

## Characterization of polymers

Dipl. Phys. Wolfgang Simon, Application Consultant

FRITSCH GMBH

Milling and Sizing

Industriestraße 8 • 55743 Idar-Oberstein • Germany

Tel.: +49 6784 70 0 • Fax: +49 6784 70 11 • E-Mail: info@fritsch.de

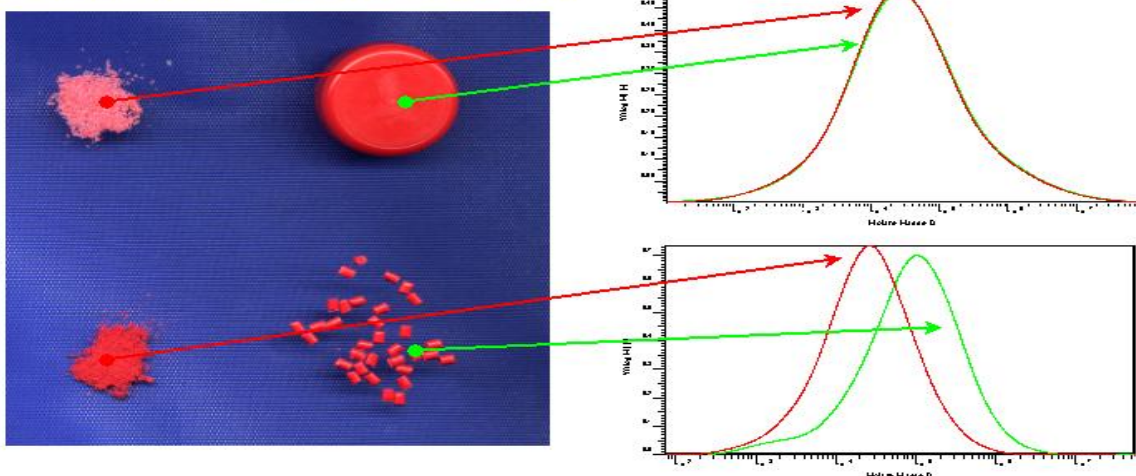
[www.fritsch.de](http://www.fritsch.de)

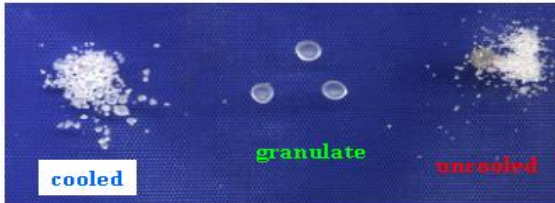
The analysis of polymers is executed with the aid of gel permeability chromatography. This process is a kind of liquid chromatography similar to the HPLC. Due to the size of the molecules the separation takes place in the solution. Depending on the detector, the average value of the molar mass, polydispersity and the viscosity of the polymer sample are determined.

Here suitable sample preparation is important in order to dissolve the polymers. The degradation - the destruction of the characteristics of the material - has to be avoided though.

An ideal solution for the sample preparation is the Variable-Speed-Rotor Mill PULVERISETTE 14. Here a final fineness of  $< 80\mu\text{m}$  is achieved. An embrittlement of the polymers with liquid nitrogen or the grinding while adding dry ice avoid the degradation. The following graphics illustrate the analysis of PE (polyethylene) and PP (polypropylene).

Example: Polyethylene, product and masterbatch





**Example:  
ultrahighmolecular  
polypropylene**

**dissolved:  
granulate: 1,5 h at 170°C  
powder: 0,5 h at 160°C**

