FT-IR SPECTROSCOPY

# B-KIMW

## ATR-IR Polymers, Plastics and Additives Library, Kunststoff-Institut Lüdenscheid

Innovation with Integrity

With a production volume of hundreds of megatons each year, polymers and plastics have become one of the most important basic materials for manufacturing. To always obtain the required material properties many different basic polymer types are available and new types are constantly developed. Moreover, by blending basic polymers and adding fillers and additives an almost countless number of individual plastic materials is created.

### The Key to Effective Polymer Identification

Out of the various analytical methods used for the investigation of polymers and polymer products, FT-IR (Fourier transform infrared) spectroscopy is among the fastest and most powerful tools available. Besides basic polymers, also fillers, additives and other components contribute to the measured IR sample spectrum. Hence, the IR spectrum provides a chemical fingerprint of a certain plastic material.

With the availability of reference spectra databases, identification of plastic materials can be performed within just a minute. The most efficient and convenient method to obtain an IR spectrum is the attenuated total reflection (ATR) technique since generally no or only little sample preparation is needed and results are available in seconds.

### Certified Samples. Quality Data. Assembled by Experts

The "Polymers, Plastics and Additives Library" of the Kunststoff-Institut Lüdenscheid is an extensive collection of polymer ATR spectra.

A close collaboration between the Kunststoff-Institut Lüdenscheid (KIMW) and Bruker led to high quality spectra of currently used plastic materials including technical biopolymers. All materials were carefully verified and selected by the KIMW and are kept as retained reference samples.

## First Quality, then Quantity

No other spectral library offers such quality standards and high information content for each entry. Each sample is well-characterized by its plastic type and trade name. Furthermore, the library contains a wealth of additional knowledge suchs as manufacturer, color, fillers, application area and physical properties.

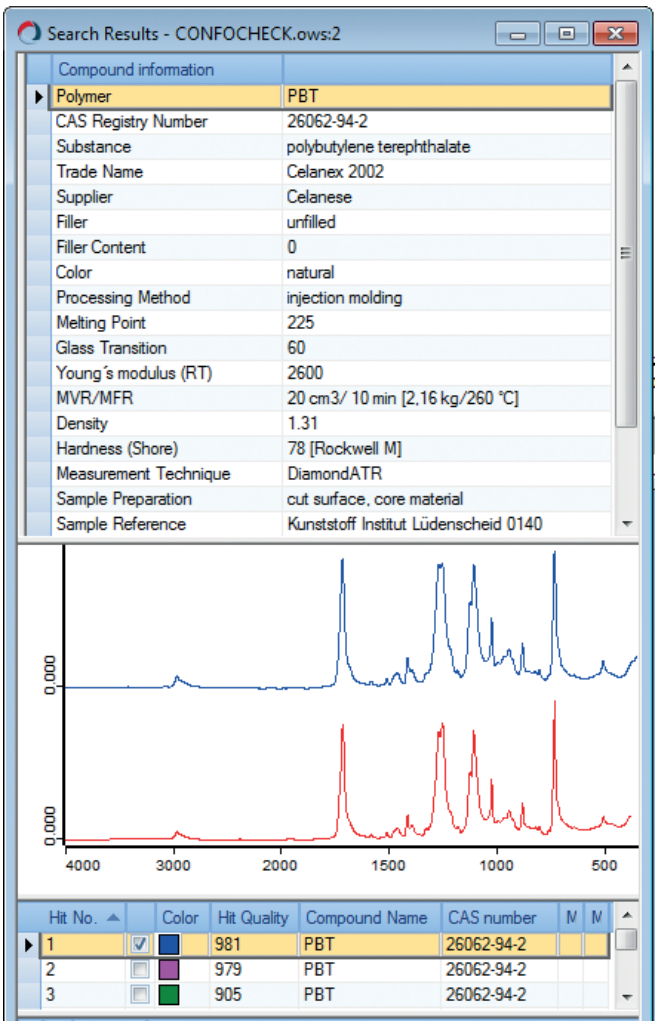


**Fig. 1**
Result of spectrum identification with the ATR-IR Polymers, Plastics and Additives Library. The upper window shows extensive compound information as well as how the reference spectra were collected.

Some of the supplementary information provided by the KIMW-library is shown in the upper part of Figure 1.

Several spectra were measured at different sample positions and averaged for the final library entry,to provide a representative spectrum of each material. In cases were the surface material differed from the core, both spectra were added to the database.

To guarantee highest quality spectra, measurements were done on a Bruker INVENIO FT-IR spectrometer equipped with a platinum diamond ATR and a spectral range down to 340 $cm^{-1}$. Furthermore, dark samples were additionally measured with a germanium ATR unit to suppress artifacts resulting from fillers with a high refractive index like carbon black.

The database is completed by spectra of relevant polymer additives like fillers, stabilizers, plasticizers, antistatic agents etc.

## Always Up-to-Date

As new plastic materials are entering the market also reference databases have to be updated regularly. Therefore, the "Polymers, Plastics and Additives Library" will be continuously expanded by new materials.

In case of specific questions regarding samples and spectra which are included in the library, the Kunststoff-Institut Lüdenscheid provides support.

**Overview**

- B-KIMW
  Bruker ATR-IR Polymers, Plastics and Additives Library, Kunststoff-Institut Lüdenscheid

**Specifications**

- Includes high-quality diamond ATR spectra of 1300 technical polymers (incl. biopolymers) and 150 additives
- Includes additional high-quality Ge-ATR spectra of materials with a high refractive index
- Full MIR range: 4000 – 340 $cm^{-1}$
- Sample materials selected and analyzed by the polymer institute KIMW Lüdenscheid
- Spectral quality and reference information verified by the polymer institute KIMW Lüdenscheid
- Comprehensive material information from material data sheets
- Regular library update available with additional new plastic materials and additives (once per year)

**About the Kunststoff-Institut Lüdenscheid (KIMW)**

- Leading provider of in-depth services in a wide range of polymer technologies
- Supports customers in selecting, developing, optimizing and implementing products, tools and processes in all areas of plastics technology
- DIN EN ISO 9001 certified
- DIN EN ISO/IEC 17025:2000 accredited laboratory
- Internet: www.kunststoff-institut.de



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