

SGIC 2D

SOLVENT GRADIENT INTERACTION CHROMATOGRAPHY X GPC



A fully automated system to determine chemical composition distribution and molar mass interdependence by Solvent Gradient Interaction Chromatography (SGIC) combined with GPC/SEC.

The Two-Dimensional Solvent Gradient Interaction Chromatograph (SGIC 2D) instrument performs an analytical fractionation of the polymer according to chemical composition by selective adsorption/desorption on a HPLC column, followed by a second separation according to molar mass on a GPC/SEC column, being the only high temperature SGIC system available in the market.

The instrument is fully automated and the whole process is controlled by the virtual instrumentation software. Once the vials with the dry polymer samples are placed in the autosampler's external tray, the instrument takes care of the vial-filling with solvent, dissolution with gentle shaking, optional in-line filtration, and injection into the HPLC column. Then the solvent gradient program starts, and the resulting fractions are injected towards the GPC/SEC columns.

The detection is done by a standard infrared detector at the exit of the GPC/SEC columns, which provides a linear response and an outstanding stability, overcoming this way the limitations in detection found in single dimension SGIC due to the varying mobile phase composition (using TCB as second solvent).

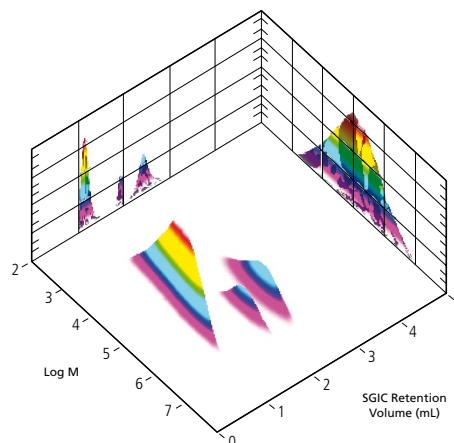
At the end of the analysis, the two-dimensional distribution interrelating molar mass and chemical composition is obtained. This combined information is often required for comprehensive characterization of complex materials. The SGIC 2D is especially suitable for the analysis of samples of low crystallinity or complex polarity distribution, when the classic cross-fractionation technique based on crystallization (TREF-GPC) does not provide the desired separation.

Polymer Char's analytical SGIC 2D instrument is a practical alternative to preparative fractionation methods, which are sometimes tedious and time consuming. The composition molar mass interdependence is now measured in hours instead of days, with limited solvent consumption and no manual intervention, in an intrinsically safe set-up.

Find out more at www.polymerchar.com/SGIC_2D

KEY FEATURES

- ▶ Fully automated instrument to measure the chemical composition - molar mass interdependence of complex and functional Polyolefins.
- ▶ Of special interest for polar or low crystallinity Polyolefins.
- ▶ Detection performed in TCB and in isocratic mode: a linear IR detector can be used instead of a non-linear ELSD. Compatible with molar-mass -sensitive detectors.
- ▶ No solvents handling, fully automated process, including in-line filtration.
- ▶ Flexible definition of the number of fractions and the solvent gradient profile.
- ▶ Bivariate distribution results presented as contour or 3D surface graphs.
- ▶ Automated analysis of a sequence of samples, with flexibility to use different methods for each one.



Polymer Char References

- App. Note: "Polyolefin Characterization by High Temperature Adsorption Liquid Chromatography: A Review of Solvent Gradient (SGIC) and Thermal Gradient Interaction Chromatography (TGIC)".
- Article: "Separation of Ethylene-Propylene Copolymers by Crystallization and Adsorption Mechanisms. A Journey Inside the Analytical Techniques" ICPC 2014, Macromolecular Symposia 2015, 356, 147-166
- Poster: "Advances in Polyolefin Characterization: CFC and HT-HPLC Techniques (8th Int. Colloq. On heterogeneous ZN Catalysts-2012 Japan).

Solutions for Polyolefin Characterization

CRYSTAF: An instrument designed for intensive use in the analysis of the Chemical Composition Distribution in Polyolefins.

TREF: A completely automated apparatus for the analysis of the Chemical Composition Distribution in Polyolefins. It provides complementary information to CRYSTAF data in the analysis of some complex resins.

CRYSTAF-TREF: CRYSTAF and TREF techniques are available in the same equipment for a full Chemical Composition Distribution characterization.

CEF: A high throughput equipment to analyze the Chemical Composition Distribution in Polyolefins, using a new approach combining CRYSTAF and TREF separation mechanisms.

PREP mc²: An automated instrument to perform semipreparative fractionation according to composition by TREF or CRYSTAF, or molar mass.

PREP C20: New column-based preparative fractionation instrument, capable to fractionate up to 20 grams of polymer.

CRYSTEX[®] QC: A truly automated system based on TREF-separation concept for soluble fraction measurement, ethylene content and intrinsic viscosity in PP/PE plants control.

CRYSTEX[®] 42: A high-throughput and easy-to-use system for simultaneous measurement of the soluble fraction, ethylene content and intrinsic viscosity in a fully automated process for up to 42 samples.

IVA: Reliable and automated instrument for Intrinsic Viscosity Analysis of polymers with dissolution temperature up to 200°C.

GPC-IR[®]: Advanced High Temperature GPC for the analysis of Molar Mass Distribution in Polyolefins. Fully automated sample preparation and filtration. Triple detector (IR, VS, LS) plus composition.

GPC-QC: High Temperature GPC instrument for Quality and Process Control in Polyolefin production plants.

CFC: A fully automated Cross Fractionation Chromatograph (TREFxGPC or TGICxGPC) for the analysis of Bivariate distribution.

GPC One[®] Software: The most comprehensive GPC/SEC Calculations Software integrating all detectors' signals.

Data Unit 200: Versatile signals acquisition device to link any vendor GPC instrument with Polymer Char's GPC One[®].

TGIC: An adsorption high temperature HPLC technique for the analysis of low crystallinity Polyolefins.

SGIC 2D: An adsorption high temperature HPLC technique combined with GPC and infrared detection for the analysis of composition and molar mass interdependence of Polyolefin resins.

IR4: Integrated, reliable and simple to use infrared (IR) detector to measure concentration and composition.

IR5 MCT: Integrated and modern IR detector with an MCT element (thermoelectrically cooled) for high sensitivity analysis.

Analytical Services: Polymer Char laboratory, a global reference in the field, counts on the latest technologies for Polyolefin Characterization.

Company Profile

Polymer Char is devoted to the development of state-of-the-art instrumentation for Polyolefin Analysis.

The company 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, GPC One[®]), Chemical Composition Distribution (CRYSTAF, TREF, CEF), Bivariate Distribution by Cross-Fractionation Chromatography (CFC), High Temperature HPLC (TGIC, SGIC 2D), Soluble Fraction Determination (CRYSTEX[®], CRYSTEX[®] QC and CRYSTEX[®] 42), Preparative Fractionation (PREP mc², PREP C20), Intrinsic Viscosity (IVA) or integrated Infrared Detection (IR4, IR5 MCT).

Polymer Char is also well known for its advanced approach to virtual instrumentation software that, together with excellent remote control capabilities and its strong commitment to Customer success, places the company at the leading edge on instrumentation diagnostics and technical support.

Together with its global network of partners and distributors, Polymer Char supplies, trains and supports Customers worldwide. The company provides analytical services in 35 countries and its instruments are present today in over 20 countries within the Americas, Europe, Africa, Middle East and Asia Pacific, predominantly serving Polymer Producers and Processors, Government and Academic Research Laboratories, Contract Research Organizations, Analytical and Testing Laboratories, and Chemical Instrumentation Manufacturers.

In the last two decades and with an annual investment of up to 20% of its manpower resources on R&D, Polymer Char has played a key role in the development of most of the existing Polyolefin analysis technologies, such as CRYSTAF, CRYSTEX[®], CEF, CFC, and GPC with IR detection. Each new project, each new analysis, underpins Polymer Char as the Polyolefin Characterization Company.



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