The KIMW Polymer Database for DSC Measurements: Its Content Has Doubled Now!

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Introduction

The Differential Scanning Calorimetry (DSC) technique is widely used in the polymer field for the characterization of raw materials and finished products. Typical DSC applications are, for example, quality control of incoming goods, failure analysis of broken plastic parts or identification of unknown components and impurities. A significantly faster and much more meaningful interpretation of DSC measurements can be done involving smart software solutions such as intelligent comparisons of test results with database measurements. The database serves as a collection of results and, in addition, as a pool of suitable measurement conditions for the preparation of future tests.

With the latest update to version 1.5, the KIMW polymer database, which was developed by Kunststoffinstitut Lüdenscheid, Germany, contains DSC measurements evaluated on 1,200 different commercially available polymers. This is already twice the number compared to the first publication of this database in 2016! The 1,200 different polymer data, which include trade names, suppliers, filler contents and colors, cover 172 different polymer types: A huge amount of polymer knowledge!

Applying the KIMW Database

Note that in addition to DSC data, the *Identify* libraries cover also signals of type TGA, STA, TGA-c-*DTA*®, c_p, DIL, TMA and DMA that can be accessed and easily overlaid. And *Identify* does not only contain measurements, but also a great variety of literature data, which in most cases include several material properties (T_g, T_m, mass changes, α, c_p, E') at once!

Library	Entries	
⊞ Literature Data Poster NETZSCH	248	
Ceramics_Inorganics NETZSCH	305	☑
Metals_Alloys NETZSCH	147	☑
MyPolymers	70	☑
Organics NETZSCH	172	☑
Pharma_Food_Cosmetics NETZSCH	239	☑
Polymers DSC KIMW	1200	☑
Polymers NETZSCH	224	☑
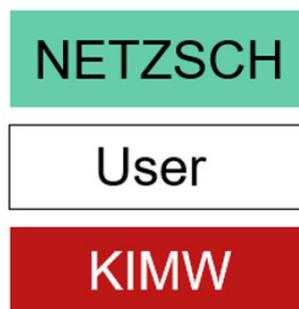
1 *Identify* database contents (status: 2023, with optional KIMW part and an example of a user library).

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Users can, of course, also build up their own *Identify* libraries (in the example above: "MyPolymers") and share them with other colleagues on the computer network!

Figures 2a and 2b display an example of a database search using *Identify* together with the KIMW polymer library. A DSC measurement on an unknown polymer was first autonomously evaluated by *AutoEvaluation* and then used as an input curve for the database search. The most similar database entry (best hit) was a measurement on a particular polyamide 46 (PA46) product and the most similar polymer type was PA46, too.
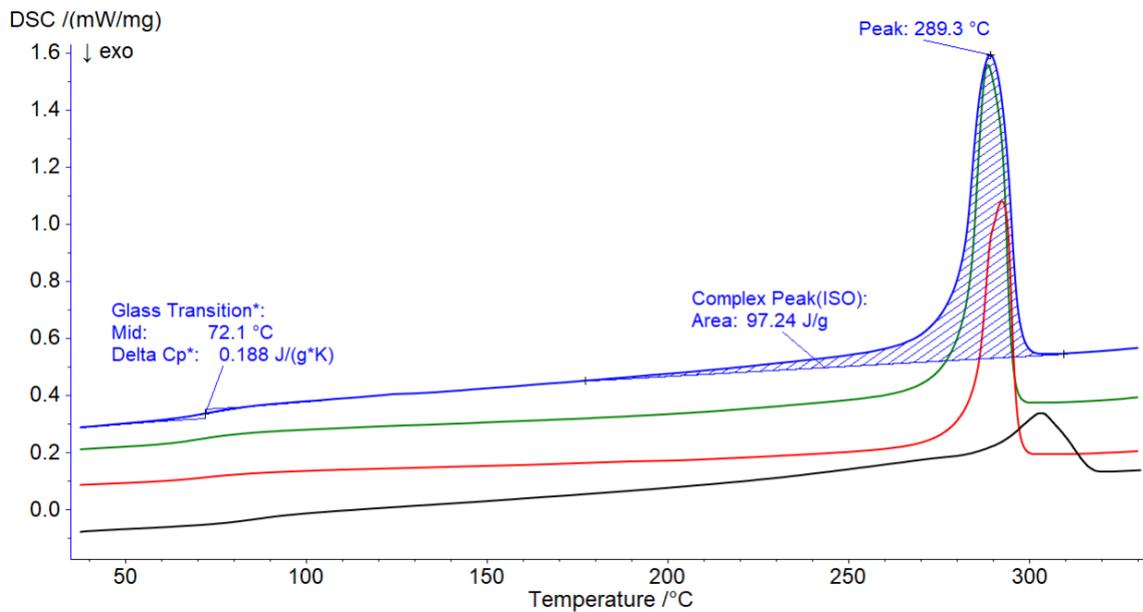
2a Temperature-dependent DSC measurement on an unknown polymer sample (blue curve) in comparison with examples of database measurements with curve colors indicated in figure 2b. Evaluation of the glass transition and the melting peak were created autonomously by the *AutoEvaluation* software functionality.

2b Database search results created with *Identify*. On the left side, a hit list of one-on-one comparisons of the input DSC measurement with individual database measurements is shown. The hit list on the right side represents polymer types (denoted as classes) sorted also according to their similarity to the input measurement. The database measurements marked as green, red and black dots are displayed in figure 2a.

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All other 171 polymer types present in the database can be exclude, so that the unknown polymer was identified as PA46 with high probability and reliability.

At the end of a conclusive investigation of materials, any data such as evaluation results, measurement conditions, graphics and also *Identify* results can easily be embedded in a customizable document using the report generator – another helpful feature of *Proteus®* analysis.

Learn more about the KIMW database, visit our website: KIMW-Landingpage-NETZSCH Analyzing&Testing

And please find more information about *Identify* in an earlier blog article and the links therein.

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