

Thermo plus EVO2 Differential Scanning Calorimeter DSCvesta



1. Introduction

Thermal analysis instruments are used in a variety of fields of specialization, such as in new materials development, product evaluation, or quality control where the reaction temperature or reaction energy derived from the melting of a material can be measured easily. Differential Scanning Calorimeter (DSC) is an analytical tool that detects the change in thermal energy generated in a sample during the heating or cooling process.

Thermo plus EVO2 DSCvesta is equipped with an advanced furnace and is the leading DSC instrument with regard to measurement temperature range. Compared to the conventional model, the sensitivity and measurement range have significantly improved.

The furnace adopts the innovative Δ (Delta) block structure, while low power consumption contributes to cooling and heating efficiency.

Moreover, expandability is improved through the availability of cooling attachments and attachments for complex measurements. The instrument can obtain a broad range of data in phenomena difficult to determine using the conventional model, and is extensively used for the analysis of materials in various fields.

2. Features

2.1. High-performance temperature control

An advanced control function is installed as standard, which prevents the occurrence of temperature overshoot or undershoot when holding at a constant temperature. Also, combining the DSC with an optional LN2 auto-filling cooling unit allows continuous heating and cooling measurements from -170°C to 725°C .

2.2. Improved dynamic range

The dynamic range has significantly improved thanks

to a new amp model. From a conventional range of ± 100 mW to a dynamic range of ± 400 mW, it is capable of fully responding to peaks with sharp and increased peak heights, such as those found during crystallization without saturation.

2.3. Automatic sample changer

Thermo plus EVO2 DSCvesta can be connected to an automatic sample changer that allows continuous measurement of up to 24 samples.



Fig. 1. DSCvesta Smart loader.

2.4. Multifunctional software

The software controlling the hardware manages functions such as turning the cooling fan off and on, and ECO mode; and enables temperature programs coupled with gas switching. The new analysis software has three new functions: noise reduction, baseline correction and peak enhancement. It also includes various functions

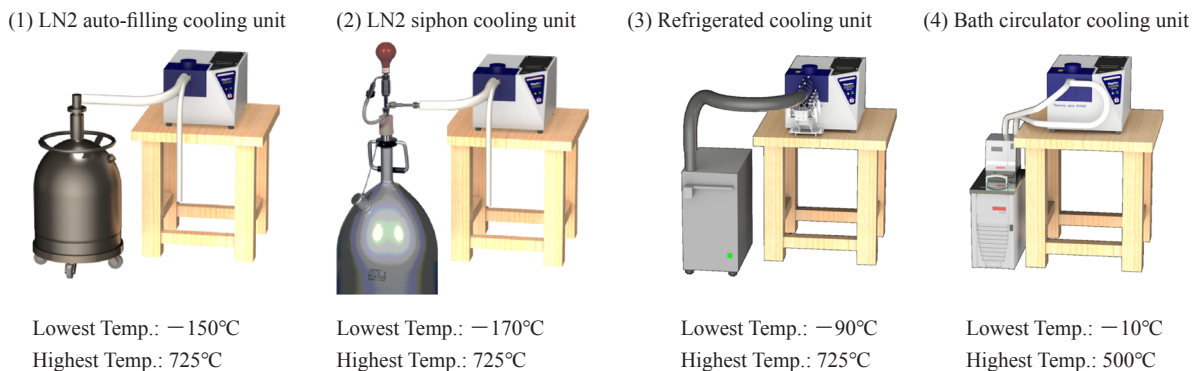


Fig. 2. Different types of cooling units.

such as automatic peak top analysis, glass-transition temperature analysis, enthalpy calculation and easy-to-use multiple displays of measurement data. Also, pasting the data into Microsoft Word or Excel is possible for convenient data analysis and report writing.

2.5. Wide temperature range

Four different types of cooling units can be selected, depending on the lowest target temperature and temperature control performance. Also, the instrument's structural design allows easy attachment/removal of the cooling unit that suits your measurement objective.

2.6. Improved safety

A safety cover secures the Smart loader and furnace to guarantee safety during operation. The cover is locked during measurement, when the furnace temperature is high, and during on-going Smart loader operation to ensure the safety of the user.

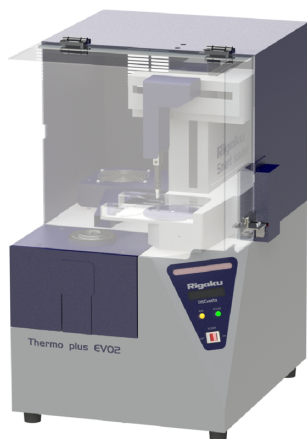


Fig. 3. DSCvesta Smart loader with safety cover.

3. Measurement Results

Here, we show the results of measurement of an uncured silicone resin. Through improvements to the cooling rate, the result shows that the temperature has reached the glass transition temperature without the occurrence of crystallization during the cooling process. During the heating process, we can observe the glass transition, crystallization and melting, confirming the thermal behavior of an amorphous material.

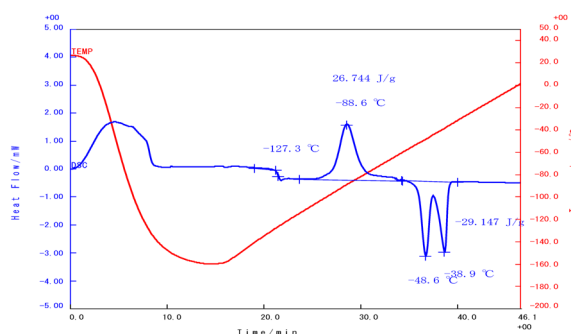


Fig. 4. Measurement of silicone resin.

4. Conclusion

In DSCvesta, the measurement temperature range has increased significantly compared to the conventional model, allowing measurement over a wider temperature range. In particular, with the refrigerated cooling unit, it can measure continuously from -90°C to 725°C . This enables the measurement of numerous materials with a single refrigerated cooling unit.