



Molecular structure and chemical composition of polymers

Application note Resolve 03-07

The molecular structure of a polymer to a large extent determines the ultimate properties of a plastic material. If relatively simple melt flow index, indicative GPC and density measurements fail to explain the unique properties of a material, a more thorough characterization is needed. Often the molecular characterization of the complete polymer is then sufficient, but in some cases a more in-depth examination using fractionation is required.

Fractionation based on molecular weight and on chemical composition or crystallinity is regularly conducted both quantitatively (SEC/GPC, TREF) and preparatively (Holtrup, LL separation, crystallization fractionation, etc.). The molar mass and composition distributions obtained provide important additional information regarding the relationship between molecular structure and synthesis on one hand, and the properties on the other. It is also possible to use preparative fractionation to isolate specific fractions for further research using other analytical techniques (e.g. IR, NMR, GPC, TREF, viscometry).

Typical areas of application include:

- product quality control in terms of molar mass, molar mass distribution, and the distribution of long and short chain branches as well as comonomers as a function of molar mass (e.g. ethylene copolymers);
- identification and quantification of high-crystalline and low-crystalline fractions; the determination of crystallinity distributions;
- determination of the intrinsic viscosity, stability, dissolution and degradation behaviour of polymers in solutions using viscometry;
- quantitative fractionation and identification of polymer mixtures for (carpet) recycling;
- determination of gel content and preparative fractionation for composition and structure determination;
- solving filtration and separation problems regarding contaminants in products and filters.

If there is any way we can help you in the areas of fractionation and molecular characterization, we will gladly provide further information. All your details will be treated in the strictest confidence. Please contact us.

For more information:
info.resolve@dsm.com
tel: (31) 46 476 0100
fax: (31) 46 476 1200

