Proteus® 6.0

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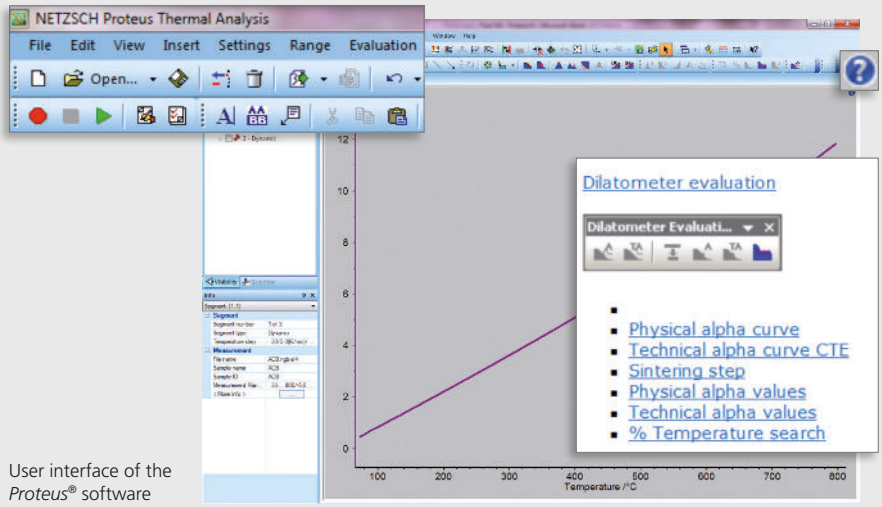
SOFTWARE UPDATE

The Sixth Generation of the High-Performance NETZSCH Measurement and Analysis Software has been Released!*

The successful *Proteus*® Version 5.2 and your intensive dialogue with us have allowed us to make detailed improvements to existing functions and implement a series of new one in *Proteus*® 6.0 which can simplify your day-to-day work.

- The new *Proteus*® Version 6.0 can be used with Windows XP Professional® and the 32- and 64-bit versions of Windows 7 Professional®, Windows 7 Enterprise® and Windows 7 Ultimate®.
- The attractive layout offers a clearly structured user interface in a modern design with "Tool Buttons" which can be quickly located.



User interface of the *Proteus*® software

- In the upper right corner of all windows and dialogs, a help button designated by a question mark icon can be found. A click here brings up a description of the dialog currently being displayed.
- Additional hypertext links, such as

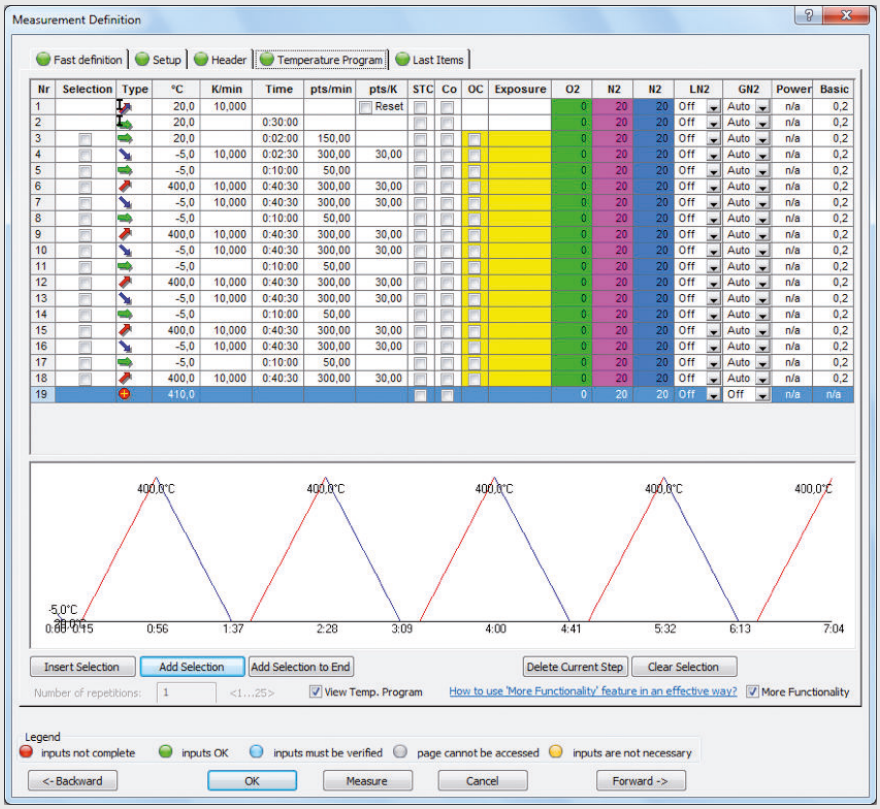
  Dilatometer evaluation

  offer further operating instructions.
- Such separate help windows leave a large part of the graphics area free so that the help function can be used simultaneously to the application.
- The programs are availalbe as 32-bit Unicode versions. This means that settings which vary by location – such as data formats and decimal separators – are supported.
- *Proteus*® 6.0 supports all NETZSCH measuring instruments. For the adiabatic calorimeters, ARC® 244/254 and APTAC™ 264, special evaluation routines are available.
- The macro recorder has proven to be a fast and reliable way of automatically evaluating such issues as quality assurance tasks. The macro recorder for TGA, DTA/DSC, STA and DIL/TMA is included in the basic package for the *Proteus*® 6.0 software at no charge.

* in the *Proteus*® software, besides English, you can choose from among the German, French, Russian or Chinese languages (for the last two, the corresponding operating system must be installed). The screenshots for this publication were all taken from the English version.

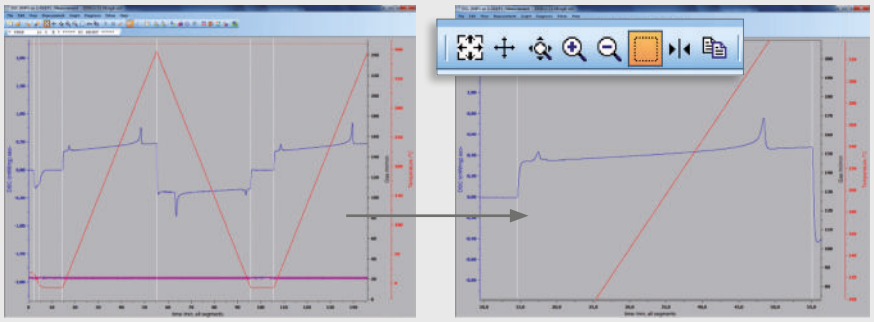
Measurement

- In order to be able to also define more comprehensive temperature programs, the maximum amount of segments was increased to 255 and the maxium amount of data points was increased to 400,000 per segment. A total of 2 million points can be recorded per measurement.
- A simplified loop programming system facilitates the comfortable input of complex temperature programs with recurring segments.
- Also new is the graphical presentation of the temperature program during program definition. It is an excellent way to maintain an overview within complex temperature profiles.



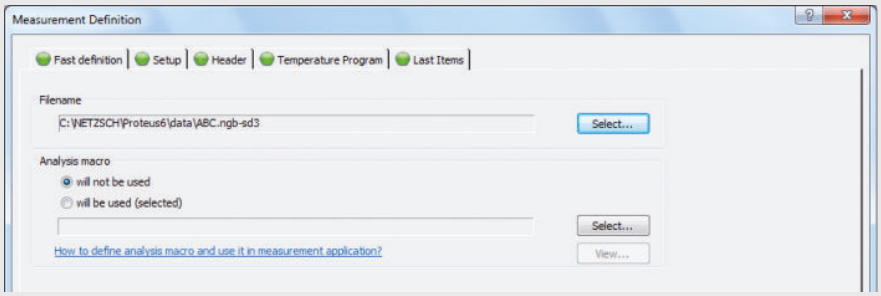
Measurement definition with graphical presentation of the temperature program

- To provide a clearer overview, the segment limits are shown as vertical, dotted white lines in the measurement diagram.
- In order to be able to carry out a more precise assessment of the data already in the measurement window, the curves can be shifted or scaled on-line and sections of them can be presented on an enlarged scale (zoom). The corresponding graphic can also be exported to the clipboard.

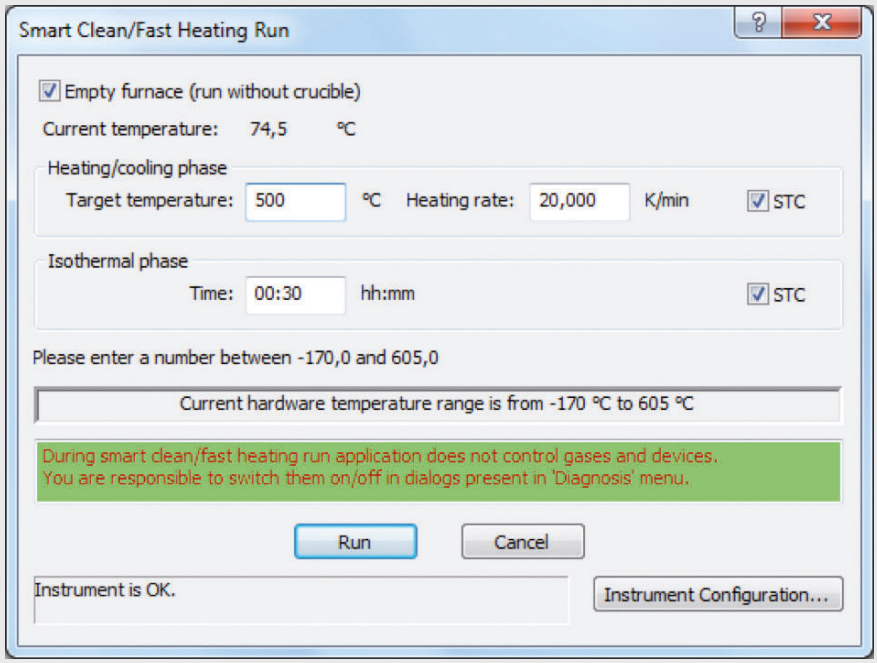


Enlarged scaling of a curve section in the measurement diagram

- By linking the measurement file with an appropriate analysis macro, individual measurements can also be automatically evaluated directly after completion of the experiment.



- *Smart Clean:*
  This function allows for quick definition of a cleaning or heating program for the furnace. The measured data are displayed, but not stored. In a slightly modified form, the *Smart Clean* option can also be used to achieve a target temperature faster and to keep it constant (isothermal) for a certain amount of time.



Smart Clean for fast heating of the furnace

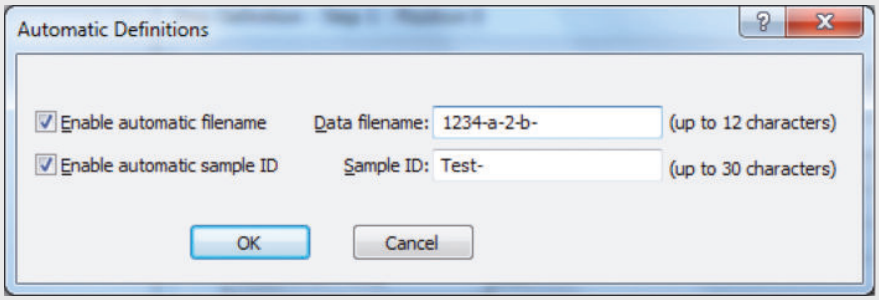
- Optimization of data storage decreases the size of the measuring file by a factor of 3 and shortens the loading time for the data.

- *Proteus*® 6.0 supports the GC-MS couplings to the STA 449 ***F1/F3*** *Jupiter*® and the TG 209 ***F1*** *Libra*® (also: TG 209 ***F1*** *Iris*® from the date of manufacture August 2011).

Sample Changer

The extended configuration settings in the sample changer software allow a measurement series to be prepared even more comfortably.

- Automatic assignment of file names and sample IDs saves time by making it unnecessary to completely reenter all designations for each measurement.



- *Proteus*® 6.0 offers comprehensive adaptation possibilities for the startup criteria for both ASC operation and individual measurements.
- With the Sample and Reference Crucible Manager, the measurement positions for sample and reference crucibles can be quickly and easily assigned.
- The sampling temperature – i.e., the temperature limit below which the crucibles are generally removed from the furnace after a measurement is finished – can be defined. So can the emergency reset temperature. The selected temperature difference is automatically added to the highest programmed temperature within a temperature program.
- All measurement positions can be measured multiple times. This is an advantage for any experiment in which it is necessary to repeat investigation of a sample within the same measurement macro.
- For STA and TGA measurements, the sample mass can be inputted either manually or by automatic weighing. For volatile samples, the sample mass can be determined immediately after insertion.
- For sample and correction measurements, the temperature program in the last segment can now also be shortened.
- *Proteus*® 6.0 supports the simultaneous implementation of ASC measurements with MS (QMS 403 C *Aëolos*®), BRUKER-FTIR or GC-MS coupling.

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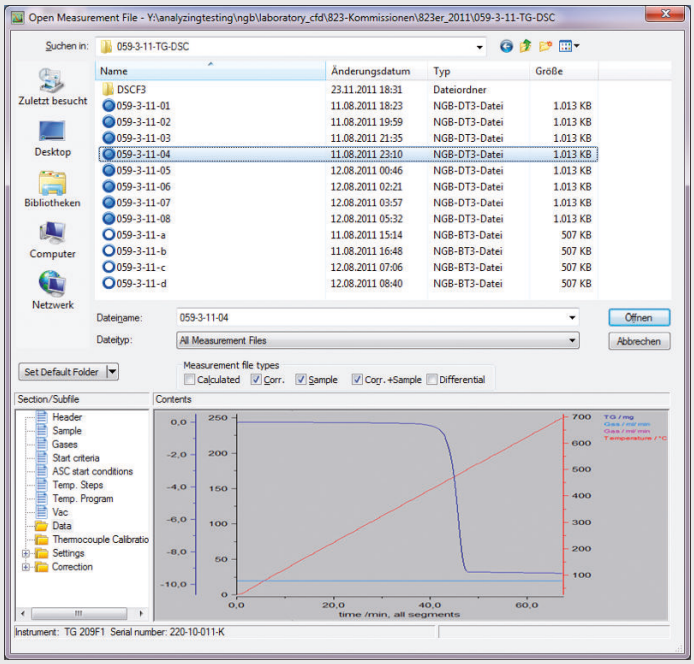
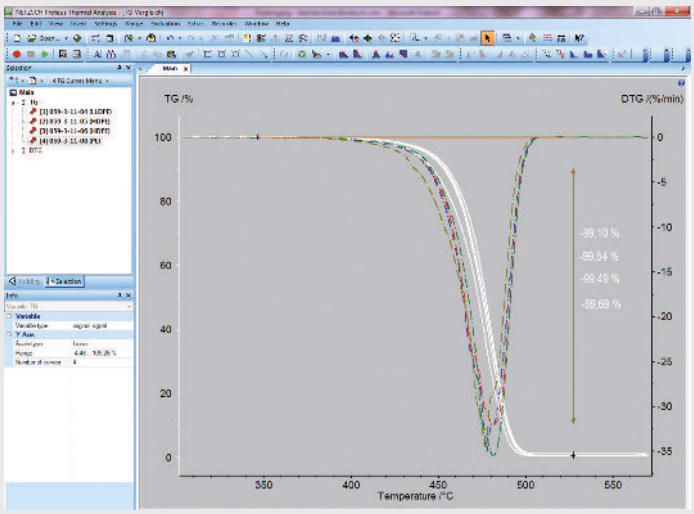
For all Thermal Analysis Instruments

- The preview option for stored measuring files and analysis states allows the user to tell at a glance whether the selected file is really the desired one.



Preview for the file selected in the upper field

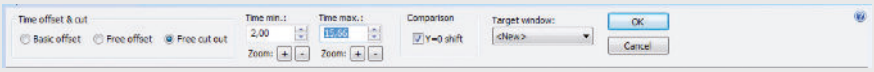
- In order to achieve the objective more quickly when analyzing an array of curves, *Proteus*® 6.0 allows any amount of curves to be evaluated in a single step. This option refers to the determination of mass changes, peak areas, extrapolated onset temperatures, peak maxima and glass transition temperatures, among others.



Simultaneous evaluation of 4 TGA curves in one step

Analysis

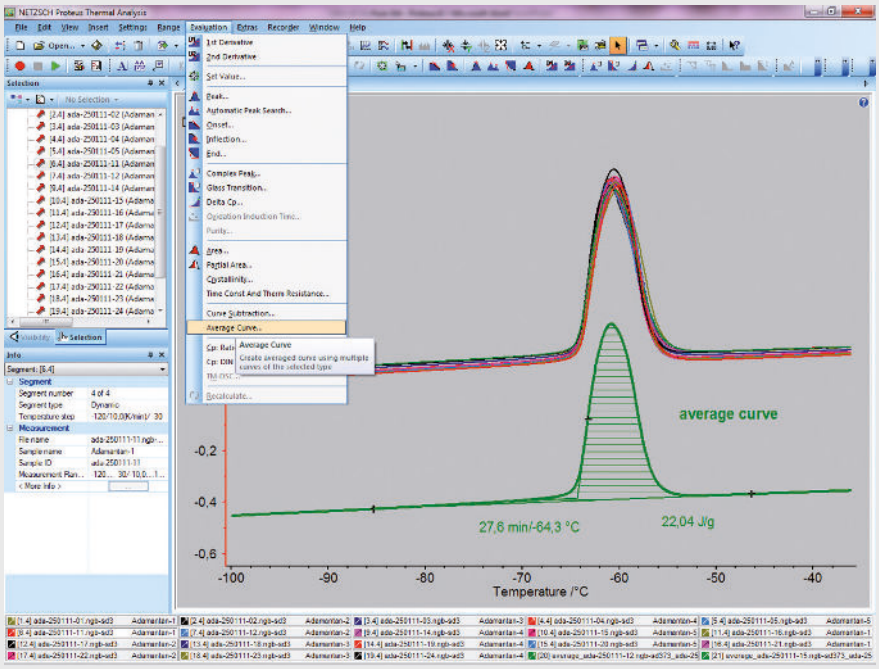
- For a direct comparison of isothermal measurements, multiple curves can be shifted to a common reference point by means of the "XY-Offset" function.



- For detail recognition or precise cursor placement, the "Zoom In/ Zoom Out" function can also be used within individual evaluation steps – such as here, in determination of the extrapolated onset temperature.

For DSC, TGA and STA Data

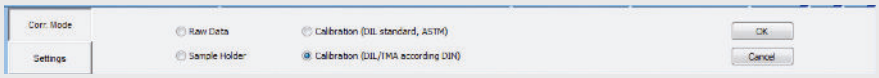
- Curve averaging:
  For incoming goods inspection, it is very advantageous to be able to compare new measurements of a material with a stored reference curve. The reference curve holds even greater significance if it is comprised not of just an individual measurement, but of an averaging of multiple measurement curves. *Proteus*® 6.0 allows for the calculation of an average curve from previously recorded individual curves and for storage as an analytical result.



20 measurements on adamantane and the resulting averaged curves

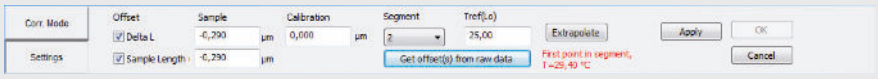
For DIL and TMA Measurements

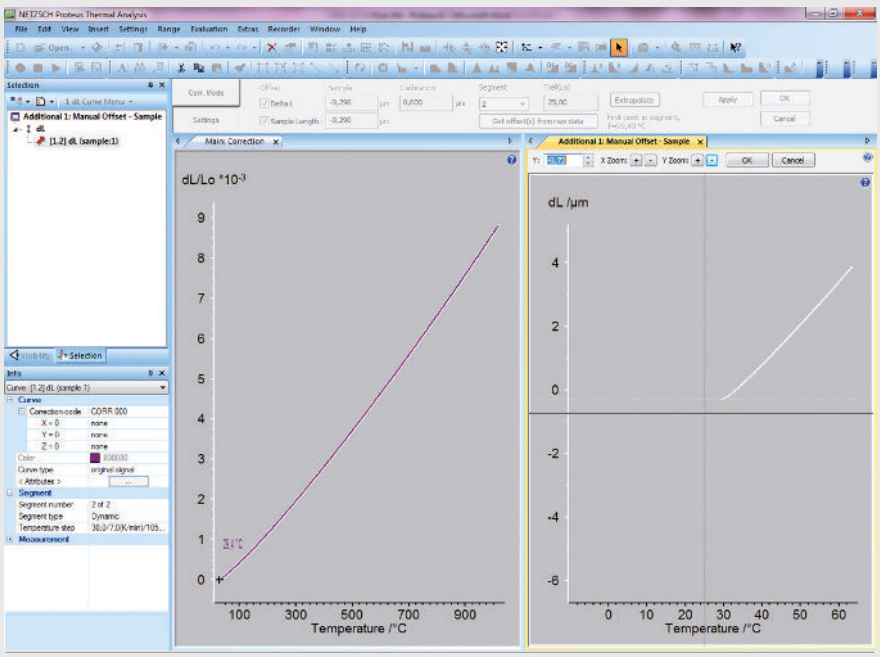
- New in *Proteus*® 6.0 0 is correction in accordance with DIN. This is particularly important for cases where standard lengths differ considerably from sample lengths, as well as for TMA measurements with non-static loads. Correction in accordance with ASTM has not been altered from the mode used in the previous version.



- In the correction mode in accordance with DIN, the reference point for the length change $T_{ref(Lo)}$ can be set to any value. The change is marked in all graphics, printouts, exported graphs, etc. with a corresponding label.

- For curve comparison, the current start value of the given expansion curve (at the beginning of a segment) can be picked out using the "Get offset from raw data" button. This is a tremendous simplification for cases where curves need to be depicted within a single presentation as beginning at the same point.



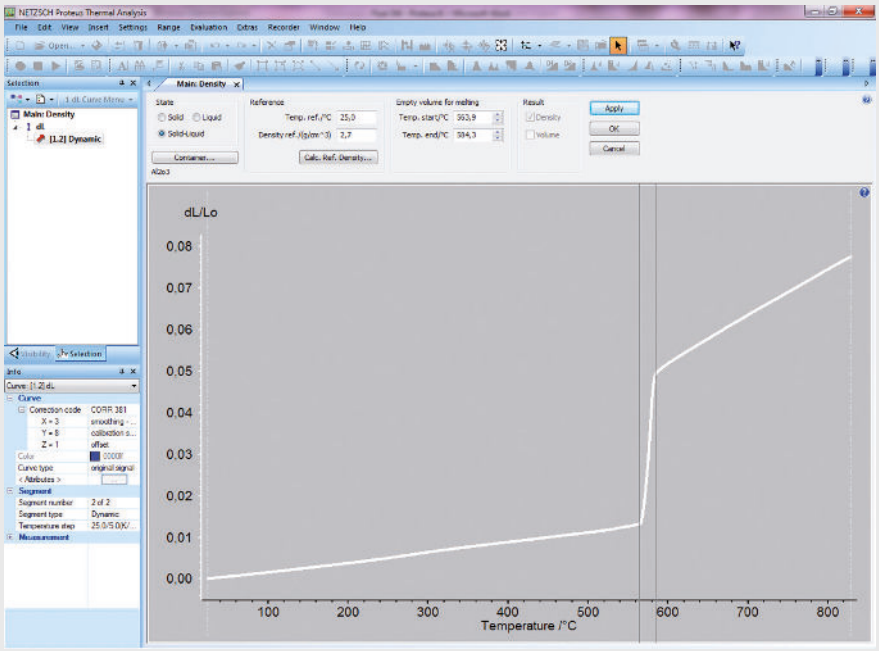


- Alternatively, the offset can be graphically determined outside of the measured temperature range by means of extrapolation, at a temperature of $T_{ref(Lo)}$. In the screenshot on the right, the selected reference temperature is at 25°C, while the actual start temperature of the experiment is at 29.1°C.

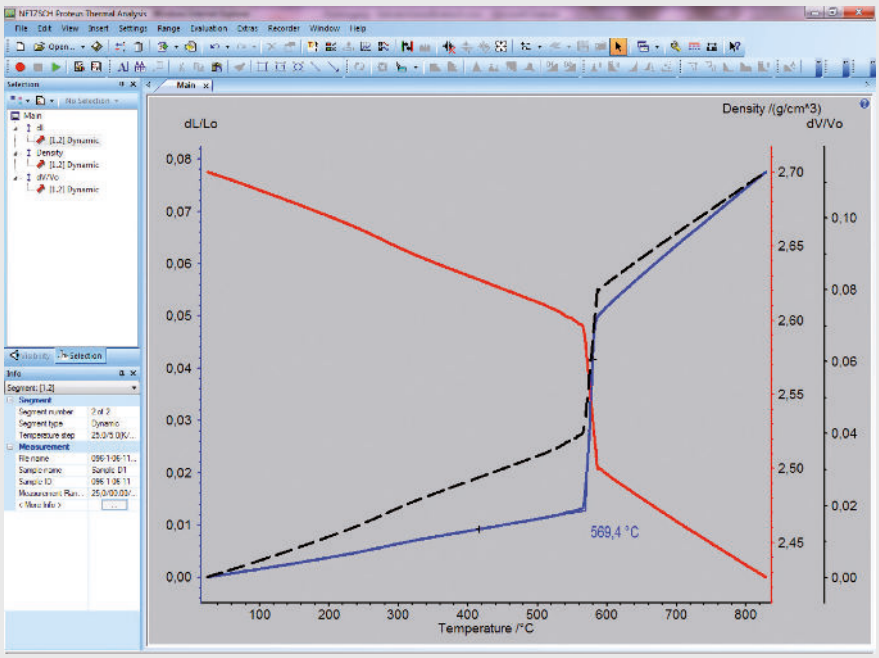
  Following the offset extrapolation, it is possible to calculate the technical expansion coefficient curve with reference to the new $T_{ref(Lo)}$.

Analysis

- With the "Density" software option within *Proteus*® 6.0, the change in density or the relative volume of a sample can be calculated as a function of temperature or time. For measurements into the melt, the expansion data for the container material used is also taken into consideration.



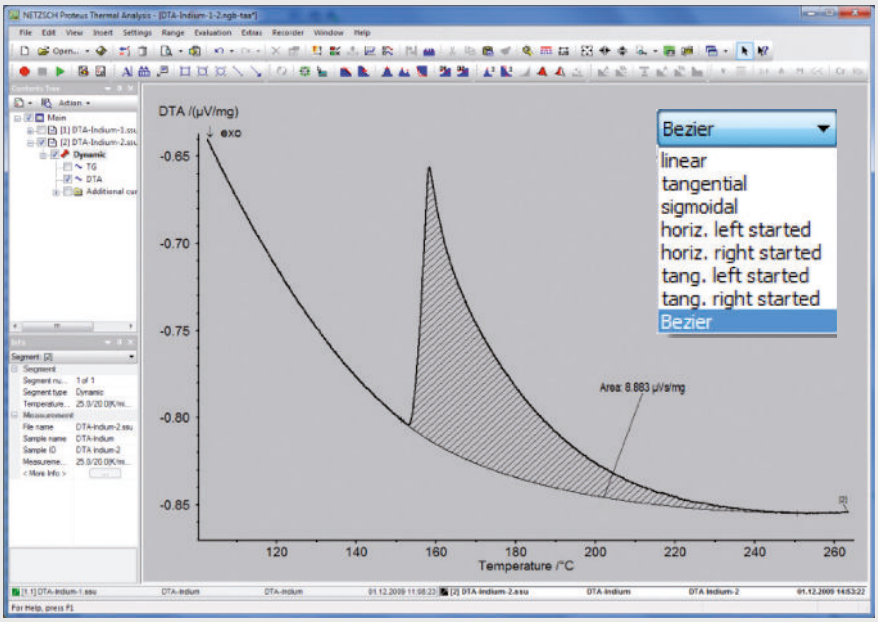
Expansion behavior of an alloy into the molten state. During melting, the sample expands greatly.



Simultaneous depiction of the relative expansion, the density change and the change in relative volume in a single graph.

For DTA and DSC Measurements

- The newly added "Bezier" baseline type is particularly well suited for curve segments where the baseline is bent, such as at the beginning of a segment or for overlapping curves.



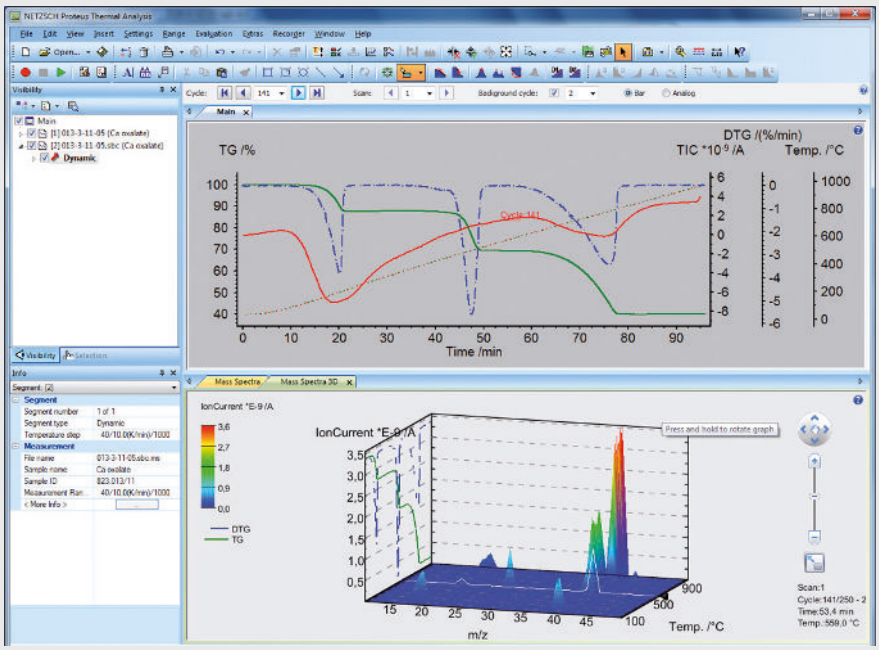
DTA measurement on indium

Analysis

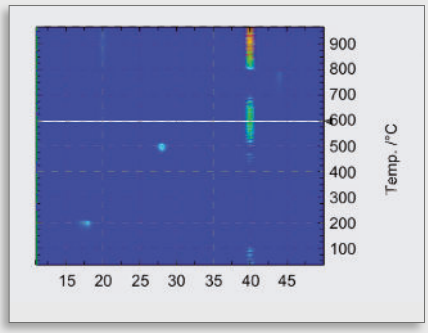
For Coupling Measurements

- For a better overview, mass spectrometer data (QMS 403 C *Aëolos*®, QMS 403/5 *SKIMMER*®) along with the corresponding TGA, DTG and/or DSC curves can be presented three-dimensionally. The color range is freely selectable, as are the number and position of the additionally embedded curves.

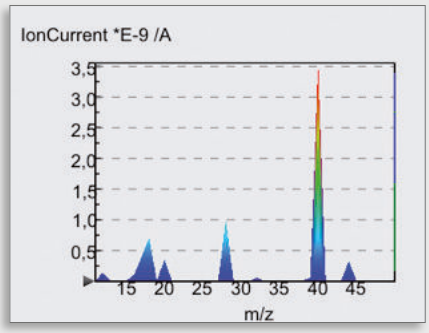
By means of the navigator, the 3-D graphics can be enlarged, reduced or rotated.



TGA-MS measurement on calcium-oxalate monohydrate with 3-D-graphics in the lower part of the screen

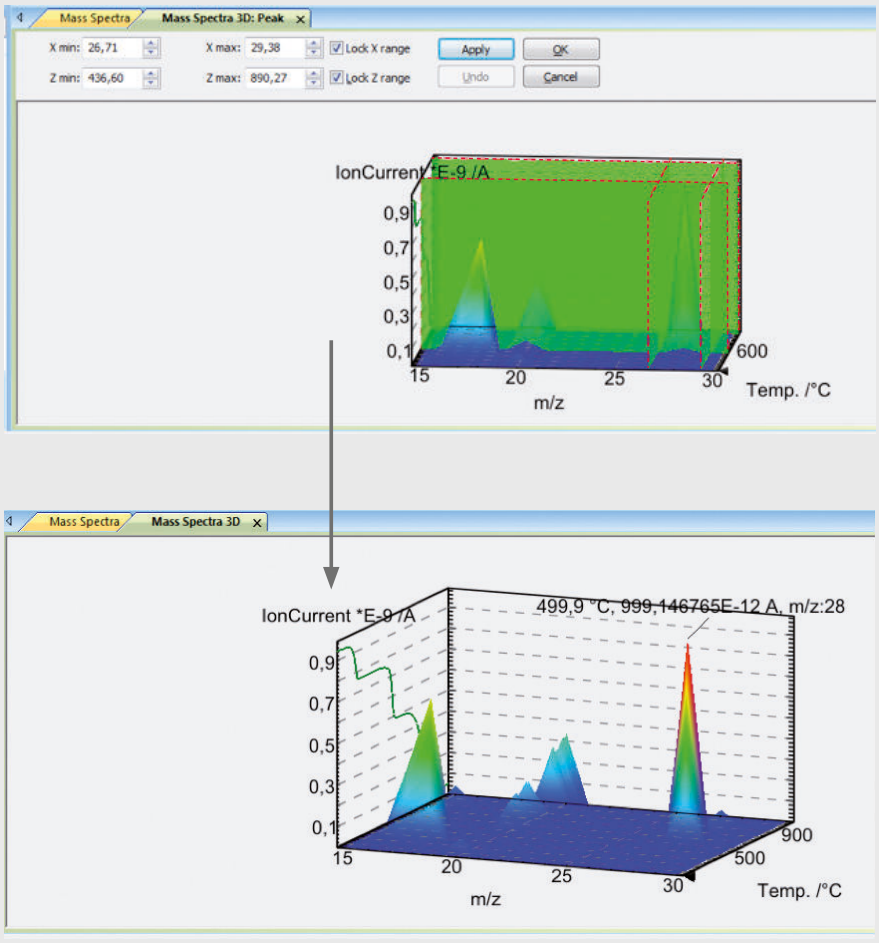


View of the 3-D cuboid from above



Front view of the 3-D cuboid

Within the 3-D plot, scaling (zoom) can be carried out, values can be determined and peaks can be evaluated. Shown here is the evaluation of the peak with mass-to-charge ratio (m/z) 28 for the aforementioned calcium-oxalate monohydrate measurement. This peak represents the formation of CO during the 2nd step.



Determination of the area for the peak evaluation; the area is presented on a larger scale than that of the previous figure.

Evaluated peak with information on the corresponding temperature and intensity values; rotated 3-D cuboid.

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The three Business Units – Analyzing & Testing, Grinding & Dispersing and Pumps & Systems – provide tailored solutions for highest-level needs. Over 2,500 employees at 130 sales and production centers in 23 countries across the globe guarantee that expert service is never far from our customers.

When it comes to Thermal Analysis, Adiabatic Reaction Calorimetry and the determination of Thermophysical Properties, NETZSCH has it covered. Our 50 years of applications experience, broad state-of-the-art product line and comprehensive service offerings ensure that our solutions will not only meet your every requirement but also exceed your every expectation.

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