

# POLYMER CHARACTERIZATION

From raw material to the final product!

**Contact:**



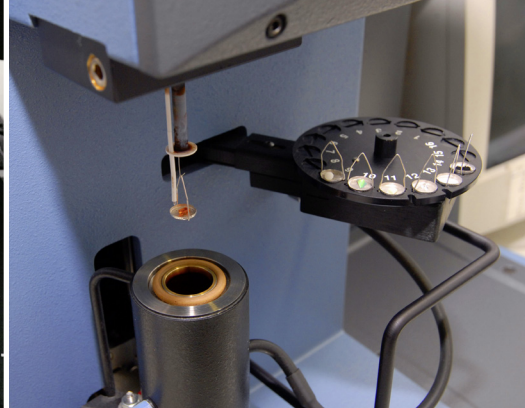
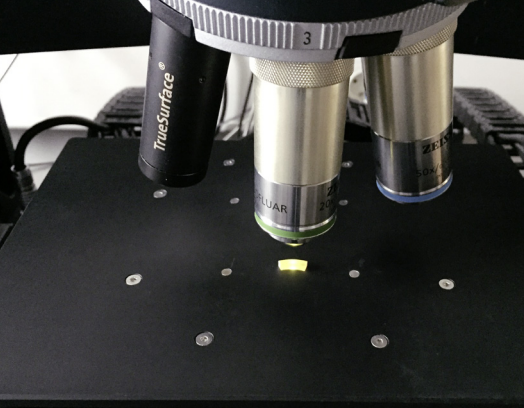
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Fraunhofer LBF's plastics research division, which evolved out of the German Plastics Institute [Deutsches Kunststoff-Institut DKI], supports its customers along the entire added value chain. We specialize in the management of complete development processes and advise our customers at all stages of development. As an identified skills center for questions regarding additivation, formulation and hybrids, we offer extensive expertise in analyzing and characterizing plastics and the changes in their properties during processing and in use, and also in developing methods for time-resolved processes.





*Fraunhofer LBF's Material Analytics examines thermoplastics, from the raw material to the final product.*

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## ANALYZING THERMOPLASTICS IS A COMPLEX AND CHALLENGING ISSUE

The distributions with regard to chemical composition and molar mass are crucial molecular metrics of any polymer and the result of the polymerization process. These can be determined by separation techniques.

Using a wide variety of additives enables end users to tailor a polymer's short and long term properties as well as its processability. Additives attain a unique distribution within the product during processing. Based on both the distribution of the additives and the processing parameters the morphological structure of the final product is set. Imaging techniques offer cutting edge possibilities to determine the distributions of additives and polymer morphology.

### We offer determining the:

- Molar mass and chemical composition distribution,
- Content and local distribution of additives,
- Polymer morphology

### Separation Techniques:

- High performance liquid chromatography
- Gel permeation chromatography
- Multidimensional liquid chromatography
- Crystallization Analysis Fractionation (CRYSTAF)
- Temperature Rising Elution Fractionation (TREF)

### Imaging Techniques:

- Polarized light microscopy
- Infrared microscopy
- Raman microscopy
- Electron microscopy

### Thermal Analysis:

- Differential scanning calorimetry
- Thermo gravimetric analysis

The effect of environmental factors on the final product can be monitored with ultimate precision using a combination of time- and spatially resolving analytic techniques. This enables to interpret the effects of aggressive media, temperature and weathering on polymer products.