



# THERMOCHIMICA ACTA

An International Journal Concerned with All Aspects of Thermoanalytical and Calorimetric Methods and their Application to Experimental Chemistry, Physics, Biology and Engineering

## AUTHOR INFORMATION PACK

### TABLE OF CONTENTS

●	<b>Description</b>	<b>p.1</b>
●	<b>Audience</b>	<b>p.2</b>
●	<b>Impact Factor</b>	<b>p.2</b>
●	<b>Abstracting and Indexing</b>	<b>p.2</b>
●	<b>Editorial Board</b>	<b>p.2</b>
●	<b>Guide for Authors</b>	<b>p.3</b>



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### DESCRIPTION

*Thermochimica Acta* publishes original research contributions covering all aspects of **thermoanalytical** and **calorimetric methods** and their application to experimental **chemistry, physics, biology** and **engineering**. The journal aims to span the whole range from fundamental research to practical application.

The journal focuses on the research that advances physical and analytical science of thermal phenomena. Therefore, the manuscripts are expected to provide important insights into the thermal phenomena studied or to propose significant improvements of analytical or computational techniques employed in thermal studies. Manuscripts that report the results of routine thermal measurements are not suitable for publication in *Thermochimica Acta*.

The journal particularly welcomes papers from newly emerging areas as well as from the traditional strength areas:

- New and improved instrumentation and methods
- Thermal properties and behavior of materials
- Kinetics of thermally stimulated processes

Each paper submitted for publication should clearly present:

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- General significance of the obtained results (i.e., how this study contributes to the advancement of knowledge in the general area of the study). Note that novelty of a study does not necessarily imply general significance of the results.

Manuscripts reporting results of kinetic studies are expected to follow the ICTAC Kinetics Committee recommendations for collecting kinetic data (*Thermochim. Acta* 590 (2014) 1-23, and for performing kinetic computations (*Thermochim. Acta* 520 (2011) 1-19).

The journal publishes *regular full-length articles, short communications* (either novel, unexpected theoretical or experimental results or short reports of collections of new data), and *reviews* (usually invited by an [Editor](#), but proposals from authors are welcome).

## AUDIENCE

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Principally Chemists but also Physicists, Biologists, Metallurgists and Mineralogists interested in the techniques and applications of thermal analysis and thermochemistry.

## IMPACT FACTOR

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## ABSTRACTING AND INDEXING

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### INTRODUCTION

*Thermochimica Acta* publishes original research contributions covering all aspects of thermoanalytical and calorimetric methods and their application to experimental chemistry, physics, biology and engineering. Specific areas of research include:

- instrumentation and theory of instrumentation
- new and improved methods of investigation
- analysis and interpretation of research data
- fundamental research and industrial application.

Papers from new emerging areas of the field are particularly welcome. The journal publishes *regular articles*, *communications* (novel, unexpected experimental results or interpretation presented within four printed pages), and *feature articles* (usually invited by the Editors).

The journal focuses on the research that advances physical and analytical science of thermal phenomena. Therefore, the manuscripts are expected to provide important insights into the thermal phenomena studied or to propose significant improvements of analytical or computational techniques employed in thermal studies. Manuscripts that report the results of routine thermal measurements are not suitable for publication in *Thermochimica Acta*.

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### *Contact details for submission*

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Example: '..... as demonstrated [3,6]. Barnaby and Jones [8] obtained a different result ....'

**List:** Number the references (numbers in square brackets) in the list in the order in which they appear in the text.

### *Examples:*

Reference to a journal publication:

[1] J. van der Geer, J.A.J. Hanraads, R.A. Lupton, The art of writing a scientific article, *J. Sci. Commun.* 163 (2010) 51–59.

Reference to a book:

[2] W. Strunk Jr., E.B. White, *The Elements of Style*, fourth ed., Longman, New York, 2000.

Reference to a chapter in an edited book:

[3] G.R. Mettam, L.B. Adams, How to prepare an electronic version of your article, in: B.S. Jones, R.Z. Smith (Eds.), *Introduction to the Electronic Age*, E-Publishing Inc., New York, 2009, pp. 281–304.

Reference to a website:

[4] Cancer Research UK, Cancer statistics reports for the UK. <http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/>, 2003 (accessed 13 March 2003).

Reference to a dataset:

[dataset] [5] M. Oguro, S. Imahiro, S. Saito, T. Nakashizuka, Mortality data for Japanese oak wilt disease and surrounding forest compositions, *Mendeley Data*, v1, 2015. <https://doi.org/10.17632/xwj98nb39r.1>.

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### **Appendix A. Brief recommendations for reporting thermal analysis data**

Because thermal analysis techniques involve the measurement of some system parameter as a function of temperature [1], it is essential that all experimental details be given in the typescript. The reports of the Nomenclature Committee of the International Confederation for Thermal Analysis

(ICTA) [2,3] and the recommendations of McAdie [4,5] should, in general, be adhered to as far as typescript space permits. Some of the recommendations are briefly summarized here; for further information the original references should be consulted.

- (1) Identify all materials by a definitive name, an empirical formula, or equivalent compositional data.
- (2) State the sources of all materials, their chemical purities, and other pertinent data.
- (3) Give the furnace heating rate over the temperature range of interest.
- (4) Identify the sample chamber atmosphere by pressure, composition and purity. The conditions of atmosphere control (static, dynamic or self-generated) should be specified.
- (5) Label the abscissa in temperature units or time.

In reporting TG data:

- (6) Give the type of thermobalance employed, including the manufacturer's name and the instrument model number.
- (7) Mass loss should be plotted as a downward type curve either in mass or percent mass units.

In reporting DTA data:

- (8) Give the type of instrument employed, including the manufacturer's name and the instrument model number.
- (9) Report the sample preparation and dilution, and also the reference material employed.
- (10) The ordinate scale should indicate the temperature difference between sample and reference sample  $T = TS - TR$ . Preferred plotting for endothermic reactions consists of downward deflection of the curve peaks, and exothermic reactions as upward deflections. In addition, authors must make clear the sign convention they are using.

In reporting DSC data:

- (11) Give the type of instrument employed, including the manufacturer's name and the instrument model number.
- (12) The ordinate scale should be described in power or units. Plotting for endothermic reactions is as upward deflection of the curve peaks, and exothermic reactions as downward deflections. In addition, authors must make clear the sign convention they are using.

Other thermal analysis techniques:

- (13) Give the type of instrument employed, including the manufacturer's name and the instrument model number.
- (14) The ordinate scale should be accurately described in the preferred units of measurement.

*Quantities and units*

Length  $l$ : metre (m)

Mass  $m$ : kilogram (kg); gram (g)

Time  $t$ : second (s); minute (min); hour (h)

Thermodynamic temperature  $T$ ; kelvin (K)

Celsius temperature  $t$ : degree Celsius ( $^{\circ}\text{C}$ )

Amount of substance  $n$ : mole (mol)

Molar mass  $M$ : ( $\text{kg mol}^{-1}$ )

Concentration (amount)  $c$ : ( $\text{mol dm}^{-3}$ ); ( $\text{mol l}^{-1}$ )

Molality  $m$ : ( $\text{mol kg}^{-1}$ )

Pressure  $p$ : pascal (Pa)

Energy  $E$ : joule (J)

Heat  $q$ ,  $Q$ : joule (J)

Power, heat flow rate  $P$ ,  $F$ : watt (W)

Volume  $V$ : ( $\text{m}^3$ ); litre (l), (L)

Chemical potential (partial molar Gibbs energy): ( $\text{kJ mol}^{-1}$ )

Viscosity: dynamic  $\eta$  ( $\text{Pa s}$ ); kinematic ( $\text{m}^2 \text{s}^{-1}$ )

*Subscripts to denote a chemical process:*

Combustion: c; reaction: r; transition: trs; fusion: fus; solution: sol; vaporization: vap; mixing: mix; sublimation: sub.

*Superscripts for standard conditions*



\_ or °

Examples:  $p_{\text{H}_2\text{O}} = 105 \text{ Pa}$  (1 bar)

$D_{\text{CH}_2}$

$H_{\text{BH}_2}$  (standard partial molar enthalpy of substance B)

#### Prefixes

$10^{-1}$  d;  $10^{-2}$  c (centi);  $10^{-3}$  m (milli);  $10^{-6}$   $\mu$  (micro);  $10^{-9}$  n (nano);  $10^{-12}$  p (pico);  $10^{-15}$  f (femto);  $10^{-18}$  a (atta); 10 da (deca); 102 h (hecto); 103 k (kilo); 106M (mega); 109 G (giga); 1012 T (tera); 1015 P (peta); 1018 E (exa)

#### Special recommendations for thermal analysis

(International Confederation for Thermal Analysis and Calorimetry, ICTAC)

Differential scanning calorimetry: DSC

Differential thermal analysis: DTA

Dynamic mechanical analysis: DMA

Thermogravimetry/thermogravimetric analysis: TG/TGA

Thermomechanical analysis: TMA

Average heating rate:  $\beta$  ( $\text{K min}^{-1}$ )

Fractional extent of reaction:  $\alpha$

#### Subscripts

S, sample; R, reference sample.

To denote characteristic temperatures: i, initial; e, extrapolated onset; p, peak; f, final, g, glass transition.

When labelling the axes of graphs, symbols and units must be used as follows in order to have dimensionless data on the axes.

#### Examples

T/K or  $T_{\text{in K}}$

(or temperature in K)

103 T/K

m/kg or m in kg

(or mass in kg)

ln (p/MPa)

P/W or P in W

(or heat flow rate in W)

do not write T(K) or T[K], etc.

#### References

[1] W.W. Wendlandt, *Thermal Methods of Analysis*, third ed., Wiley-Interscience, New York, 1976, Chapter 1.

[2] R.C. Mackenzie, *Talanta* 16 (1969) 1227.

[3] R.C. Mackenzie, C.J. Keattch, D. Dollimore, J.A. Forrester, A.A. Hodgson, J.P. Redfern, *Talanta* 19 (1972) 1079.

[4] H.G. McAdie, *Anal. Chem.* 39 (1967) 543.

[5] H.G. McAdie, *Anal. Chem.* 44 (1972) 640.

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