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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 33047.2-2021

Plastics - Thermogravimetry (TG) of polymers - Part 2: Determination of activation energy

Issued on: August 20, 2021 **Implemented on: March 1, 2022**

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

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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 of Standardization Documents"

Drafting.

This document is the second part of GB/T 33047 "Plastic Polymer Thermogravimetry (TG)". GB/T 33047 has released the following

part.

---Part 1.General rules;

---Part 2.Determination of activation energy;

---Part 3.Use Ozawa-Friedman plot to determine activation energy and analyze reaction kinetics.

The translation method used in this document is equivalent to ISO 11358-2.2014 ``Plastic Polymer Thermogravimetric Method (TG) Part 2.Activation Energy

Determination".

The Chinese documents that have consistent correspondence with the normatively cited international documents in this document are as follows.

---GB/T 33047.1-2016 Plastic Polymer Thermogravimetric Method (TG) Part 1.General (ISO 11358-1.2014,

MOD)

This document has made the following editorial changes.

---Renumber the formula;

---3.3 added "Note 4.It is also called mass loss score".

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Plastics Standardization Technical Committee (SAC/TC15).

Drafting organizations of this document. Zhonglan Chenguang Chengdu Testing Technology Co., Ltd., Guangzhou Weike Environmental Protection Technology Co., Ltd., Anhui Xinsu Pipe Industry Section

Technology Co., Ltd., Guangzhou Institute of Quality Supervision and Inspection, Shandong Dawn Polymer Materials Co., Ltd., Suzhou Runjia Engineering Plastics Co., Ltd.

Co., Ltd., China Petroleum & Chemical Corporation Beijing Research Institute of Chemical Industry, Xiamen Defengxing Plastic Industry Co., Ltd., Beijing Physical and Chemical Analysis

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company.

1 Scope

This document specifies a method to determine the activation energy Ea in the Arrhenius equation of the polymer decomposition reaction using the thermogravimetric method.

This method is only suitable for reactions with a single mechanism. For multi-step reactions, the reaction mechanism of each step is single.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, dated quotations

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

This document.

ISO 11358-1 Plastic Polymer Thermogravimetry (TG) Method Part 1.General Principles [Plastics-Thermogravimetry (TG) of

polymers-Part 1.Generalprinciples]

3 Terms and definitions

ISO 11358-1 and the following terms and definitions apply to this document.

3.1

Arrhenius equation Arrhenius formula

The formula for the relationship between the rate constant of a chemical reaction and the temperature.

Note. The reaction rate constant k, expressed by Arrhenius equation (1), is as follows.

k=Aexp-Ea/RT (1)

Where.

R---gas constant, 8.314J.K-1.mol-1;

T---absolute temperature, the unit is open (K);

A-refers to the former factor, the unit is per second (s-1);

Ea---activation energy, in units of coke per mole (Jmol-1);

k ---Reaction rate constant (=dalpha/dt), the unit is per second (s-1).

3.2

Activationenergy

Ea

The energy required for an atom or molecule to change from a ground state to an active state where chemical reactions easily occur.

Note. The unit is joule per mole (J.mol-1).

3.3

Conversion rate degreeofconversion

The ratio of the mass loss of the reaction at a specific time and temperature to the final mass loss.

Note 1.Given by equation (2).

alpha = (mi-mt)/(mi-mf) (2)