

CRYSTAF-TREF

CRYSTAF AND TREF TECHNIQUES IN ONE INSTRUMENT



CRYSTAF and TREF techniques in the same hardware to obtain complete CCD information.

CRYSTAF and TREF techniques are intended to measure the Chemical Composition Distribution in Polyolefins: CRYSTAF analyzes it in a crystallization cycle, and TREF in a dissolution cycle.

The analysis of complex PP-PE combinations has been shown to require TREF and CRYSTAF to unequivocally characterize unknown samples due to differences in undercooling. Such a case is the analysis of samples containing both HDPE and Ethylene-Propylene copolymer (EP) for instance. In TREF, the two components are not well resolved but CRYSTAF is capable of getting a very good separation. An opposite case is the analysis of samples containing both HDPE and Ziegler type PP homopolymer, which are better separated with TREF than with CRYSTAF.

Thus, the CRYSTAF-TREF instrument is a very convenient option to analyze the CCD in Polyolefins, since either CRYSTAF or TREF techniques can be performed just by changing the configuration of the equipment.

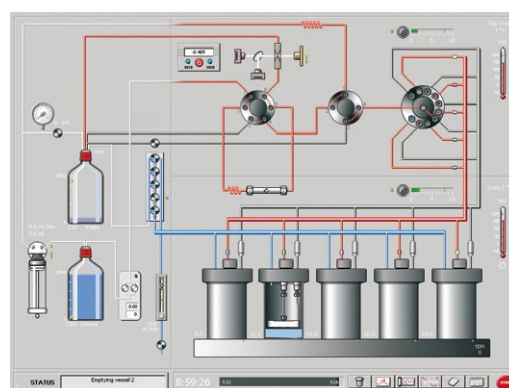
Additional information about comonomer content can be obtained if a composition sensor is incorporated into the IR4 detector, or about Molar Mass tendency by adding a Viscometer detector (only in TREF mode).

The virtual instrumentation software controls the full process either by CRYSTAF or by TREF, so no manpower is required. Samples are put into the vessels and the instrument performs the whole process including a final automatic cleaning.

Find out more at www.polymerchar.com/CRYSTAF-TREF

KEY POINTS

- ▶ Possibility of running CRYSTAF or TREF techniques in the same instrument.
- ▶ Full automation of the CRYSTAF and TREF techniques to measure the CCD:
 - ▶ No manpower required.
 - ▶ No handling of solvent.
 - ▶ Low consumption of solvent.
 - ▶ Automatic cleaning at the end of the analysis.
- ▶ 5 samples can be analyzed with no supervision required; done sequentially in TREF mode with an analysis time of 6 hours/sample, and simultaneously in CRYSTAF mode with a total analysis time of 8 hours.
- ▶ Possibility of subambient operation (down to -20°C) for low crystallinity samples.



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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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