

Product Note M165 - 01/17

B-KIMW

ATR-IR Polymers, Plastics and Additives Library, Kunststoff-Institut Lüdenscheld



With a production volume of hundreds of megatons each year, polymers and plastics have become one of the most important basic materials for manufacturing a vast range of products. 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.

Spectral libraries: key for effective polymer identification

Various analytical methods are used for the purpose of quality control and failure analysis of these plastic materials. The FTIR (Fourier transform infrared) spectroscopy is a very fast and powerful method that allows identifying unknown polymer materials. Next to the basic polymer 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 the plastic material can be performed within a minute analysis time. The most efficient and convenient method to obtain an IR spectrum is the attenuated total reflection (ATR) technique since no or only little sample preparation is needed and results are available in seconds.

High quality data assembled by experts

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



It is the result of a close collaboration between the Kunststoff-Institut Lüdenscheld (KIMW) and Bruker and contains high quality spectra of up-to-date plastic materials including technical biopolymers. All materials were verified carefully by the KIMW. Each sample is well-characterized by its plastic type and trade name. Furthermore, the library contains a wealth of additional information like manufacturer, color, fillers, application area and physical properties. Figure 1 shows an example search result with additional information of the library spectrum shown on top. To always provide a representative spectrum of each material several spectra were measured at different sample positions and averaged for the final library entry. In cases where the surface material differed from the core, both spectra were added to the database.

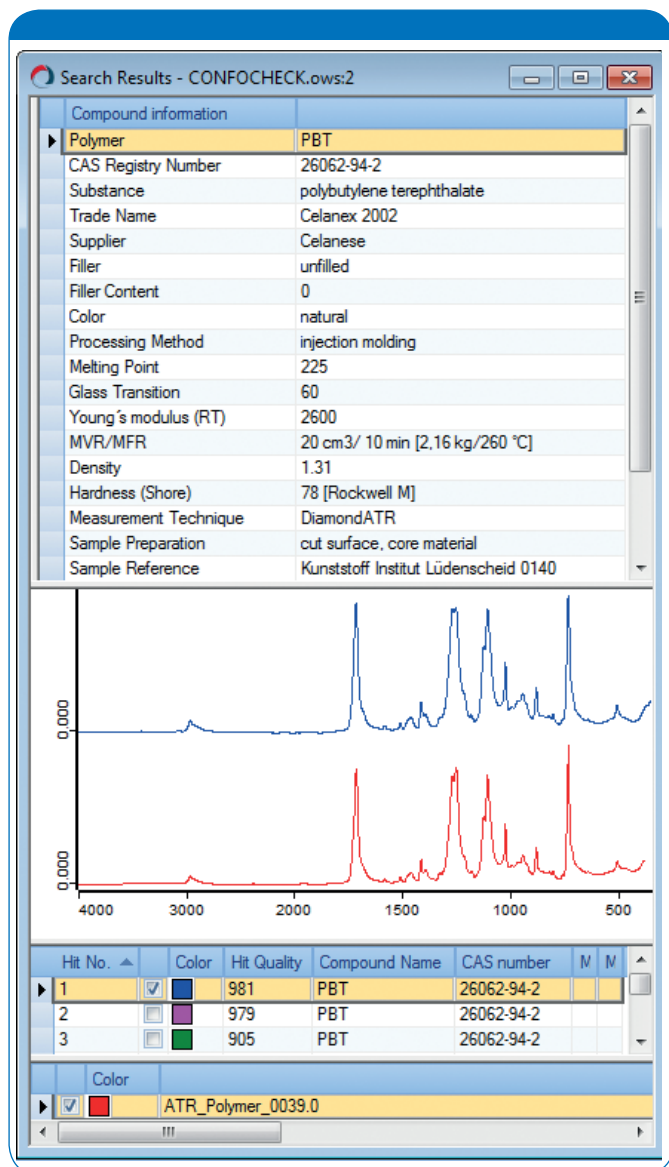


Figure 1: Result of spectrum identification with the ATR-IR Polymers, Plastics and Additives Library.

The library data was measured with a Platinum diamond-ATR on a Bruker TENSOR II spectrometer, resulting in spectra covering the complete Mid-IR 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.

Up-to-Date: now and in the future

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 expanded by new materials on a regular basis. In case of specific questions regarding samples and spectra which are included in the library, the Kunststoff-Institut Lüdenschied provides support.

Kunststoff-Institut Lüdenschied (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

Overview:

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

Specifications:

- About 800 high quality ATR spectra of up-to-date plastic materials including technical biopolymers, and additives
- Sample materials selected and analyzed by the polymer institute KIMW
- Ca. 130 different polymer types and about 100 additives
- Spectral quality and reference information verified by the polymer institute KIMW
- Comprehensive material information from material data sheets
- Full MIR range: $4000 - 340\text{ cm}^{-1}$
- Additional Germanium-ATR spectra of materials with high refractive index
- Regular library update available with additional new plastic materials and additives (once per year).