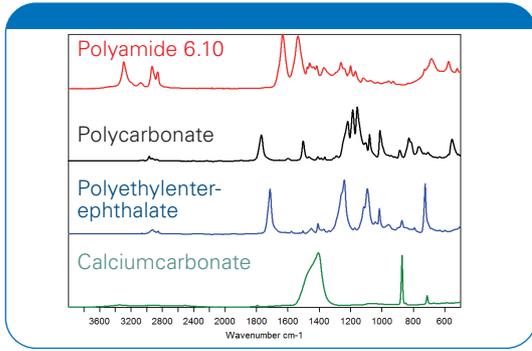


## • **Quality Control and Failure Analysis** Plastics

Bruker's FT-IR spectrometer ALPHA II provides a quick, reliable and universally applicable identity control of your incoming raw materials.

With the FT-IR microscope LUMOS II even complex or unknown samples can be characterized very accurately. This makes the LUMOS II a powerful analytical tool in product development and failure analysis.

- Incoming goods inspection
  - Plastics
  - Auxiliaries
- Failure analysis on plastic components
  - Wrong composition
  - Inclusions
  - Bloomings
  - Contaminations
- Characterization of unknown samples
  - Bulk
  - Multilayer products (laminates, paint chips and varnish)
- Quantification of fillers and additives
- Universally applicable:
  - Pellets
  - Thermoplastics, elastomers, rubbers
  - Monomers
  - Fillers
  - Additives
  - Plastic products (films, fibers, parts)



The IR-spectrum: Chemical fingerprint of polymers and auxiliaries.



Analysis of a polymer sample with the FT-IR microscope LUMOS II.

## Quality Control

Identity control using the ALPHA II typically is performed without sample preparation providing the result within seconds: Place the sample, apply clamp, measure 10 seconds – done!

As analysis result the user is informed if the inspected material is the correct material. Furthermore differences in the composition of the tested material compared to reference batches are detected. If the sample is completely unknown large reference databases allow an automated determination.

The use of the ALPHA II is very simple: Even untrained staff can perform the analysis. The software guides the operator through measurement, evaluation and reporting step by step.

## Failure Analysis

Amongst others the failure of plastic parts can be caused by contaminations or an inhomogeneous distribution of the used polymer components. Such defects are often extremely

small and therefore hard to analyze. However, a successful failure analysis requires determining the chemical nature of the defect to track its cause. The FT-IR microscope LUMOS II allows to measure smallest structures and to determine their chemical composition.

LUMOS II is a stand-alone system that is very easy to use due to its full automation and intuitive analysis software. Furthermore its design is very compact and space saving. Due to these features the LUMOS II is very suitable for the use in routine analysis.

In addition the LUMOS II generates precious information in the field of product development and reverse engineering. Measurements with a local resolution in the micrometer range allow to characterize the composition of polymer products. Mapping measurements on the sample reveal the distribution of individual components, e.g. the basic polymer, fillers and plasticizers.

Also the different layers of complex composite materials like multilayer films can be identified.

## FT-IR Spectroscopy

Fourier-Transform-Infrared (FT-IR) –spectroscopy also is called molecular spectroscopy. Infrared light induces molecular vibrations of the molecules in the analyzed sample. These vibrations are visualized in the infrared spectrum as absorption lines. Each chemical substance has its own infrared signature, just like a finger print. Therefore, infrared spectroscopy is able to identify substances and quantify ingredients.

## Advantages IR-Method

- Short analysis time (< 1 min)
- No / minimal sample preparation
- Nondestructive
- Low running costs:
  - Long life time
  - No disposables
  - Low power consumption

## Bruker Optics

Bruker is the leading manufacturer and worldwide supplier of Infrared and Raman spectrometers.

It offers the world's most comprehensive FT-IR product line that includes routine to research grade FT-IR spectrometers; from very compact to the highest resolution spectrometers for various quality control and research applications.

Customer support is provided worldwide by qualified and experienced application and service personnel.

Technologies used are protected by one or more of the following patents:  
DE 102004025448; DE 19940981; US 5923422

[www.bruker.com/optics](http://www.bruker.com/optics)

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