TORONTECH

LOW TEMPERATURE DIFFERENTIAL SCANNING CALORIMETER

Low Temperature Differential Scanning Calorimeter TT-4419

Low Temperature Differential Scanning Calorimeter TT-4419 conforms to ASTM D4419, the Standard Test Method for Measurement of Transition Temperatures of Petroleum Waxes by Differential Scanning Calorimetry (DSC).

DSC provides a convenient and rapid method for determining the temperature limits within which a wax undergoes transitions. The highest temperature transition is a solid-liquid transition associated with complete melting, which can guide the choice of wax storage and application temperatures. The solid-solid temperature transition is related to the properties of the solid, such as hardness and blocking temperature.

Instrument purpose

Measure physical and chemical changes associated with heat, including glass transition temperature, melting point, melting temperature, crystallization and crystallization heat, phase transition reaction heat, thermal stability of products, curing/cross-linking, oxidation induction period, and more.

APPLICATIONS

The Torontech TT-4419 performs Differential Scanning Calorimetry (DSC) on petroleum waxes per ASTM D4419 to create a detailed thermal signature. This analysis precisely identifies key transition temperatures, including melting points and solid-solid phase changes, which are fundamental to predicting a wax's real-world performance, from its hardness and blocking tendency to its behavior at various application temperatures.

This comprehensive thermal analysis is a critical tool for R&D and quality control in:

- **Hot-Melt Adhesives:** To precisely engineer formulations by controlling the melting and crystallization behavior, which dictates critical performance characteristics like open time, set speed, and final bond strength.
- **Packaging & Coatings:** For optimizing wax coatings on paper and cardboard, ensuring they have the correct thermal stability to prevent blocking (sticking) in storage and maintain barrier integrity.
- **Cosmetics & Pharmaceuticals:** To control the consistency, texture, and thermal stability of products like creams, lipsticks, and ointments, ensuring product integrity and a consistent user experience.
- **Polymer & Wax Blending:** As a primary research tool for developing new wax blends and polymer-wax composites, allowing formulators to understand component interactions and engineer materials with specific thermal properties.

FEATURES

- The new fully enclosed metal furnace design structure significantly enhances resolution and baseline stability.
- Utilizing a professional alloy sensor provides improved corrosion resistance, oxidation resistance, and heightened sensor sensitivity.
- Incorporating a comprehensive two-way atmosphere control system ensures precise management of purge gas flow, with software settings automatically switching and data directly recorded in the database.
- Equipped with a Cortex-M3 core ARM controller, enhancing operational speed and temperature control accuracy.
- USB two-way communication facilitates more convenient operation and supports self-recovery connection functionality.
- Featuring a 7-inch 24-bit color full-color LCD touchscreen for real-time display of instrument status and data.
- Standard materials are included with the instrument, allowing users to self-calibrate each temperature section, thereby minimizing instrument error.
- Intelligent software design enables automatic generation of instrument process diagrams, with software capable of various data processing tasks such as enthalpy calculation, glass transition temperature determination, oxidation induction period analysis, and substance melting point and crystallization calculation.

TECHNICAL SPECIFICATIONS

1. DSC range: 0 to ±500mW
2. Temperature range: -40°C to 600°C (Refrigeration by low-temperature constant temperature device)
3. Temperature resolution: 0.01°C
4. Heating rate: 0.1 to 80°C/min
5. Cooling rate: 0.1 to 50°C/min
6. Temperature repeatability: ±0.1°C
7. DSC Noise: 0.01mW
8. DSC Resolution: 0.01mW
9. DSC accuracy: 0.01mW
10. DSC sensitivity: 0.1mW
11. Temperature control mode: heating, cooling, constant temperature, any combination of three modes for recycling
12. Curve scan: temperature rise scan
13. Atmosphere control: automatic switching of the instrument
14. Gas flow: 0-200mL/min
15. Gas pressure: 0.2MPa
16. Display mode: 24-bit color 7-inch LCD touchscreen display
17. Data interface: standard USB interface
18. Parameter standard: equipped with reference material, with one-button calibration function, user can self-calibrate temperature and enthalpy
19. Working power supply: AC 220V 50Hz or customized (110V also available)
20. Power: 300W

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