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# Touch Screen Differential Scanning Calorimeter User Manual

# HM-Q8

## Product instruction

The differential scanning calorimeter is a touch screen type and can perform glass transition temperature test, phase transition test, melting and thermal enthalpy value test, thermal stability test, and oxidation induction period test.

## Complies with the following standards

Determination of glass transition temperature
Determination of melting and crystallization temperature and thermal enthalpy Determination of oxidation induction time and oxidation induction temperature

## Technical parameters

1. Temperature range: room temperature ~ 500°C
2. Temperature resolution: 0.01°C
3. Temperature fluctuation: ±0.1°C
4. Temperature repeatability: ±0.1°C
5. Heating rate: 0. 1~100°C/min
6. Constant temperature time: recommended <24h
7. Temperature control method: heating, constant temperature (fully automatic program control)
8. DSC range: 0~ ±600mW
9. DSC resolution: 0.01mW
10. DSC sensitivity: 0.01mW
11. Power supply: AC 220V/50Hz or customized

12. Atmosphere control gas: nitrogen, oxygen (automatic switching of the instrument)
13. Gas flow rate: 0~300mL/min
14. Gas pressure: 0. 2MPa
15. DSC sensitivity: 0.01mW
16. Power supply: AC 220V/50Hz or customized
17. Atmosphere control gas: nitrogen, oxygen (automatic switching of the instrument)
18. Gas flow: 0~300mL/min
19. Gas pressure: 0. 2MPa
20. Display mode: 15-inch LCD touch screen display
21. Data interface: standard USB interface
22. Parameter standard: equipped with standard substances (indium, tin, zinc), users can calibrate the temperature by themselves

## Technical features

1. Industrial-grade 15-inch touch screen, completely free from the constraints of computers.
2. Electronic flow meter, more accurate flow recording.
3. Touch interface independent of display, more flexible.
4. Unique furnace sealing, can provide good experimental conditions.
5. Automatically switch two-way atmosphere flow, fast switching speed, short stabilization time. At the same time, add one protective gas input.
6. The software is simple and easy to operate.

## Standard configuration list

**No. Name Specification Quantity**

1. Differential scanning calorimeter HM-Q8 1 unit
2. Power cord 220v 1 unit
3. Aluminum crucible Φ6.7x4 100 units
4. Standard sample Indium, Tin 1 bag
5. PU tube Φ6*4 10 meters
6. PU tube adapter Φ12 to Φ6 quick plug 2 units
7. Wireless keyboard 1 unit
8. Wireless mouse 1 unit
9. Tweezers 12cm 1 unit
10. Fuse 10A 5 units
11. Certificate of conformity 1 unit
12. Instruction manual 1 unit

# Differential Scanning Calorimeter Q8
# Operating instructions

## Preparation before experiment

1. Connect oxygen and nitrogen to the corresponding gas pipe connector of the instrument. Adjust the pressure of oxygen and nitrogen to 0.3MPa.

2. Connect the data cable to the computer, and install the thermal analysis software in the computer.

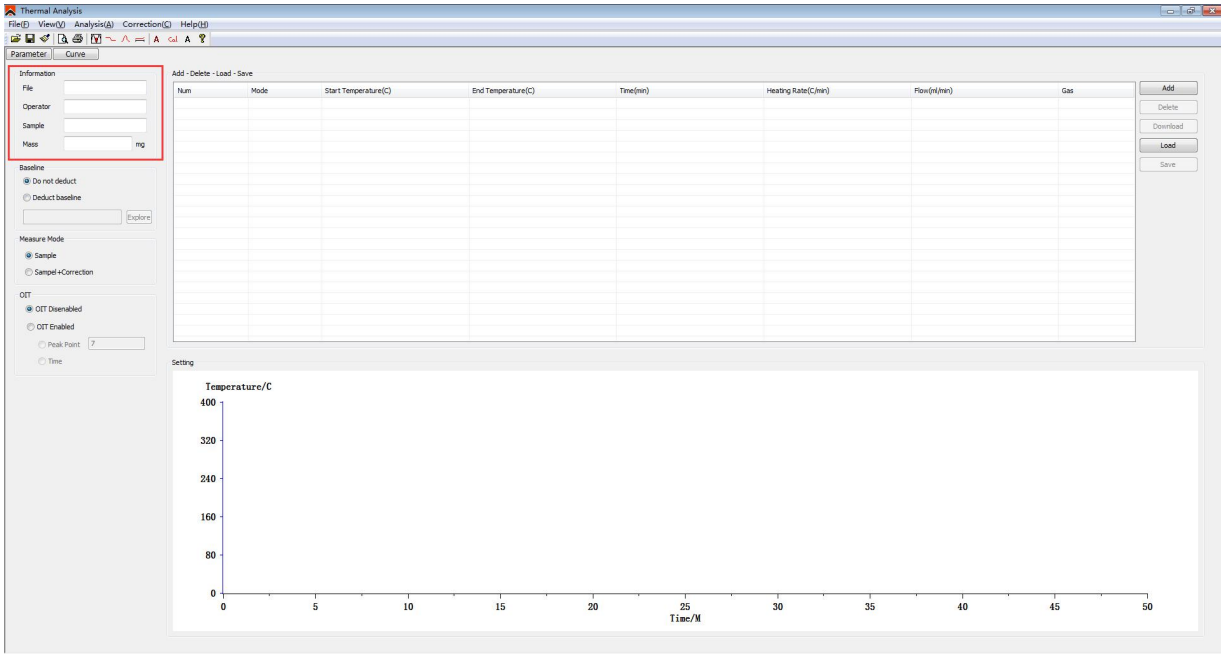
3. The power cord of the instrument is connected with the power supply of 220V50 Hz and grounded correctly.

4. Prepare the sample to be tested, select the correct crucible, and put the sample crucible and reference crucible into the tray of the instrument respectively.

# Thermal analysis software operation:

## 1. Double click【 UI.exe 】Open the thermal analysis software.

## 2. Enter【Thermal analysis software】




Fill in [experimental information], [temperature setting], [baseline deduction], [measurement mode], [OIT] in the [application parameters] column

(1) [experimental information]: file name, operator, sample name, sample weight.

(2) [temperature setting]: add temperature segment, delete temperature segment, Download setting, load temperature program and save temperature program

(3) [baseline deduction]: no deduction of baseline, deduction of list baseline.

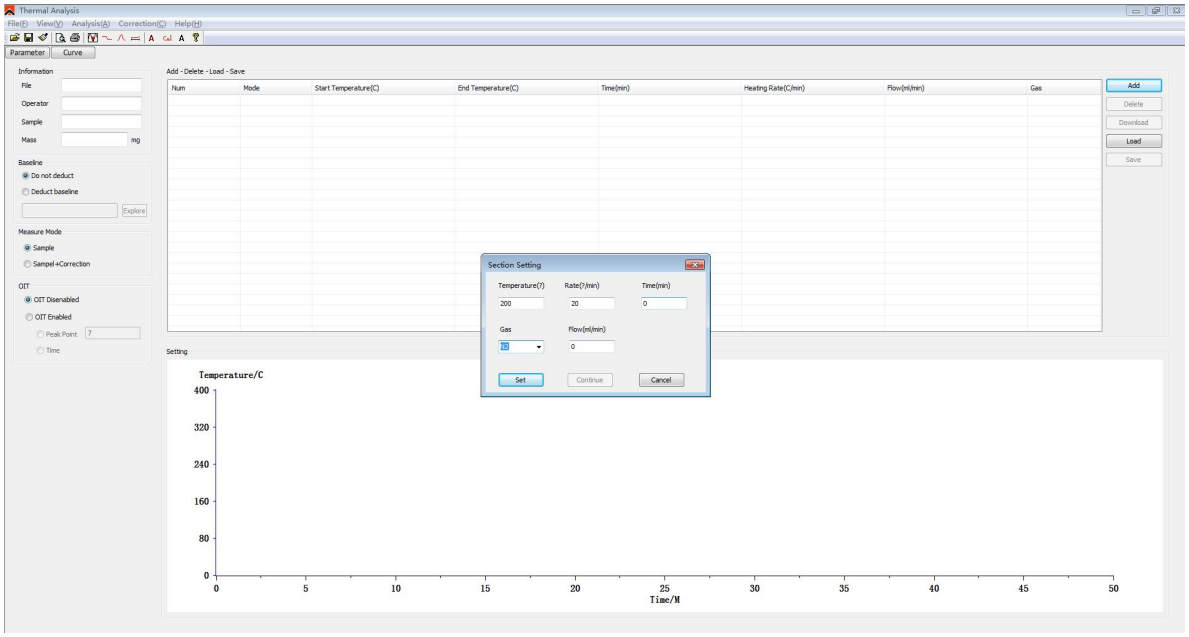
(4) [measurement mode]: sample, sample + calibration.

(5) [OIT]: non OIT mode, OIT mode.

## 3. [Temperature setting] Temperature program setting

(1) Delete the existing temperature program and click Delete temperature segment until all temperature segments are deleted.

(2) Set the temperature program you need and click [add temperature segment]




In the pop-up dialog box, fill in the [cut-off temperature], [scanning rate], [constant temperature time], [atmosphere], [flow rate] of the current section

**A. Take the oxidation induction period test as an example:**

Under the protection of nitrogen, the temperature is raised to 200 ℃ at a scanning rate of 20 ℃ per minute,

Then the temperature was kept for 5 minutes, and the oxygen was switched to determine the induction period of isothermal oxidation.

<1> The first stage [cut-off temperature] 200, [scanning rate] 20, [constant temperature time] 0, [atmosphere] N2[flow] 50. After the first paragraph is completed, click Settings > continue

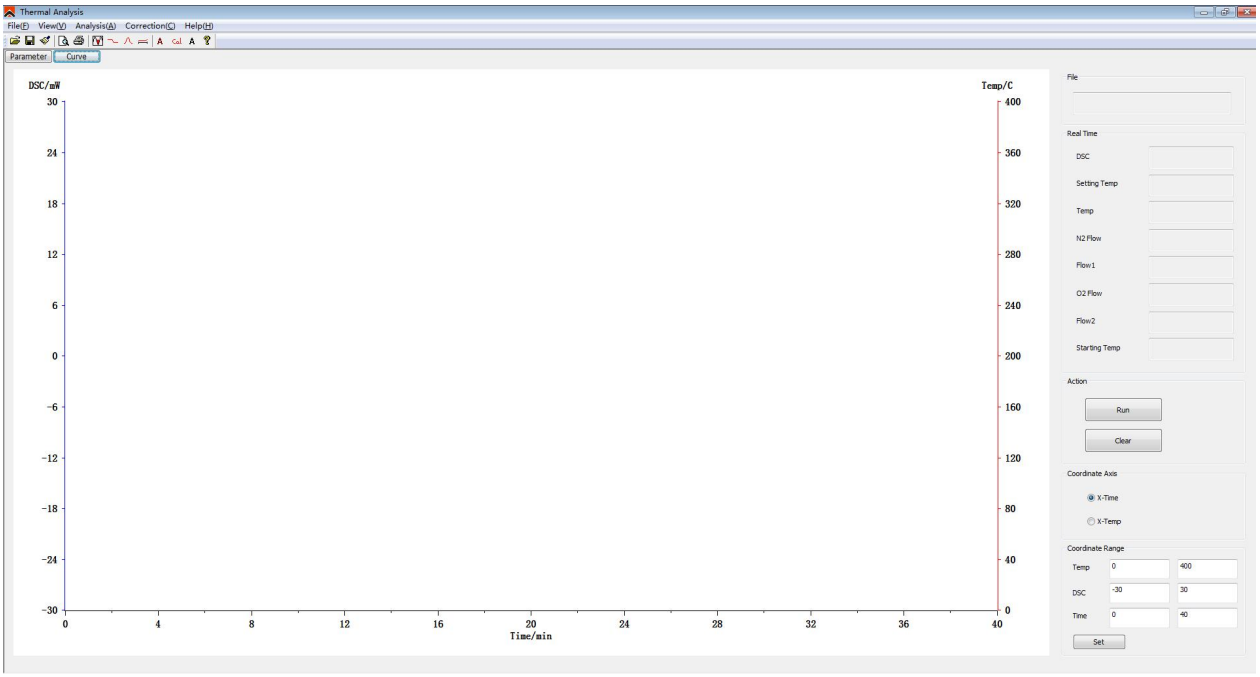
<2> The second stage [cut-off temperature] 200, [scanning rate] 0, [constant temperature
time] 5, [atmosphere] N2. After the second paragraph is completed, click Settings > continue

<3> The third stage [cut-off temperature] 200, [scanning rate] 0, [constant temperature time] 200, [atmosphere] O2. After filling in, click Settings > cancel

**B. Take the melting peak test as an example: (the melting point of indium is 156.7 ℃, and the cut-off temperature can be set at 50 ℃ after the melting peak.)**

<1> The first stage [cut-off temperature] 220, [scanning rate] 20, [constant temperature time] 0, [atmosphere] N2. Click "set" after the next program. You can also save the temperature program and click [save temperature program]; for experiments using the same heating program later, click [load temperature program].

**4. After setting the experimental information and temperature program, you can click [curve] to enter the curve drawing interface**




Click control > run, the instrument will beep, and the real-time information will be displayed on the right. Information (DSC, set temperature, actual temperature, nitrogen flow, actual flow, oxygen flow, actual flow, ambient temperature), at this time, the [run] button in the [control] column becomes the [stop] button display, if you want to stop the operation, click [stop].

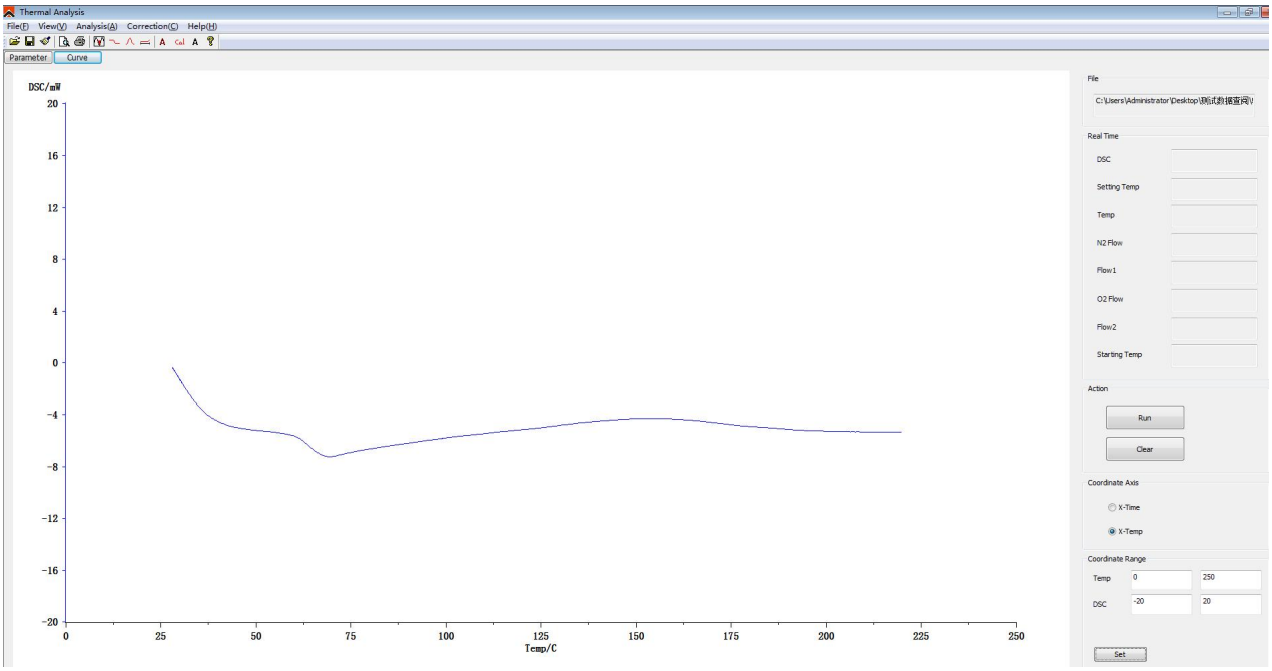
**5. [curve] interface, adjust [coordinate range]**

The temperature coordinate, DSC coordinate and time coordinate can be adjusted. After filling in, click [set]

**6. [curve] interface, switch [coordinate format]**

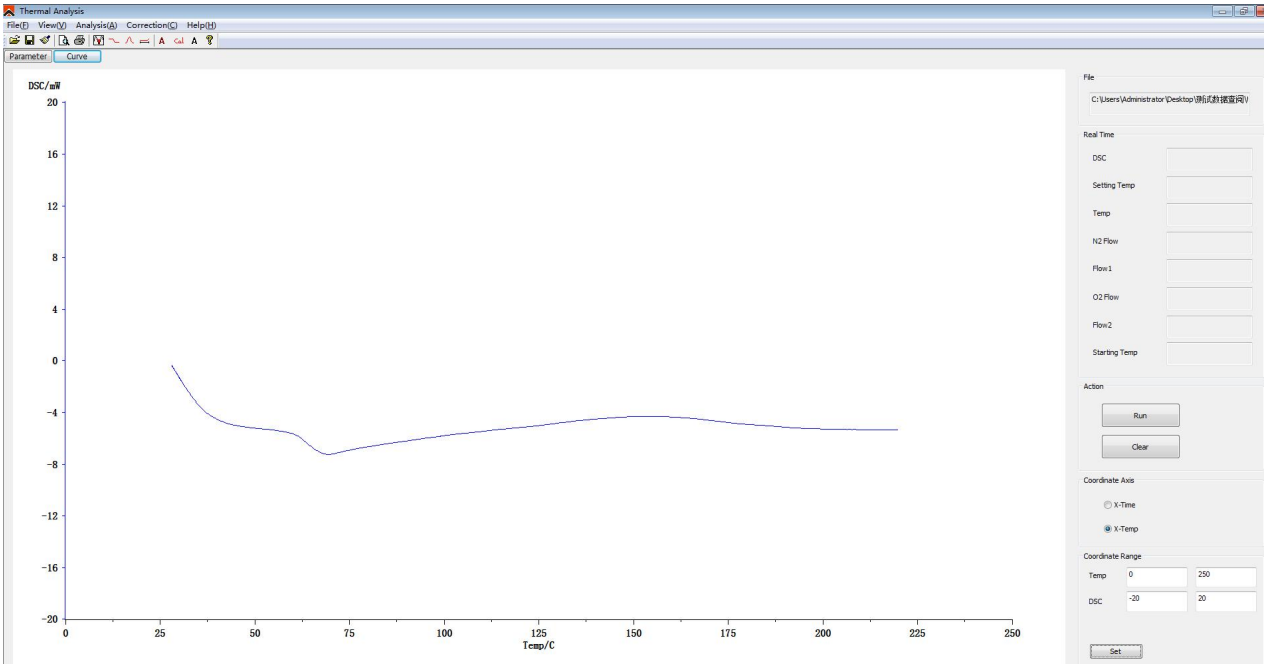
There are two coordinate formats: x-time and x-temp.

**7. Save and analyze the data**




**<1> At the end of the experiment, click File > save or shortcut key【 】**

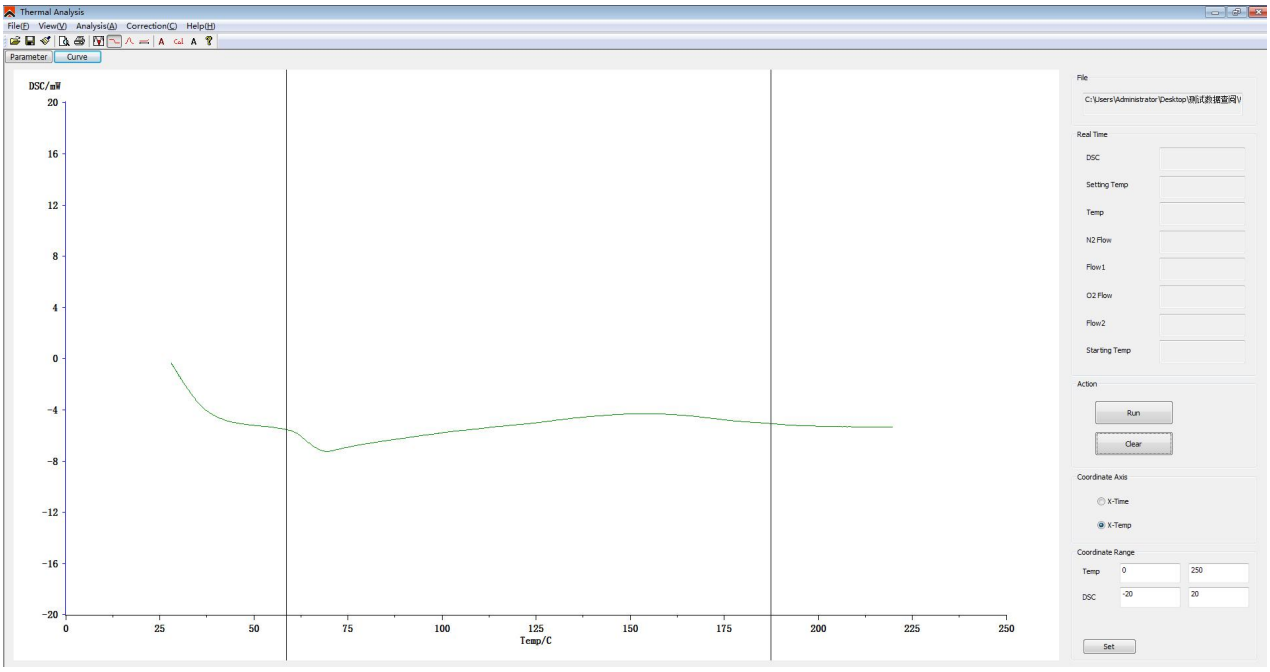
**<2> Open [file] - > [open] or shortcut key【 】**



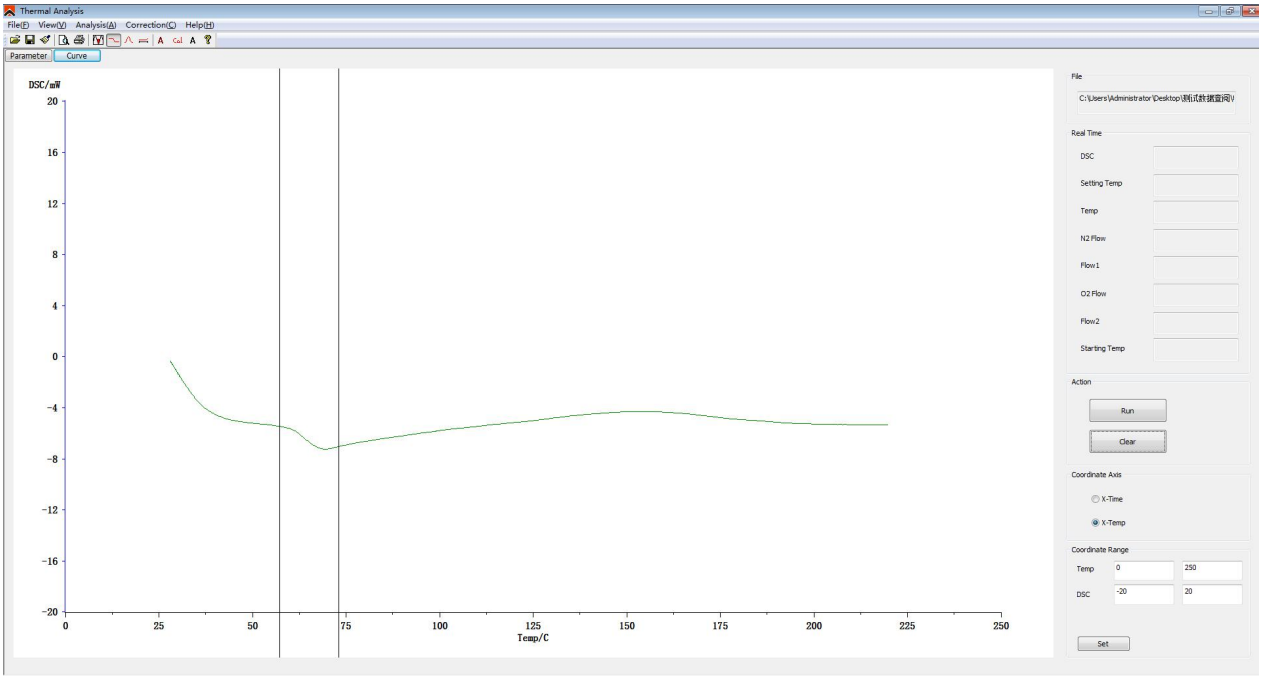

**<3> Curve analysis [glass transition temperature]**

a. Click the blue curve and the curve turns green to indicate the selected curve.

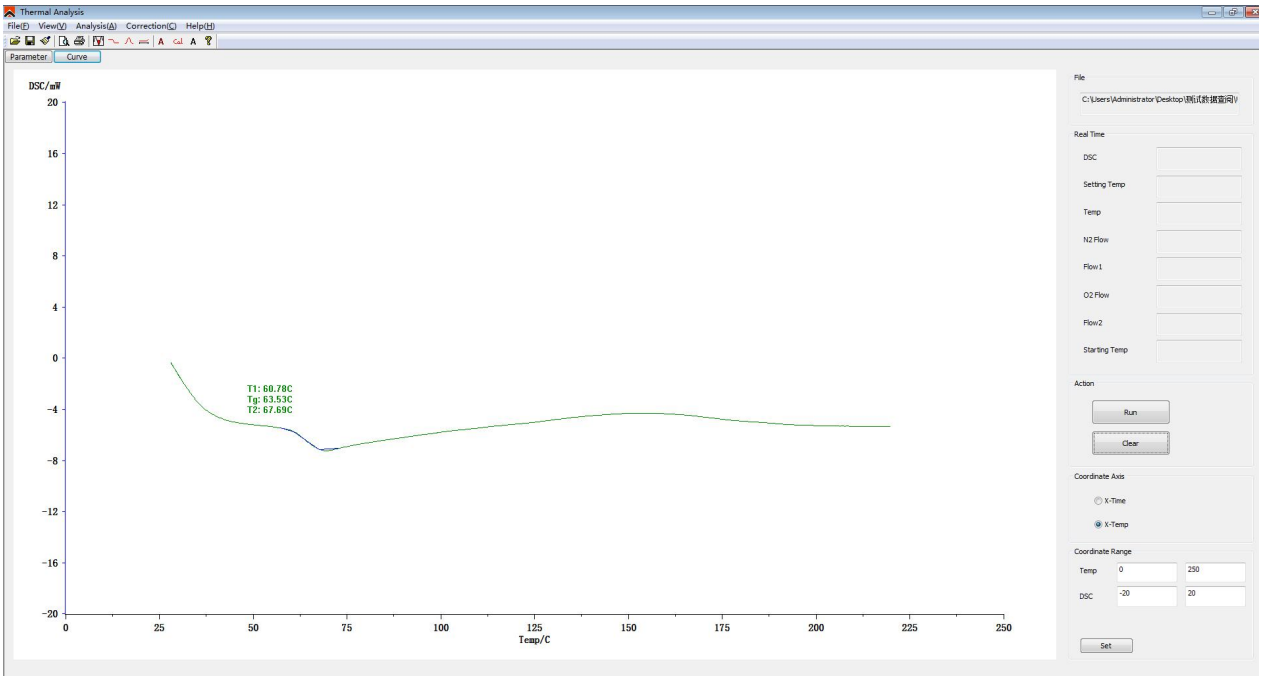
b. Click [analysis] - > [glass transition] or shortcut key【 】， Two black vertical lines will appear on the [curve] interface.




c. Drag 2 black vertical lines, the first vertical line is placed at the smoother place before the vitrification inflection point, and the second vertical line. It should be placed at a smooth place after the turning point of vitrification.




d. Click the shortcut key【Cal】Calculate the glass transition temperature and click again【Cal】The vertical line disappears



## <4> Curve analysis [oxidation induction period]

a. Click the black curve and the curve turns green to indicate the selected curve

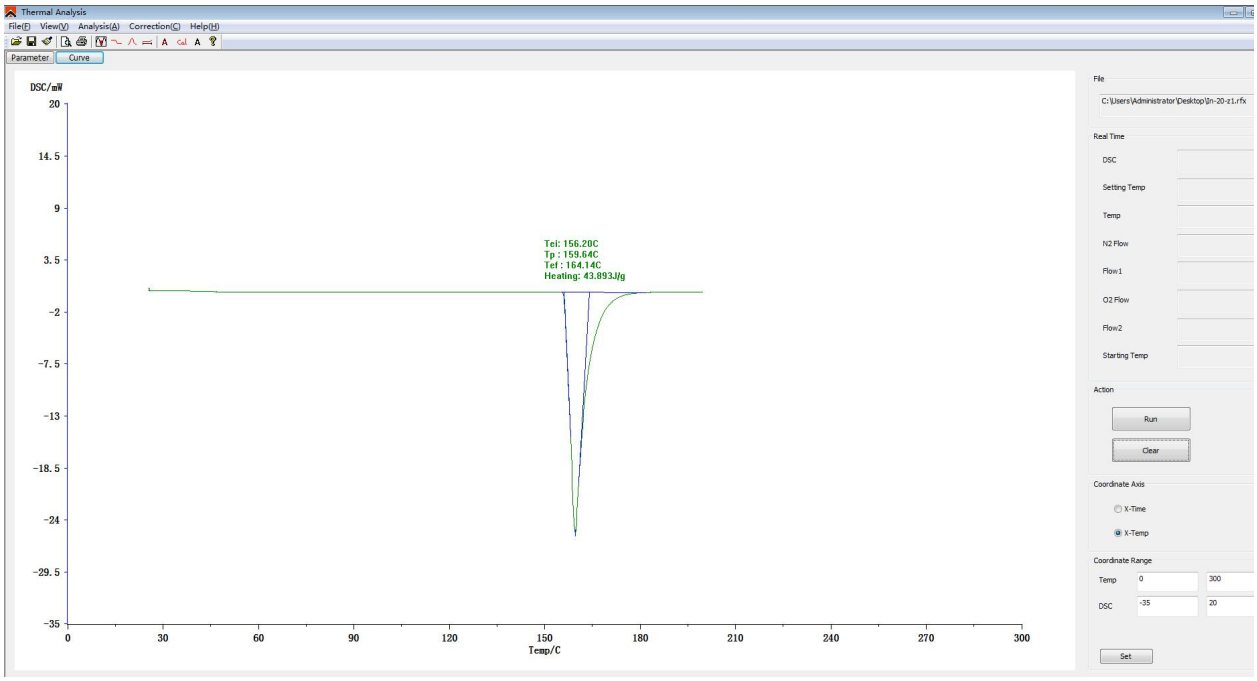
b. Click【 Analysis(A) 】-> 【 Oxidation(O) Induction Time 】, then Three black vertical lines will appear on the [Curve] interface .

c. Drag three black vertical lines, the first and second vertical lines are placed at the smoother place before oxidation, and the third vertical line is placed near the oxidation peak

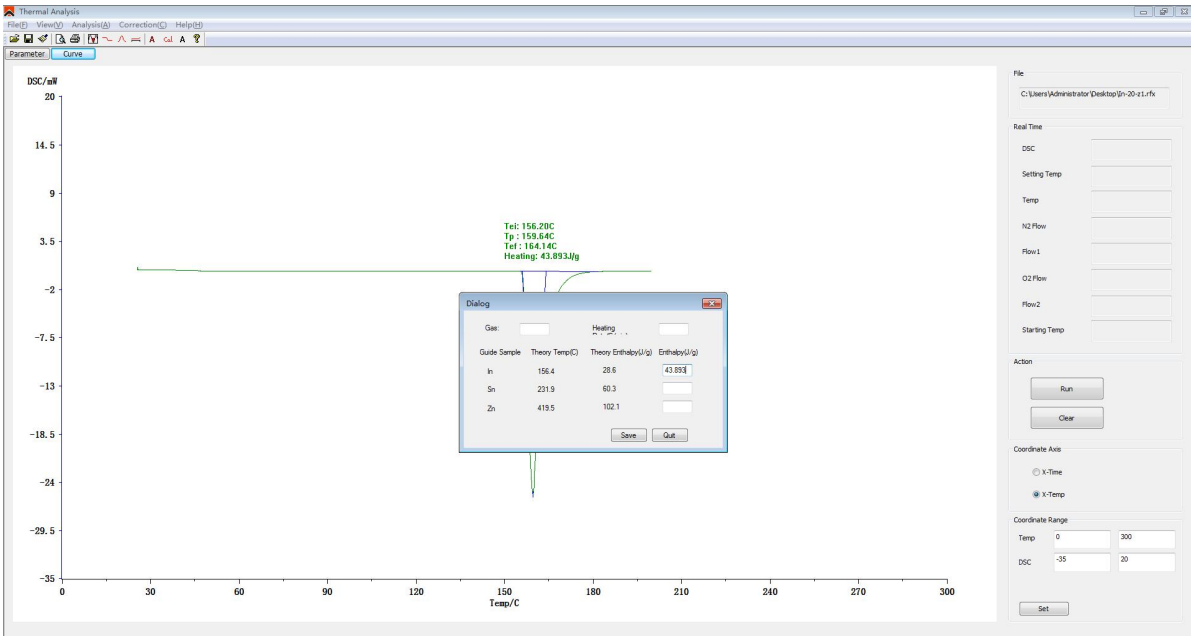
d. Click the shortcut key [ Cal ] to calculate the time of oxidation induction period, and then click the vertical line [ ]again to disappear

## 8. Calibration of temperature and enthalpy

**<1>** The melting point and enthalpy of the standard substance "indium" were measured. It can be seen from the above figure that the melting point of indium is correct,but the enthalpy deviation is very large.



<2> Click [Correction] - > [Sensitivity(S) Correction...]



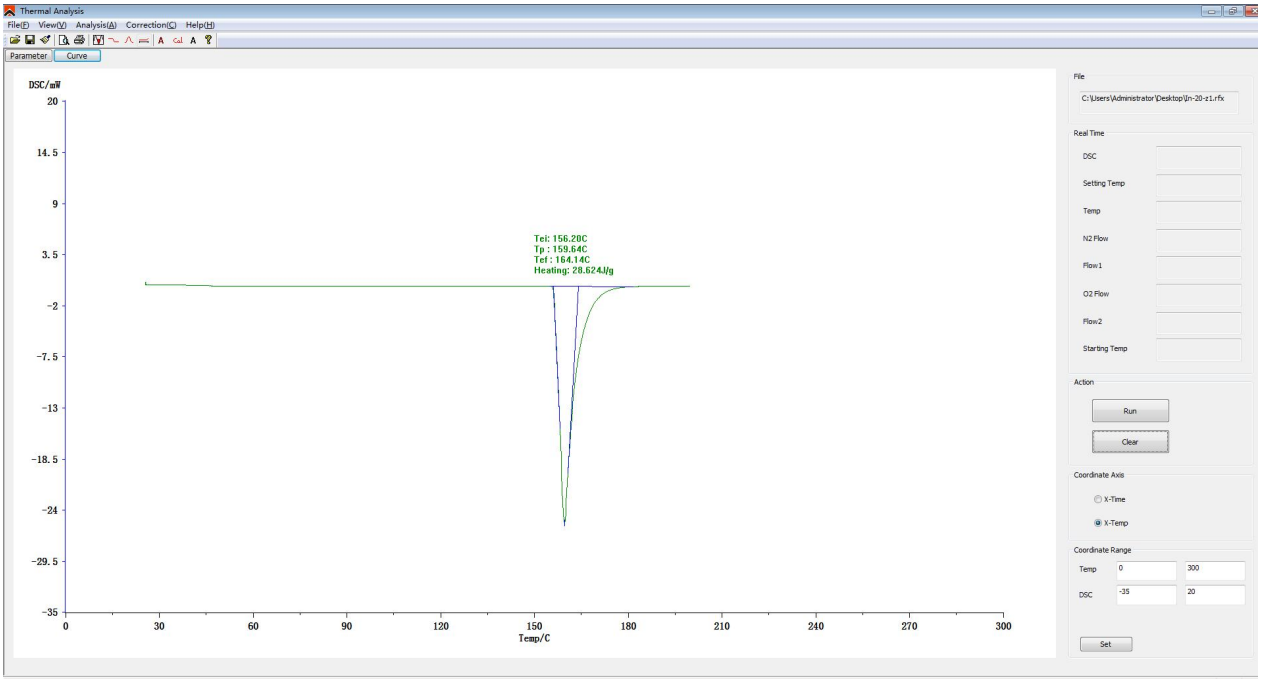

Fill in the actual enthalpy value just calculated in the [measured enthalpy value J / g] in the pop-up dialog box. Click save. Generate enthalpy correction file suffix [.Co]

**<3>** Calculate the enthalpy after correction, and click File- > [open sensitivity(S) Correction File] to open the Saved. Co calibration file.

**<4>** Open the sample curve we tested. Here we open the in test curve.

After opening the curve, click the curve itself to turn blue to green, and then click analysis - > [peak comprehensive analysis] or shortcut key【 】。

This shows that the enthalpy is 28.373j/g, which has been corrected. The mouse can drag the data display position



# HM-C Series

## HM-C1

## Product introduction

This differential scanning calorimeter is a touch screen type, mainly customized for the plastics industry, and can test the oxidation induction period of various plastics such as melt, block, granule, film, pipe, and casing.

## Compliant standards

Determination of melting and crystallization temperature and enthalpy (melting point test)

## HM-C2

## Product introduction

This differential scanning calorimeter is a touch screen type, mainly customized for the plastics industry, and can test the oxidation induction period of various plastics such as melt, block, granule, film, pipe, and casing.

## Compliance with standards

Determination of oxidation induction time and oxidation induction temperature

## HM-C3

## Product introduction

The full-function differential scanning calorimeter is a touch screen type that can perform glass transition temperature tests, phase transition tests, melting and thermal enthalpy tests, thermal stability tests, and oxidation induction period tests.

## Complies with the following standards

Determination of glass transition temperature
Determination of melting and crystallization temperature and thermal enthalpy
Determination of oxidation induction time and oxidation induction temperature

## HM-C1/C2/C3

## Technical parameters

1. Temperature range: room temperature ~ 500°C
2. Temperature resolution: 0. 01°C
3. Temperature fluctuation: ±0.1°C
4. Temperature repeatability: ±0.1°C
5. Heating rate: 0.1~ 100°C/min
6. Constant temperature time: recommended <24h
7. Temperature control method: heating, constant temperature (fully automatic program control)
8. DSC range: 0~600mW
9. DSC resolution: 0. 01mW

10. DSC sensitivity: 0.01mW
11. Working power supply: AC220V/50Hz or customized
12. Atmosphere control gas: nitrogen, oxygen (automatic switching of the instrument)
13. Gas flow: 0~300mL/min
14. Gas pressure: 0. 2MPa
15. Display mode: 8-inch LCD touch screen display, ultra-hardness instrument mask design

## Technical features

1. Industrial-grade 8-inch touch screen, perfect combination of instrument face frame and touch screen.
2. The sensor is tightly integrated with the furnace body, making the baseline more stable, and the sensitivity and resolution greatly improved.
3. USB communication interface, strong versatility, reliable and uninterrupted communication, and supports self-recovery connection function.
4. Digital flow meter, more precise airflow control.
5. Automatically switch between two-way atmosphere flow, fast switching speed, short stabilization time. At the same time, add one protective gas input.
6. The software is simple and easy to operate.