

ICS 83.080.01

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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 19466.5-2022

**Plastics - Differential scanning calorimetry (DSC) - Part 5:
Determination of characteristic reaction-curve temperatures
and times, enthalpy of reaction and degree of conversion**

Issued on: December 30, 2022

Implemented on: April 1, 2023

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

foreword	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 principles	
5 Instruments and materials	

foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules for Standardization Documents" drafting.

This document is Part 5 of GB/T 19466 "Differential Scanning Calorimetry (DSC) for Plastics". GB/T 19466 has issued the following

part.

- Part 1. General principles;
- Part 2. Determination of glass transition temperature;
- Part 3. Determination of melting and crystallization temperature and enthalpy;
- Part 4. Determination of specific heat capacity;
- Part 5. Determination of characteristic reaction curve temperature, time, reaction enthalpy and conversion rate;
- Part 6. Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT).

This document is modified to adopt ISO 11357-5:2013 "Differential Scanning Calorimetry (DSC) for Plastics - Part 5. Characteristic Reaction Curve Temperature

Determination of temperature, time, reaction enthalpy and conversion rate".

Compared with ISO 11357-5:2013, this document has made the following structural adjustments.

- Adjusted the position of Figure 2 (see 10.2) and Figure 4 (see 10.3.2).

The technical differences between this document and ISO 11357-5:2013 and their reasons are as follows.

--- Replaced ISO 11357-1 with the normatively quoted GB/T 19466.1 (see Chapter 3~Chapter 8, 9.2, 10.1, 10.3.2,

Chapter 12) to adapt to the technical conditions of our country and increase operability;

--- Increased the requirements for DSC curves (see Chapter 12), and the DSC curves are attached to the test report to make the results determined by this method more complete complete, easy to understand and apply.

The following editorial changes have been made to this document.

--- Added 9.3.2 and 9.3.3 introductory words (see 9.3.2 and 9.3.3).

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

GB/T 19466 "Plastic Differential Scanning Calorimetry (DSC)" is the use of differential scanning calorimetry (DSC) for thermoplastic materials and thermosetting

Standard method for the thermal analysis of polymers such as plastics including molding materials and composites. The method comprises the application of differential scanning calorimetry

General principles and methods for various thermodynamic and kinetic determinations of polymers, proposed to consist of seven parts.

--- Part 1.General. The purpose is to establish the use of differential scanning calorimetry (DSC) for the determination of plastics, including molding materials and composite materials.

General principles and related rules of various thermodynamics and kinetics of polymers such as materials.

--- Part 2.Determination of glass transition temperature. The purpose is to establish an operable, traceable,

Verifiable procedures.

--- Part 3.Determination of melting and crystallization temperature and enthalpy. The aim is to set melting and crystallization temperatures for crystalline and semi-crystalline polymers and enthalpy determination to establish operable, traceable and verifiable procedures.

--- Part 4.Determination of specific heat capacity. The purpose is to establish an operable,

traceable and verifiable procedure for the determination of the specific heat capacity of plastics.

--- Part 5.Determination of characteristic reaction curve temperature, time, reaction enthalpy and conversion rate. The purpose is to be a solid or liquid monomer,

The temperature and time of the reaction between the prepolymer and the polymer, the reaction enthalpy, and the determination of the conversion rate establish operable, traceable, and verifiable

program.

--- Part 6.Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT). for polymer

The determination of material oxidation induction time and oxidation induction temperature establishes operable, traceable and verifiable procedures.

--- Part 7.Determination of crystallization kinetics. The purpose is to establish an operable, traceable, and reliable method for the determination of polymer crystallization kinetics.

Confirmed procedure.

Plastic Differential Scanning Calorimetry (DSC)

Part 5.Characteristic reaction curve temperature, time,

Determination of reaction enthalpy and conversion

WARNING. Be alert to the possibility of runaway reactions or other hazardous phenomena with certain materials.

1 Scope

This document describes a method for determining the temperature and time of the reaction, the enthalpy of reaction, the conversion using differential scanning calorimetry (DSC).

This document applies to solid or liquid monomers, prepolymers and polymers, including materials containing solid or liquid fillers and/or initiators.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, dated references

For documents, only the version corresponding to the date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to

this document.

GB/T 19466.1 Plastic differential scanning calorimetry (DSC) Part 1. General principles
(GB/T 19466.1-2004, ISO 11357-1.

1997, IDT)

3 Terms and Definitions

The following terms and definitions defined in GB/T 19466.1 apply to this document.

3.1

Polymerization

The process by which monomers or mixtures of monomers are converted into polymers.

3.2

crosslinking

The process by which multiple intermolecular covalent or ionic bonds are formed between polymer chains.

3.3

conversion rate

The ratio of the amount of the reactant (monomer) that participated in the reaction to the amount of the starting reactant (monomer).

NOTE. The conversion rate depends on time and temperature.

4 principles

In accordance with the provisions of GB/T 19466.1.

The test method described represents the various stages of the reaction by DSC curves.

5 Instruments and materials

In accordance with the provisions of GB/T 19466.1.