INTERNATIONAL STANDARD

ISO 11358-2

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Plastics — Thermogravimetry (TG) of polymers —

Part 2: Determination of activation energy

Plastiques — Thermogravimétrie (TG) des polymères —

Partie 2: Détermination de l'énergie d'activation

Reference number
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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical and chemical properties*.

This second edition cancels and replaces the first edition (ISO 11358-2:2005), of which it constitutes a minor revision. The following are the changes:

— limitation of the term "activation energy" to gas-phase reactions was deleted;

— normative references were changed into undated ones;

— the term "pan" was replaced by "crucible" in the whole text;

— in line with 3.2, the term "energy of activation" was replaced with "activation energy" (see 9.2).

ISO 11358 consists of the following parts, under the general title *Plastics — Thermogravimetry (TG) of polymers*:

— *Part 1: General principles*

— *Part 2: Determination of activation energy*

— *Part 3: Determination of the activation energy using the Ozawa-Friedman plot and analysis of the reaction kinetics*

Plastics — Thermogravimetry (TG) of polymers —

Part 2: Determination of activation energy

1 Scope

This part of ISO 11358 specifies a method for the determination of the activation energy, E_a, in the Arrhenius formula for the decomposition of polymers using a thermogravimetric technique. The method is applicable only if the reaction proceeds by a single mechanism. It is applicable to multistage reactions if they consist of clearly separated single-stage steps.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11358-1, *Plastics — Thermogravimetry (TG) of polymers — Part 1: General principles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11358-1 and the following apply.

3.1
Arrhenius formula
formula representing the temperature dependence of the rate constant of a reaction

Note 1 to entry: The rate constant, k, of a reaction is expressed by the Arrhenius formula, as follows:

$$k = A\exp^{(-E_a/RT)}$$

where

R is the gas constant (= 8,314 J · K^{-1} · mol^{-1});

T is the absolute temperature, in kelvins (K);

A is the pre-exponential factor, in reciprocal seconds (s^{-1});

E_a is the activation energy, in J · mol^{-1};

k is the rate of reaction (= dα/dt), in reciprocal seconds (s^{-1}).

3.2
activation energy
E_a
energy, above that of the ground state, which must be added to an atomic or a molecular system to allow a particular process to take place

Note 1 to entry: It is expressed in J · mol^{-1}.