other modules. This architecture allows the columns to remain at a constant, stable operating temperature, even during cooling phases required for detector or injector maintenance.

By minimizing thermal shocks and uncontrolled temperature fluctuations, the GPC-IR® significantly reduces stress on the columns, resulting in improved long-term chromatographic stability, extended column lifetime, and higher reproducibility between analyses. This design is particularly critical for routine high-temperature GPC analysis of polyolefins, where column replacement costs and downtime can be substantial.

### Reliability:

Since the very beginning, Polymer Char's philosophy for developing instrumentation has been strongly focused on reliability and continuous improvement to overcome the historical maintenance problems usually arisen when handling polymer solutions at high temperatures. Polymer Char has been optimizing process performance and minimizing downtime through meticulous designs, and rigorous internal quality and testing procedures. As a result, GPC-IR® has become a robust system that is being successfully used today all around the world.

### Service and Support:

Today, you can count on the experience and dedication of Polymer Char and its global network of partners and distributors. We are committed to support your GPC-IR® with efficient remote and on-site service. We offer a close collaboration to ensure the highest performance of the equipment, and the best quality of the analyses' results provided.

### Leadership in Polyolefin Characterization:

With over 3 decades of experience in the characterization of polyolefins, Polymer Char offers a portfolio of high quality and reliable instrumentation, responsive service and comprehensive training; thus, delivering exceptional longterm value to your laboratory.



Several Polymer Char's R&D projects have counted on the financial support of IMPIVA, the Spain's Ministries of Science and Innovation and of Industry and Trade; and the European Union, with its Funds for Regional Development within the FEDER operational program of the Valencia Community 2007-2013.