RAMAN SPECTROSCOPY

R-KIMW

Raman Polymers, Plastics and Additives Library, Kunststoff-Institut Lüdenscheid

Innovation with Integrity

With a production volume of hundreds of megatons per year, polymers and plastics are among the most important raw materials for industrial manufacturing. By varying the polymer base, the final material properties can be easily adjusted while new polymer bases are introduced to the market regularly. Additionally, through the mixing of base polymers and the addition of fillers and additives an almost unlimited number of individual plastics is potentially available.

The Key to Effective Polymer Identification

Out of the various analytical methods used for the investigation of polymers and polymer products Raman spectroscopy is among the fastest and most flexible tools available. Besides basic polymers, also fillers, additives and other components contribute to the measured Raman sample spectrum. Hence, a plastics Raman spectrum provides a chemical fingerprint containing all material information.

Different laser wavelengths can be used to investigate polymer samples to avoid unwanted fluorescence. Because generally no or only little sample preparation is needed and results are available in seconds, Raman is a very efficient analytical technique for polymer analysis. Along with the availability of reference spectra databases, identification of plastic materials is performed within 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 Raman spectra.

By the close collaboration between the KIMW and Bruker high quality spectra of currently used plastic materials were obtained, including technical biopolymers.
All materials were carefully selected and verified 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.

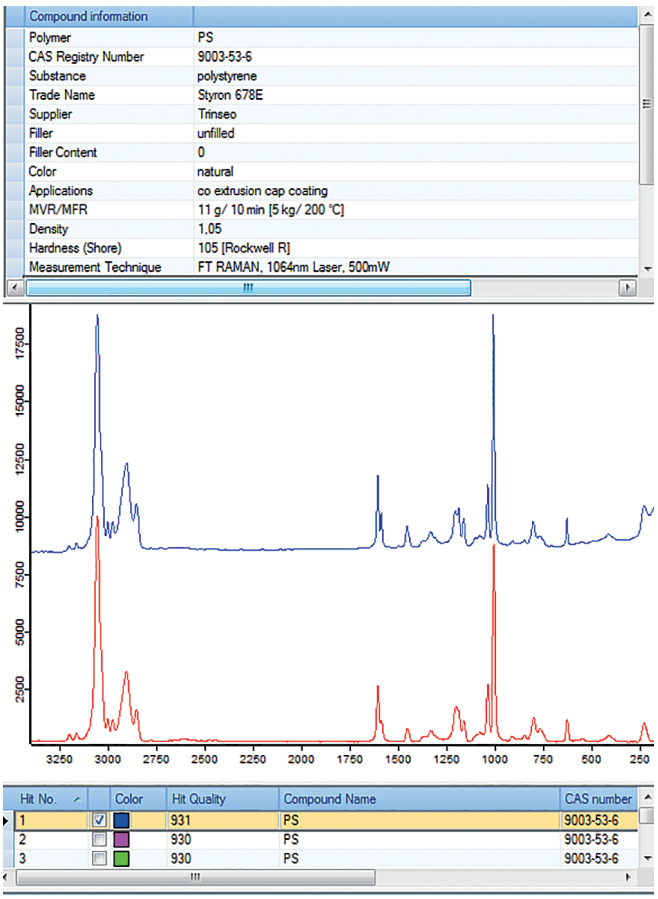

Fig. 1
Result of spectrum identification with the ATR-IR Polymers, Plastics and Additives Library. The upper window shows extensive compound information as well as how the reference spectra were collected.

Furthermore, the library contains a wealth of additional knowledge suchs as manufacturer, color, fillers, application area and physical properties. Some of the supplementary information provided by the KIMW library is shown in the upper part of Figure 1.

To always provide a representative spectrum of each material, several spectra were measured at different sample positions and averaged for the final library entry.

To guarantee highest quality spectra, measurements were done on a Bruker SENTERRA II and MultiRAM. FT-Raman (1064 nm) was used to protect the sample from degradation during the measurement and avoid fluorescence. In cases where samples were not suitable for FT-Raman measurements optimal results were obtained using a 532 nm laser.

The database is completed by Raman 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 additional support.

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

Overview

- R-KIMW
  Bruker Raman Polymers, Plastics and Additives Library, Kunststoff-Institut Lüdenscheid

Specifications

- >650 high quality Raman spectra of up-to-date plastic materials including technical biopolymers, and additives (>560 polymer and >90 addivitve spectra)
- Sample materials selected and analyzed by the polymer institute KIMW Lüdenscheid
- Ca. 130 different polymer types and about 90 additives
- Spectral quality and reference information verified by the polymer institute KIMW Lüdenscheid
- Comprehensive material information from material data sheets
- Raman laser excitation: 1064 nm or 532 nm
- Spectral range: 3400 - 120 cm^{-1}
- Spectral resolution: 4 cm^{-1}
- Regular library update available with additional new plastic materials and additives (once per year)

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