Measurement / Analysis Software
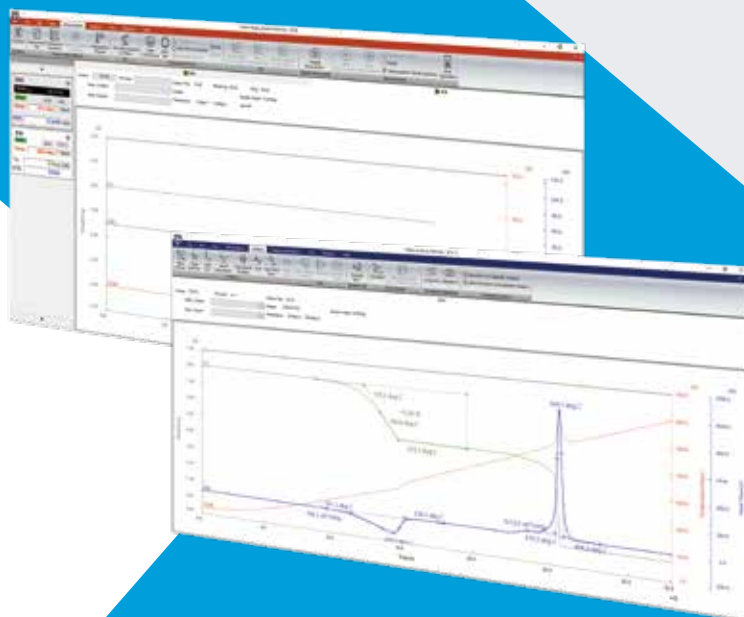
for Thermal Analysis and Evolved Gas Analysis Instruments

Vullios

THERMAL ANALYSIS SOFTWARE

Rigaku

POWERING NEW PERSPECTIVES

Vullios

New Measurement and Analysis Software Designed with a Focus On Ease of Use

Vullios is the latest measurement / analysis software for Rigaku thermal analysis instruments. It can control up to eight Thermo plus EVO/EVO2/EVO3 series instruments using a Windows PC as the host. It also supports older models from the Thermo plus EVO series onward. The analysis software is license-free, allowing analysis work anywhere. The interface combines operability and multifunctionality to enhance user convenience.
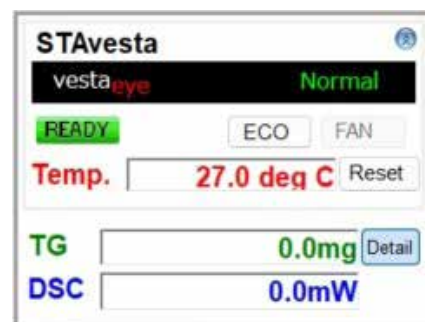
Features

Excellent Compatibility

Even measurement data from other companies' thermal analysis instruments can be analyzed with Vullios analysis software by converting it to CSV format. Furthermore, data measured with Vullios can be exported as CSV files.

ECO Mode

ECO mode can be selected at the end of measurement or during standby, reducing power consumption in standby mode. This especially beneficial for STA and TMA, as they can quickly transition from standby to a stable measurement state.

Compliance with ER/ES Regulations

Vullios SureDI (Data Integrity Support) is a system for manufacturers of pharmaceuticals, bioproducts, and medical devices to securely manage electronic records (ER) and electronic signatures (ES). The system includes security features necessary for regulatory compliance and can be used as a system compliant with regulatory requirements such as 21 CFR Part 11. Vullios SureDI provides robust access control, authority management, operation log recording, and audit trail management. This ensures data integrity and compliance with electronic records and electronic signatures.

Display Designed for Readability

Shortcut Launcher Allowing Selection from a List

Thermal analysis software is managed by a launcher, allowing visual selection from a list.
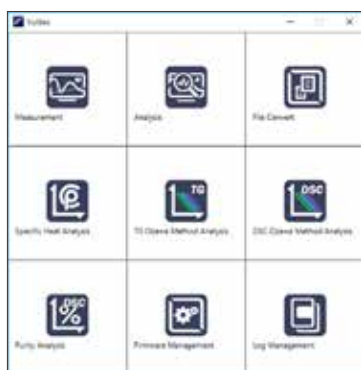
Enhanced Multiple Display Function

Vullios eliminates the concept of primary data and treats all data equally. When saving multiple display files, they are saved with new names.

Easy-to-See Icons and User-Friendly Ribbon

The color of the bands in the measurement / analysis windows can be changed for easy identification. The menu style is familiar to Windows users, making it even easier to use. Icons use globally recognizable pictograms.

Simple Screen Operations

You can easily zoom in and out using the mouse scroll.
- Zoom the selected curve in/out.
- If the cursor is inside the graph, both axes are zoomed together.
- If the cursor is on an axis, only the selected axis is zoomed.

Safety and Security Support

Reliable Measurement Data Backup

Even if a communication error occurs between the PC and the instrument during measurement, the measurement continues to the end and the data is saved in the instrument. The saved data can be retrieved after measurement, protecting valuable measurement data.

First Aid Function

When a problem or error occurs on the instrument, the error number, details, and first aid measures are displayed, enabling quick recovery. Error details are also logged, allowing for status monitoring and rapid response.
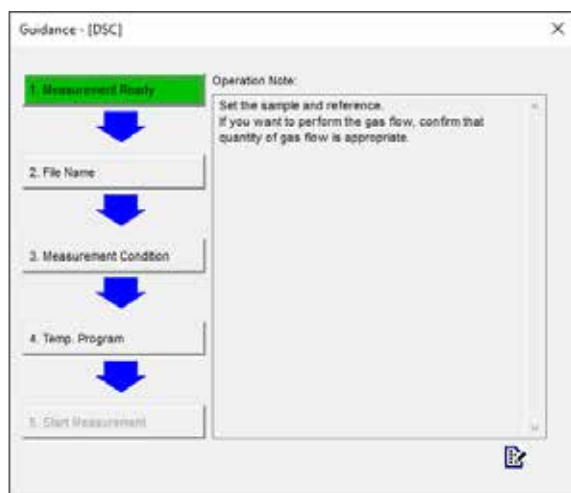
Measurement

One-Screen Management of Measurement Methods

Measurement file name, measurement conditions, temperature program, and sample observation conditions can all be set from a single screen, improving operability. "Measurement conditions" and "temperature program" can be saved individually or as a set as a measurement method.

Guidance Function

The measurement procedure is provided step by step. By recording the surrounding conditions that must be checked during measurement, careless mistakes are prevented. For example, if an aluminum sample pan is specified in the measurement conditions and a measurement above 500°C is set in the temperature program, a warning message is displayed to prevent melting the sample pan.

Gas Purge Time Setting Function

By setting the gas purge time, measurement will automatically start after the purge time has elapsed. There is no need to return to the instrument at the end of the purge.


Automatic Input (Barcode) Function (Optional)

By reading the pre-registered measurement conditions and temperature program settings with a barcode, they can be automatically entered into the measurement software. This avoids human error from manual input.

Up to 1000 Measurements with ASC (Automatic sample changer)

By using the continuous measurement setting of the ASC in the program screen, downtime for exchanging references and samples can be reduced. ASC allows up to 1000 measurements. Measurement order of samples on the tray can be freely specified.

* By upgrading from Tp EVO2 software to Vullios, it is possible to support previously delivered products (for a fee).
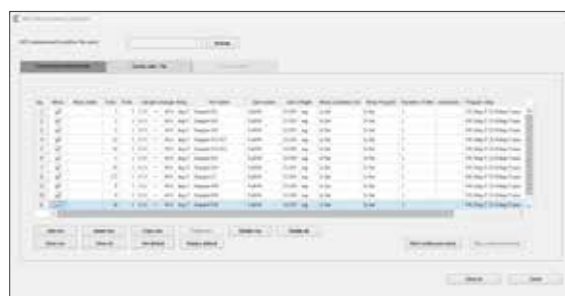
Analysis

License-Free

The analysis software is license-free. It can be installed not only on the control PC but also on each user's PC, allowing analysis of measurement results anywhere.

Automatic Analysis

By creating automatic analysis condition files for calibration and analysis items and ranges in combination with ASC, automatic execution at the end of measurement and batch automatic analysis of multiple measurement data can be performed. For quality control and other applications involving routine, standardized analysis procedures, this eliminates the need for calibration and analysis operations with each measurement.

Mass Loss Rate Analysis Table

It is possible to create a table that calculates the transition of mass loss rate at fixed intervals with respect to time and temperature.

Data Management

File Save Path Can Be Changed

The file save destination can be specified for each measurement. This is very convenient when multiple people use one instrument, as measurement data can be separated by user.

Management and Maintenance by Instrument Usage History List

Usage history such as date/time, usage time, model name, username, temperature program, and measurement result file name is automatically created in Excel. This clarifies usage and makes management and maintenance easier.

Instrument Call Function

When you click "Instrument Identification" in the software, the display panel of the selected instrument blinks to indicate the corresponding instrument. This is convenient when multiple identical instruments are connected, as you can check the measurement screen and the instrument.

Email Notification Function

By connecting the control PC to the network, you can receive email notifications. Multiple email addresses can be set, and notification events can be set for each measurement unit.

	A	B	C	D	E
1	Date	Time	Equipment	Operater	Folder
2	2024/7/4	14:27:58	STA	sato	D:¥2024¥1301
3	2024/7/4	13:45:24	STA	tanaka	D:¥2024¥1301
4	2024/7/4	12:21:24	STA	tanaka	D:¥2024¥1301
5	2024/7/4	11:34:10	TMA	suzuki	D:¥2024¥1301
6	2024/7/4	10:52:34	STA	endo	D:¥2024¥1301
7	2024/7/4	10:03:44	STA	endo	D:¥2024¥1301
8	2024/7/3	17:29:06	DSC	hayashi	D:¥2024¥1301
9	2024/7/3	16:54:43	DSC	hayashi	D:¥2024¥1301
10	2024/7/3	16:35:55	DSC	hayashi	D:¥2024¥1301

Optional Software

Temperature Modulation DSC Method
Dynamic DSC

This is a method in which a sinusoidal temperature modulation is superimposed on conventional linear heating, enabling separation of overlapping reactions and easy determination of specific heat capacity.

Separation Observation Possible

Even if enthalpy relaxation, glass transition, and recrystallization overlap, they can be separated.

Modulation Period: 5 Seconds or More

Supports periods from 5 seconds! Frequency-resolved analysis and other analyses can be performed with even higher accuracy (maximum period: 200 seconds).

Upgradable

Upgrades are available for your DSCvesta2, DSCvesta, and DSC8231.

Easy Specific Heat Capacity Measurement

Specific heat capacity can be measured more easily than with conventional DSC measurements.

Easy-to-read Data

By utilizing the Non-reversible DSC zero sift function, the analyzed data can be easily visualized and separated.

Dynamic DSC Measurement Example

Sample: Pharmaceutical; Heating rate: 3° C/min; Period: 36 sec; Amplitude: 0.43° C
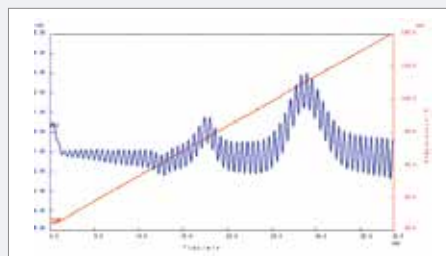
Dynamic DSC Measurement Result
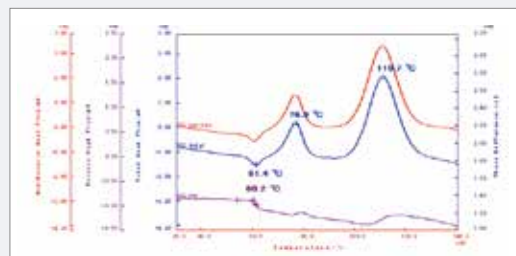
Analysis

Dynamic DSC Analysis Result

Dynamic DSC measures with a sinusoidal temperature amplitude in addition to the constant heating/cooling rate.
By separating the measurement results (left figure) into the average for one cycle (DSC total), the component that follows the sine wave (DSC rev.), and the component that does not follow it (DSC non-rev.), three DSC curves are obtained. At this time, DSC total corresponds to the constant rate heating result, DSC rev. shows the reversible component, and DSC non-rev. shows the non-reversible component. In the analyzed result (right figure), DSC total shows an endothermic peak at 61° C and exothermic peaks at 77° C and 110° C, with no glass transition observed, but DSC rev. shows a shift due to glass transition at 60° C. Since glass transition is a change in specific heat capacity, it appears in the reversible component, DSC rev. In this way, by performing dynamic DSC measurement, it is possible to separate and confirm the glass transition when it overlaps with non-reversible reactions such as enthalpy relaxation or crystallization in constant heating rate measurements.

Specific Heat Capacity Analysis by Dynamic DSC
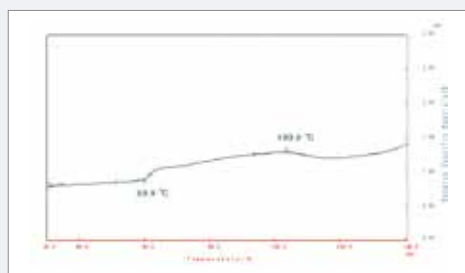
Dynamic DSC Specific Heat Capacity Plot (Cp rev.)
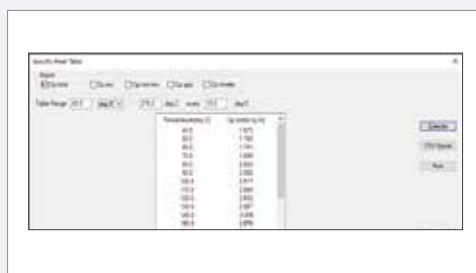
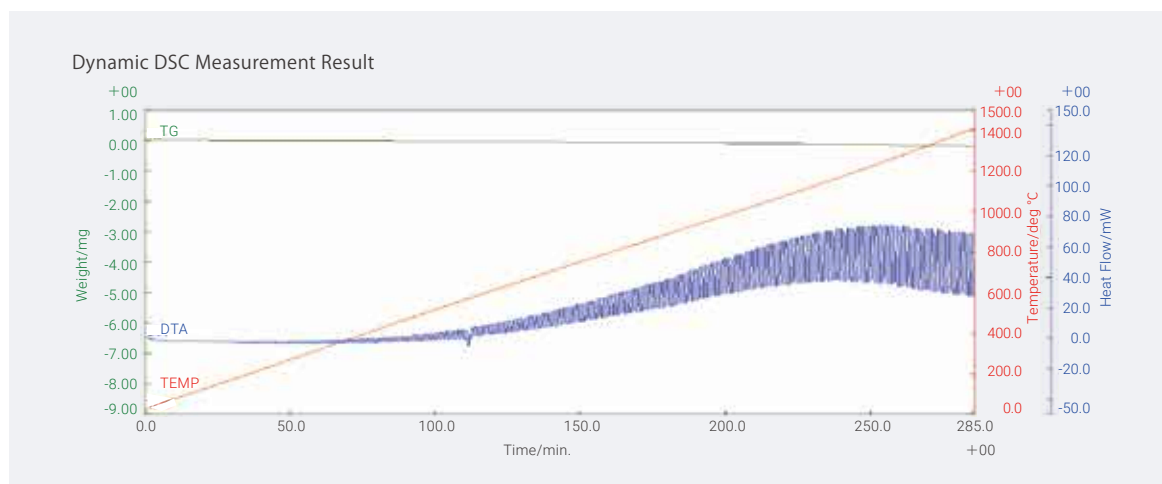Dynamic DSC Specific Heat Capacity Analysis Table (Cp rev.)

In Dynamic DSC, the specific heat capacity of the sample can be calculated by analysis. By measuring a reference material such as sapphire (Al_2O_3) under the same conditions as the sample in advance and calibrating, the specific heat capacity of the sample is calculated from the DSC rev. result.

Temperature Modulation Measurement
Dynamic DSC (STA)

This is a method of measurement while controlling the temperature with a sine wave modulation superimposed on conventional constant rate heating. With this function, specific heat measurement up to 1500°C[*1] can be easily performed.

Dynamic DSC Measurement by TG-DSC

Sample: Silica (SiO_2) powder; Heating rate: 5° C/min; Period: 60 sec; Amplitude: 2° C

Dynamic DSC Measurement Result

Analysis

Quartz is stable as α-quartz at room temperature and pressure, but it is known to transform to β-quartz with temperature changes as follows:
α-quartz → 573° C → β-quartz
The dynamic DSC function of STA enables specific heat capacity (Cp) measurements over a wide temperature range that could not be measured with a dedicate DSC.


Dynamic DSC Analysis Result
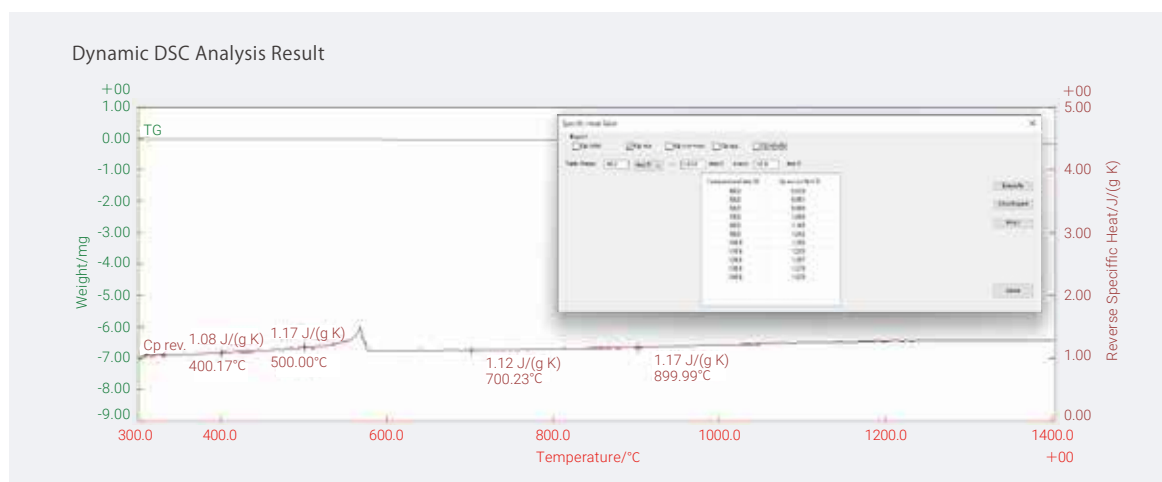
Heating/Cooling Rate	20℃ /min (max)
Temperature Amplitude	0.02℃ to 5℃(setting resolution：0.01℃)
Modulation Period	40 s[*2] to 200 s (setting resolution: 1 s)
Temperature Range	According to the specifications of the electric furnace

*1 The maximum temperature depends on the specifications of the electric furnace.
*2 The modulation period can be set from 5 seconds.

DSC Specific Heat Capacity Analysis Software

From the results of measuring the sample pan, standard sample, and measurement sample under the same temperature program, the specific heat capacity of the measurement sample can be calculated using specific heat calculations.
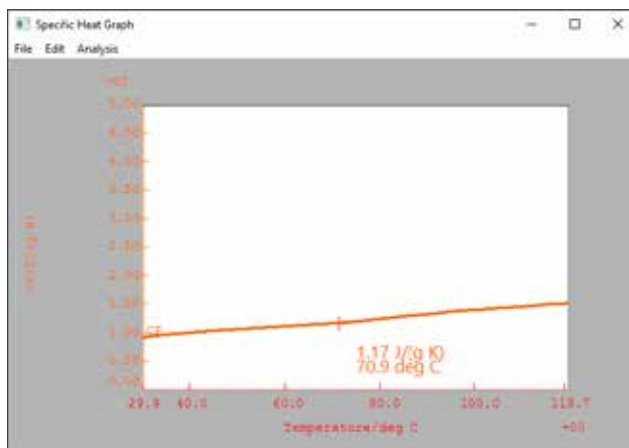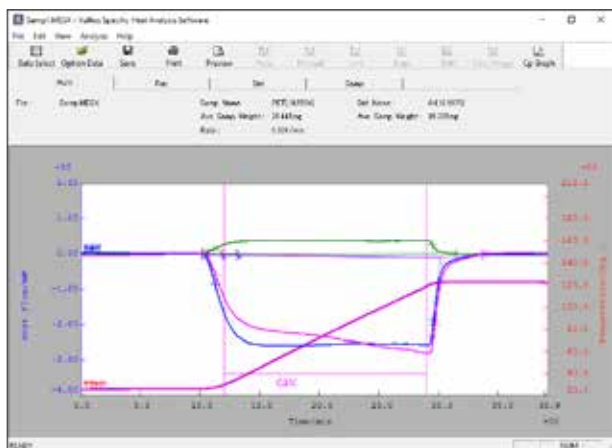

DSC Purity Analysis Software

DSC purity analysis is performed using analyzed files of standard samples and unknown samples that have undergone energy analysis.
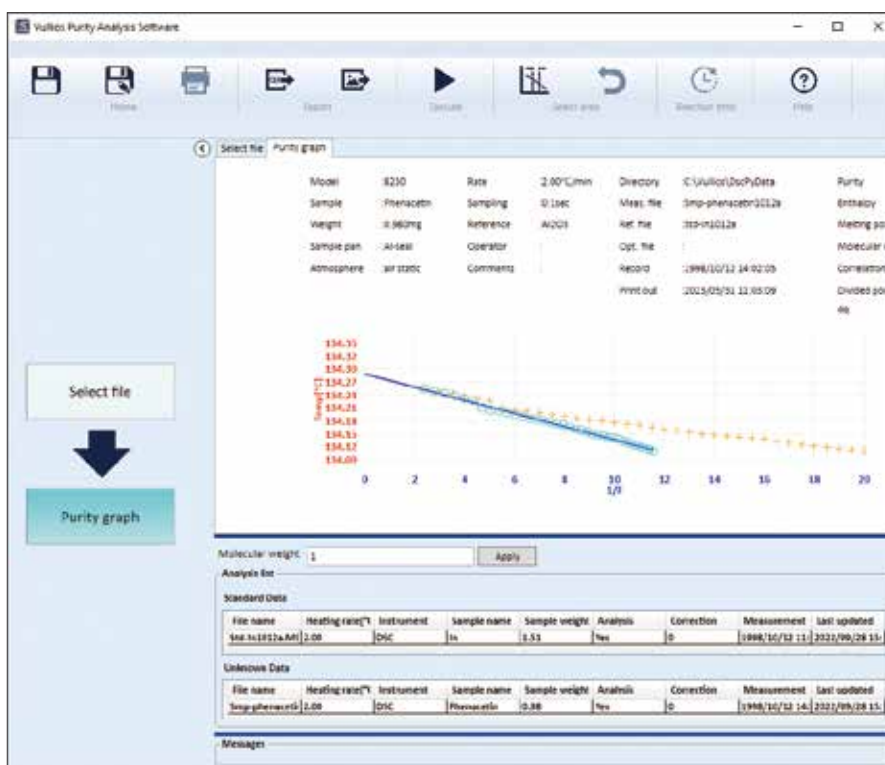
DSC Ozawa Method / TG Ozawa Method Analysis Software

With simple operations, you can calculate the activation energy of a reaction and estimate the predicted reaction time (sample lifetime) to reach a specific reaction rate at any temperature.
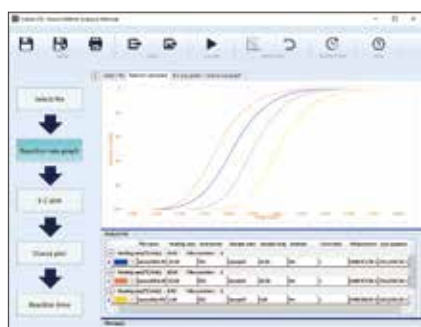
Sample Observation Software
(included in the sample observation unit)

By performing sample observation measurements with STA or DSC, changes in the sample during thermal analysis measurement can be observed in real time. During analysis, you can consider both the analysis results and sample images, gaining new insights.

- Real-time display of sample images during measurement
- Thumbnail display of selected points of the graph
- Slideshow of sample images while displaying measurement data as a graph
- Digital zoom function for observation images

- Sample length measurement function
- RGB display
- Side-by-side display of sample images
- Camera property setting function
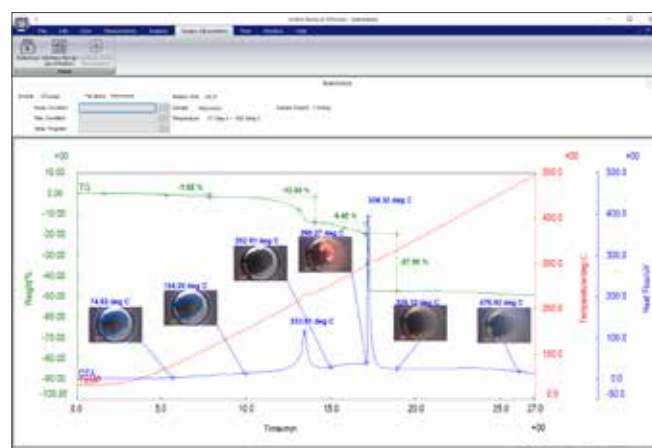
# 3D Display and Analysis Software for TG-MS

Since the matrix data obtained by ThermoMass Photo and STA/GC-MS are displayed in an easy-to-read 3D format, making it easy to understand the behavior of the evolved gases.
Selection and extraction of 2D data are also possible, providing powerful support for the analysis of complex measurement data.
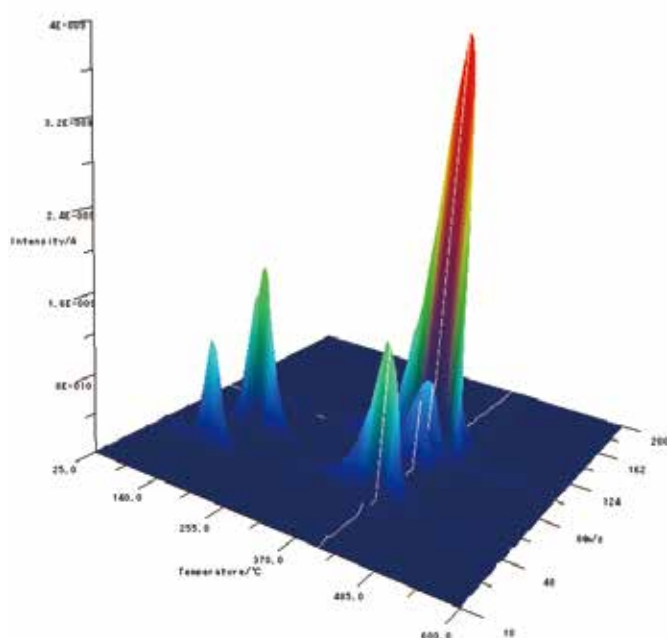
Multiple Display of Thermal Analysis Data and MS Data

Mass spectra and temperature profiles (MS ion thermograms) of any temperatures and mass numbers can be extracted from the main 3D graph window. Extracted MS ion thermograms can be displayed together with thermal analysis data on the SIM multi-graph screen.
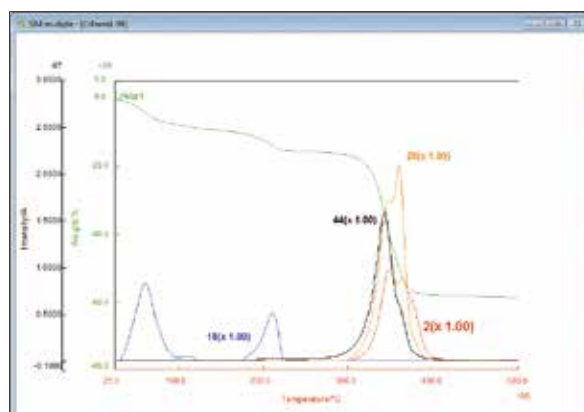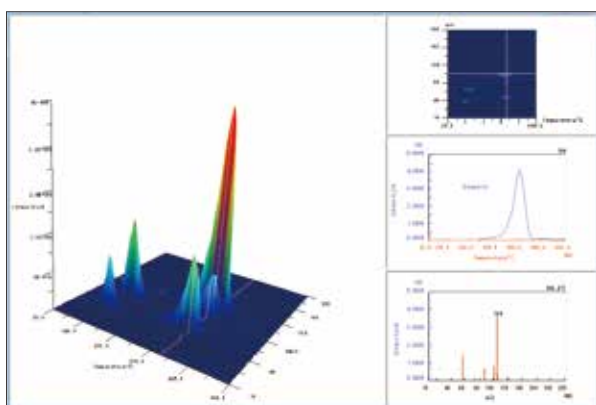

Degassing Behavior Observable at a Glance

The 3D matrix data display can be freely manipulated from any angle (360° rotation), allowing degassing behavior to be observed over a wide temperature range at a glance.

Mass Spectrum Search by Library

Mass spectra selected at any temperature can be qualitatively analyzed via direct linkage with the NIST-MS library search software (optional).
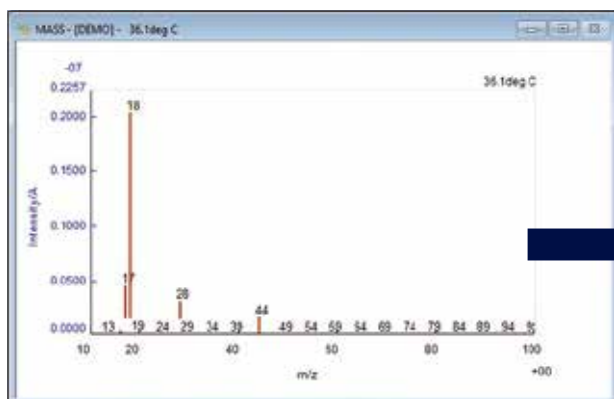
Snapshot Function

Mass spectra and MS ion thermograms selected or extracted at any mass number or temperature can be stored and managed as bitmap images. Clicking on an image allows it to be redrawn, ensuring that no target data is missed in analysis.

Thermogram - [CaCuAC-6H2O] - 18   MASS - [CaCuAC-6H2O] - 34.8deg C   Thermogram - [CaCuAC-6H2O] - 28
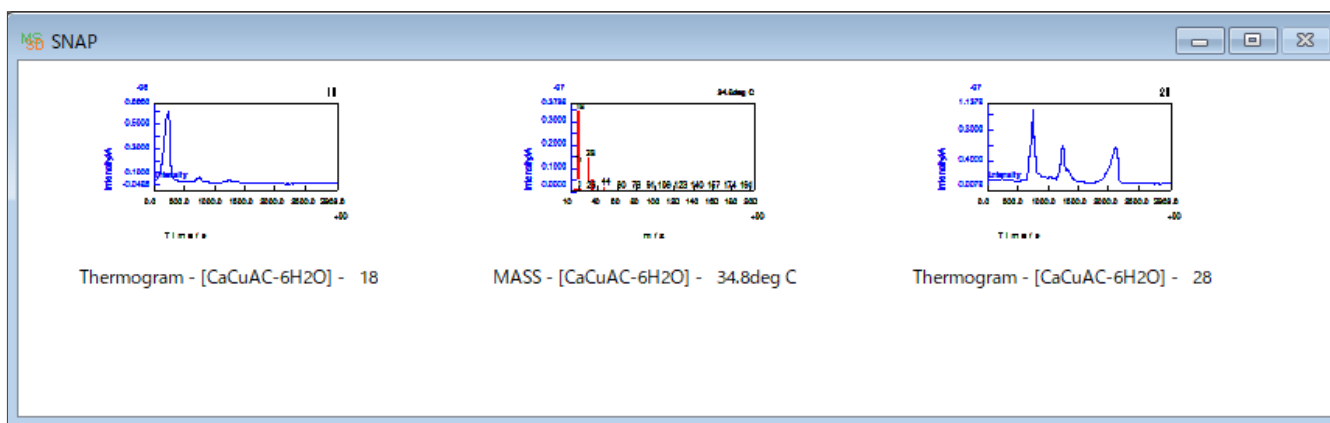
Easy Operation with Mouse

With mouse cursor operation, you can select and extract 2D data such as mass spectra at any temperature or ion chromatograms at any mass number.

Measurement / Analysis Software
for Thermal Analysis and Evolved Gas Analysis Instruments

BTTASW0_ENGLA1

Specifications and appearance are subject to change without notice.