
Differential Scanning Calorimeter

Model: DSC-100

Summary:

- The **Differential Scanning Calorimeter DSC** refers to in the temperature control program and a certain atmosphere, measuring the temperature difference between the sample and the reference material is proportional to the rate of heat flow through the thermal plate instrument.
- the relevant differential scanning calorimeter technical specifications can be found in the National Metrology regulations (JJG936-1998).
- DSC have two main types: the power compensation and heat flux.
- Our DSC is heat flow differential scanning calorimeter.
- DSC is widely used in the field of polymer development, performance testing & quality control.

➢ The Detectable Material's Characteristics of DSC.

Oxidation induction time (OIT)	**Glass transition (Tg)**
Melt	**Crystal**
Thermal Stability	**Curing / Crosslinking**
Cold Crystal	**Phase Transition**

✧ The Typical Test Curve of DSC

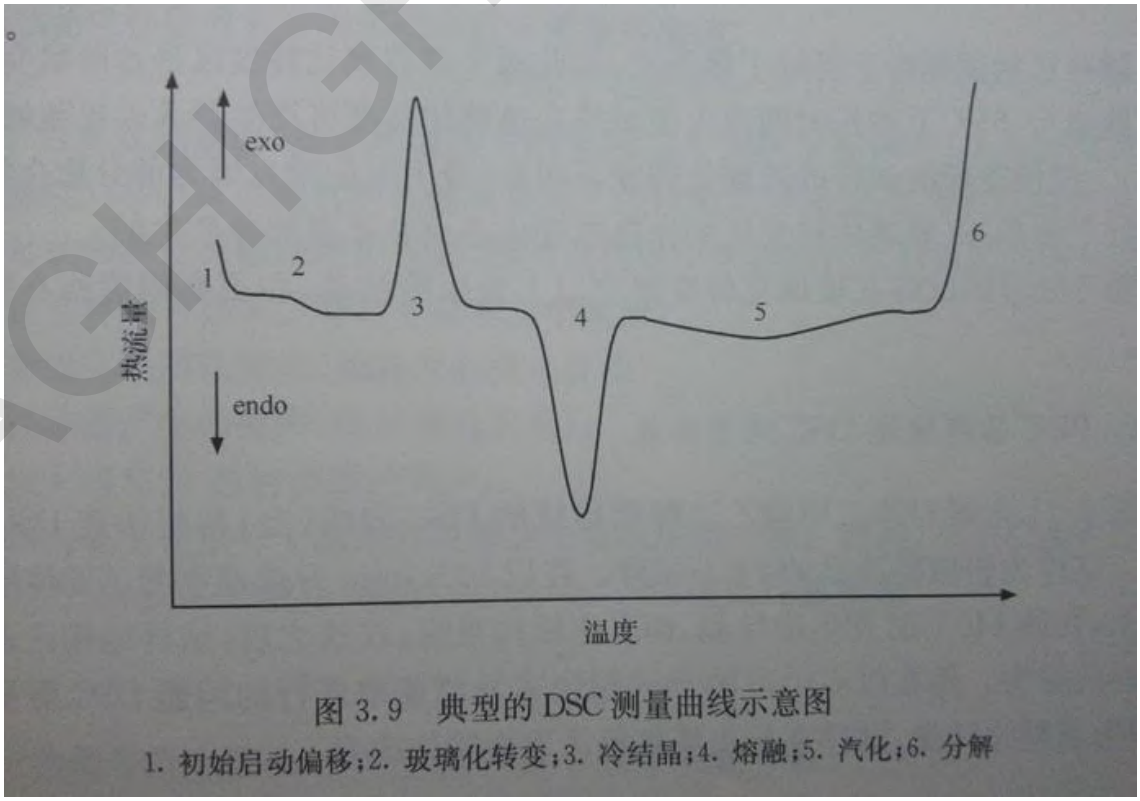


图 3.9 典型的 DSC 测量曲线示意图

1. 初始启动偏移；2. 玻璃化转变；3. 冷结晶；4. 熔融；5. 汽化；6. 分解

Standards:

ISO/TR10837:1991, ASTM D3895-1998, ASTM E 967, ASTM E 968, ASTM E 793, ASTM D 3895, ASTM D 3417, ASTM D 3418, ISO 11357-6 ETC...

What is the Oxidation Induction Time ?

Oxidation Induction Time (OIT) is the beginning of a sample at a high temperature (200 degrees Celsius) oxygen conditions began to automatic catalytic oxidation reaction time, the evaluation of materials in the molding processing, storage, welding and heat degradation indicators are used. Oxidation induction period (referred OIT) is a method using a differential thermal analysis (DTA) with an exothermic reaction when the molecular chains of plastic based, accelerated aging test method for plastics in high temperature oxygen. The principle is: the plastic sample and an inert reference material (such as aluminum oxide) is placed in a differential thermal analyzer, so that at a certain temperature rapidly replaced with an inert gas sample chamber (such as nitrogen) with oxygen. DTA curve test sample due to oxidation caused by the (differential thermal spectrum) changes, and access to the oxidation induction time (Time) OIT (min), to assess the plastic heat aging properties.

What is the Glass Transition Temperature ?

The Glass Transition is an amorphous polymer materials (ie, amorphous polymer) the inherent nature of the polymer is in the form of motion of macroscopic change reflects, it directly affects the performance and technological properties of the material, so for a long time it is the main content of research in polymer physics.

In DSC, for example, when the temperature is gradually increased, through the glass transition temperature of the polymer, the baseline DSC curve moving (see figure) to the endothermic direction. Fig. A point is a point begins to deviate from the baseline. Extended baseline before and after the change, the vertical distance between the two lines is stepped ΔJ, in the delta J/2 can find C, from point C as the tangent to the previous baseline intersect at point B, point B corresponding to the temperature value that is the glass transition temperature.

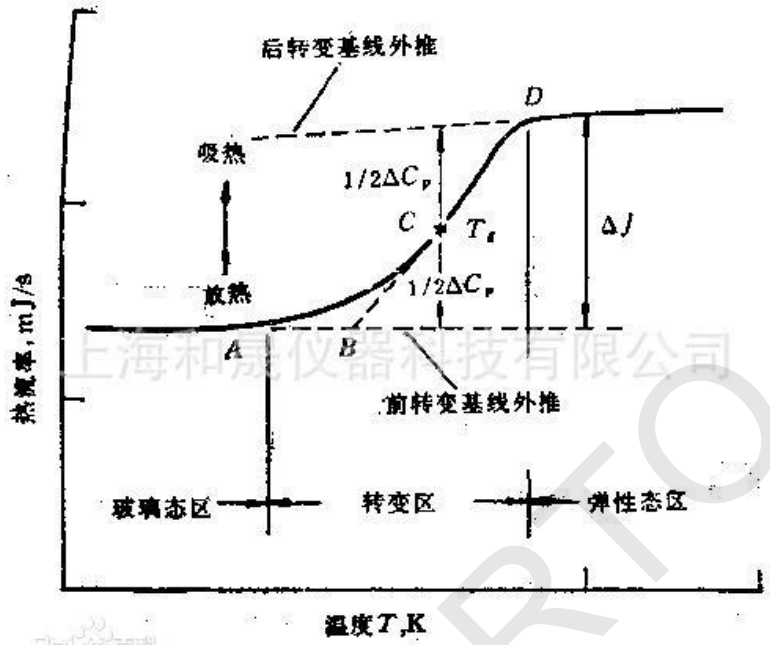


图 1.35 玻璃化转变的 DSC 曲线

Common crystalline plastics are: polyethylene PE, polypropylene PP, poly formaldehyde POM, polyamide PA6, polyamide PA66, PET, PBT, etc.

Non crystalline plastics are: poly carbon, ABS, benzene, transparent vinyl chloride (such as plastic case, TV shell etc.)

➢ What is melting?

Fully crystalline or semi-crystalline polymer from a solid to a liquid state having different viscosities transition phase. [Endothermic peak].

➢ What is the crystallization?

Reference: Part 3 Determination of melting and crystallization temperature and enthalpy GBT 19466.3-2004 plastic differential scanning calorimetry (DSC)

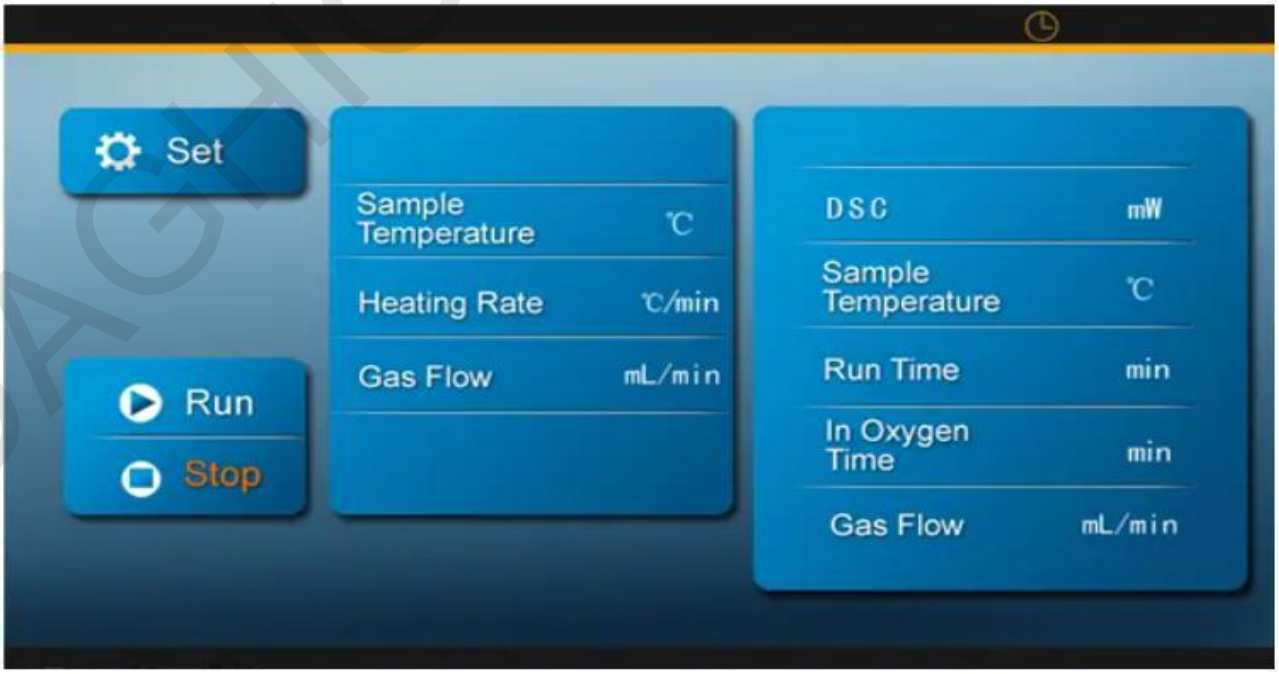
Amorphous liquid crystalline polymer to a fully or semi-crystalline solid phase transition. [Exothermic peak]

Technical Parameters:

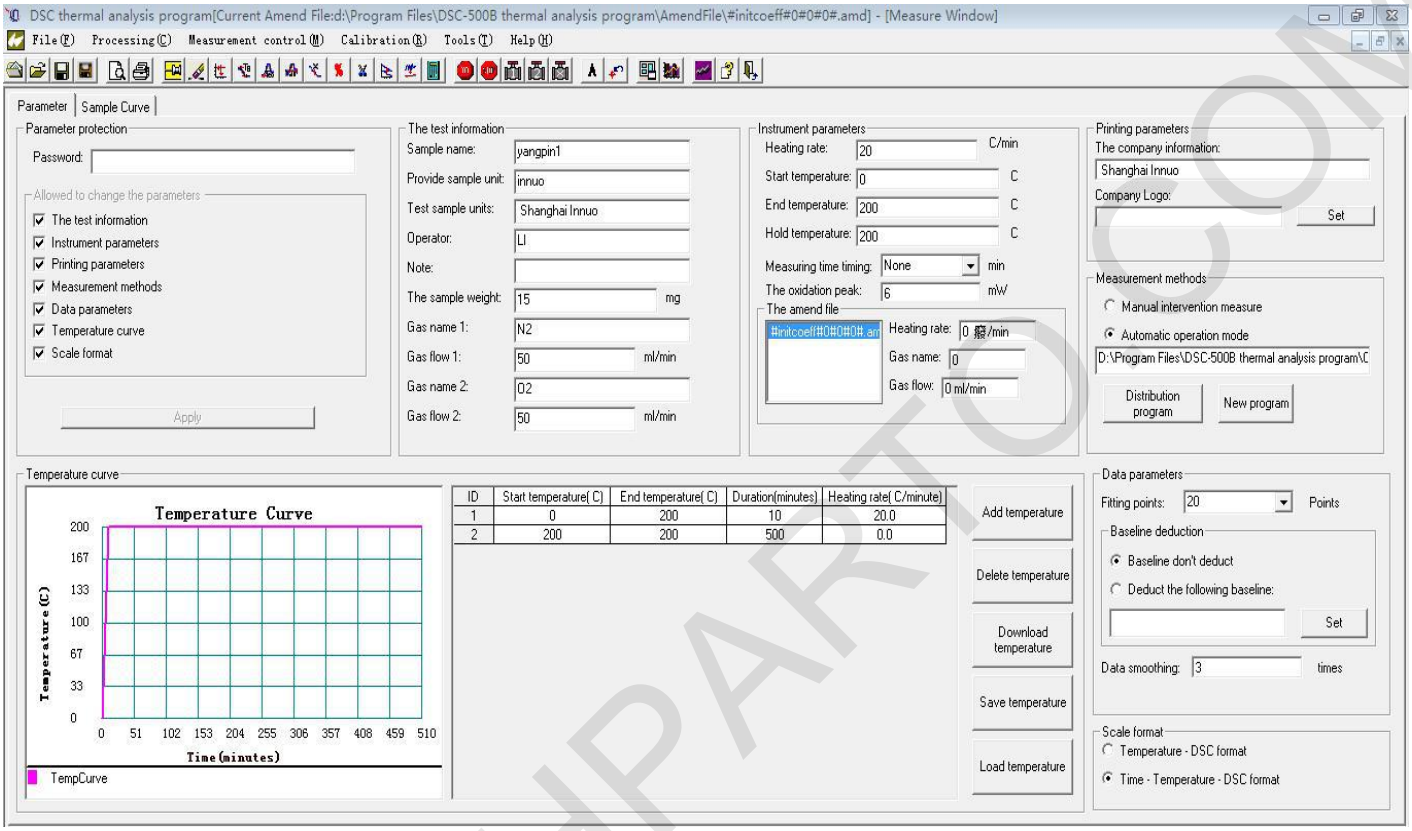
Model	**DSC-100**
DSC Range	**0～± 600mW**
Temperature Range	**RT ~ 600℃ (Air-cooled)**
Heating Rate	0.1~80℃/min
Temperature Resolution	0.001℃
Temperature Fluctuation	±0.001℃
Temperature Repeatability	±0.1℃
DSC Noise	0.01μW
DSC Resolution	0.01μW
DSC Accuracy	0.01mW
DSC Sensitivity	0.01mW
Temperature Control Mode	Rising Temp, Constant Temp, Cooling Temp (Full Automatic Programmed Control)
Curve Scanning	Rising Scan
Atmosphere Control Gas	Nitrogen, Oxygen (Switch Automatically)
Gas Flow Rate	0-300mL/min
Gas Pressure	0.2MPa
Display method	7-inch LCD Touch Screen
Communication Interface	Standard USB interface
Parameters Standard	Equip with Standard Materials (INDIUM, TIN)
Software	4 in 1 operating software
Thermocouple	Total 3 sets of thermocouples for: 1). Test Sample Temperature 2). Test Furnace Temperature, 3). Test Internal Ambient Temperature

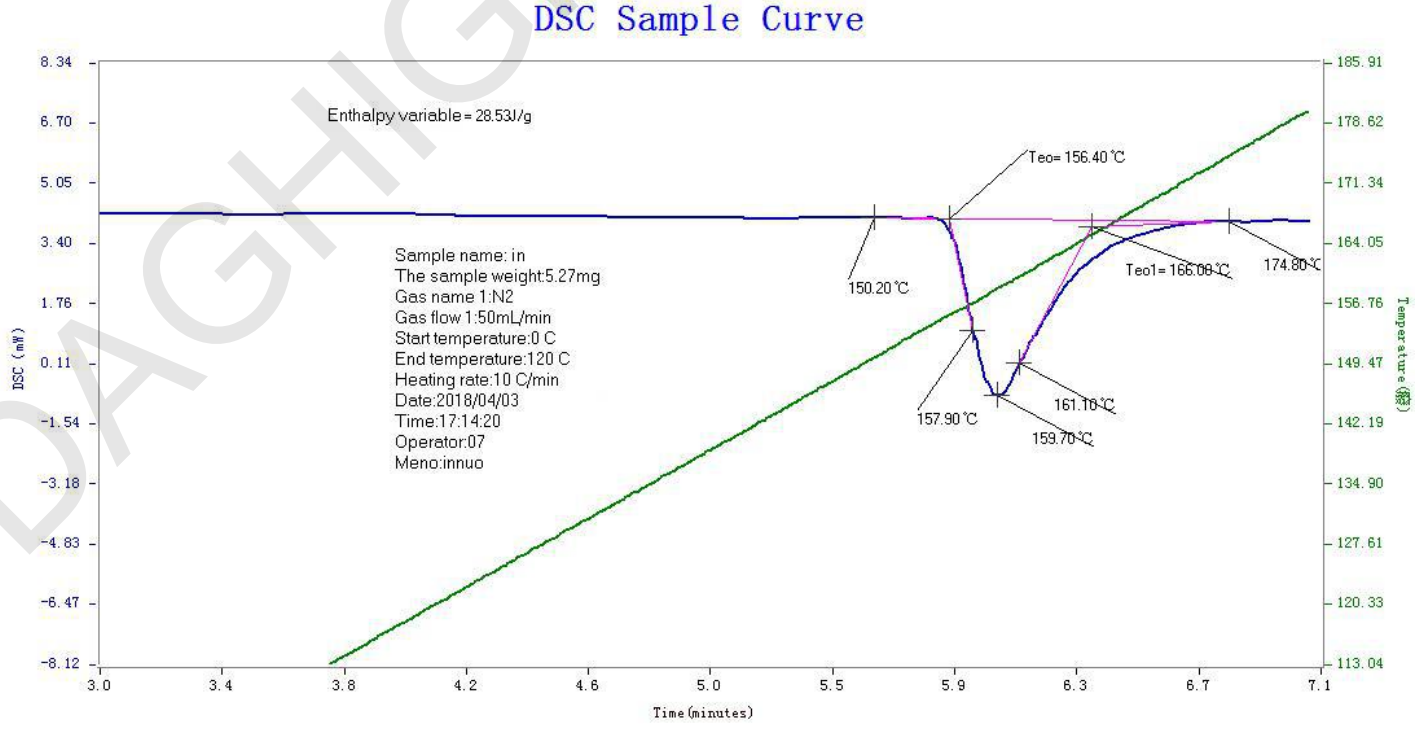
Features:

1. The industrial-grade 7-inch touch screen displays rich information.
2. Brand-new metal furnace body structure, with better baseline and higher accuracy. The heating adopts indirect conduction method, which has high uniformity and stability, reduces pulse radiation, and is better than traditional heating mode.
3. USB communication interface, strong versatility, reliable and uninterrupted communication, supports self-recovery connection function.
4. Automatically switch the two-channel atmosphere flow, fast switching speed and short stabilization time. At the same time, a protective gas input is added.
5. The software is simple and easy to operate.



Software





Model Selection

Model	DSC-100	DSC-500	DSC-300	DSC300C	DSC-300L
Temperature Rane	RT ~ 600℃	RT ~ 1250℃	RT ~ 550℃	-40 ~ 600℃	-150 ~ 600℃
DSC Range	0~± 600mW	0~± 600mW	0~± 600mW	0~± 600mW	0~± 600mW
Cooling Method	Air Cooled	Air Cooled	Air Cooled	Mechnical Cooled	Liquid Nitrogen Cooled
Scanning Method	Heating Scan		Heating Scan + Cooling Scan		

Standard Accessories:

Main Machine	1 pc
Professional Software	1 pc
Aluminum Crucibles	100 pcs
Ceramic crucible	100 pcs
Pure Tin Particles	1 pack
10A Fuse	5 pcs
Air Tube	2 pcs
Tweezers and Related Tools	1 set
Data Cable	1 pc
Power Line	1 pc
Liquid Nitrogen Container	Optional for DSC-300L
Low Temperature Thermostatic Bath	Optional for DSC-300C