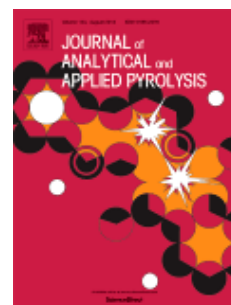




TABLE OF CONTENTS

●	Description	p.1
●	Audience	p.2
●	Impact Factor	p.2
●	Abstracting and Indexing	p.3
●	Editorial Board	p.3
●	Guide for Authors	p.4



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DESCRIPTION

The *Journal of Analytical and Applied Pyrolysis* (JAAP) is devoted to the publication of papers dealing with innovative applications of pyrolysis processes, the characterization of products related to pyrolysis reactions, and investigations of reaction mechanism. To be considered by JAAP, a manuscript should present significant progress in these topics. The novelty must be satisfactorily argued in the cover letter. A manuscript with a cover letter to the editor not addressing the novelty is likely to be rejected without review.

More specifically, the Scope of the Journal includes:

Fundamental pyrolysis research on chemical substances and materials comprising:

- experimental studies of pyrolysis reactions such as chemical mechanism and kinetic investigations; this includes preparative pyrolysis methods for the synthesis of novel compounds and mechanisms of high temperature reactions;
- computational and theoretical studies of reaction mechanism, kinetics, and thermodynamics are acceptable, provided they are directly related to experimental data, either new or previously published, but they must be described adequately in the paper;
- computational processing of pyrolysis data, such as advanced pattern recognition and principal component analysis and other multivariate analyses.

Analytical pyrolysis, i.e. the characterization of a material in inert atmosphere by thermally induced degradation reactions;

- exploring chemical composition and structure of materials by revealing thermal and chemical decomposition reactions leading to products fully identified by chemical and spectroscopic methods;
- applications of analytical pyrolysis in environmental, biological, medical, forensic, cultural heritage, food, geochemical, polymer, and materials science;
- new instrumentation and new analytical methods using pyrolysis reactions or to unravel the chemical composition of pyrolysis products.

Applied pyrolysis dealing with the development of pyrolysis processes for producing valuable chemicals and/or energy carriers (gas, liquid, solid or electricity) and/or materials from fossil or renewable feedstock or waste, the recycling of materials, and the disposal of toxic substances. The manuscript must discuss the relationships between pyrolysis conditions and product characteristics. This topic includes:

- various feedstock (fossil fuels, biomass, wastes, polymers, etc.) and the co-processing of different feedstock;
- various thermal processes (slow and fast pyrolysis, torrefaction, carbonization, high pressure pyrolysis, catalytic pyrolysis, deoxygenation, hydrolysis, solvent liquefaction).

The combination of a pyrolysis process with other types of treatment (mechanical, biological, or chemical) or materials characterization is within the scope of the journal only if the main focus of the manuscript is the pyrolysis process. Integrated processes combining pyrolysis reactors and products purification are welcome, if different pyrolysis conditions are studied. The computational modeling of pyrolysis reactors or processes should be related to experimental data, either new or previously published, but they must be described adequately in the paper.

The pyrolysis conditions should be described thoroughly (residence times of solid and vapors, temperature distributions, etc.). The pyrolysis products must be chemically characterized. Catalysts should be physically and chemically characterized before reaction, and, when feasible analysis of catalysts after reaction is also desirable. While this may not always be possible, at least qualitative assessments should be made.

The investigation of pyrolysis of a new feedstock or material with conventional methods, but without new development of the pyrolysis process is not sufficiently novel to be considered by JAAP.

Review articles are invited by the Editors but may also be proposed in writing to the Review Editor. The subject of review articles should be broad enough to appeal to a wide range of readers. Discussion should be concise, but adequate. More detailed discussion may be appropriate in some cases. It is expected that reviews should be critical rather than just catalogs of published data. They should include the most important, recent advances in the topic, whereas papers of low scientific significance should be given very limited coverage.

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The Journal does not consider studies based on:

- the activation of carbons and characterization of activated carbons;
- thermal analysis, mass yields without characterization of the pyrolysis products by chemical and spectroscopic methods;
- characterization and application of pyrolysis products, unless clearly related to/aimed at understanding the influence/details of pyrolysis processes and conditions;
- theoretical studies, kinetic modelling etc. which are not complemented with or validated by experimental data
- combustion, gasification or incineration unless specifically related to the interplay between pyrolysis and oxidation reactions.

AUDIENCE

Analytical Chemists; Researchers involved in Chromatography, Mass Spectrometry, and Polymer Science; Geochemists, Technologists in Plastic and Rubber Industries; Bacteriologists; Food and Medical Chemists.

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GUIDE FOR AUTHORS

INTRODUCTION

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- combustion, gasification or incineration unless specifically related to the interplay between pyrolysis and oxidation reactions.

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Results should be clear and concise.

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This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

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The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

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If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

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Captions: Arial 10 pt

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Pyrolysis Experiments

Drawings or illustrations of pyrolysis apparatus are welcome, except if they are commonly known and commercially available. However, even if there is little novelty, details of the apparatus may be of interest, and in such cases the information should be placed in the Supplementary material. In all cases apparatus should be described in sufficient detail to allow others to repeat the experiments.

Pyrolysis temperatures should be recorded with reasonable accuracy, e.g. 535 oC, not 534.63 oC, unless extreme accuracy is documented (see 'Significant figures' above). The method used for determining heating rates should be defined, and the rates should be realistic; for example, a heating rate of 100 oC/s is unrealistic for many compounds. For reactors, comments should be made on the distribution of temperatures.

The methods of pressure measurement should be presented (sensors type, calibration range, etc.), as applicable.

The residence times of solids and vapors and the temperature gradients for gas-phase sections should be given or estimated even for micro-pyrolysis experiments. The methods of gas/vapor sampling (length and temperature of heated lines, volume of sampling loop for GC, direct injection through molecular beam or capillary lines, adsorption followed by desorption conditions, etc.), vapour condensation system (temperatures, volumes, etc.), and liquid sampling (e.g. from the condenser to the vial) should be presented in detail.

Compound Characterization

Stable, *new* organic compounds synthesized or isolated from pyrolysis reactions should be characterized in the usual way, i.e. by ¹H and ¹³C NMR spectroscopy, IR spectroscopy, mass spectrometry and elemental analysis (tolerance 0.4%), and evidence for homogeneity should be given. If elemental analysis is not reported, copies of the ¹H and ¹³C NMR should be provided in the Supplementary material. If high resolution mass spectral measurements are reported, the full low resolution mass spectra, with relative abundances, should be reported too. Melting points for solids should be given.

When *known* compounds are identified by py-GC-MS methods, the experimental procedure should be described fully, and adequate references to libraries of GC and/or MS data used in the characterization should be given. Methods used to measure yields should be described, clear distinctions between relative and absolute yields must be made, and information of experimental errors in percentages of products must be given. For example, relative yields should not simply be read off the instrument and reported as e.g. 21.89%, 47.31%, etc for single-run experiments with no information on precision. Representative gas chromatograms and mass spectra should be published as Supplementary material with sufficient detail to enable other researchers to duplicate the results.

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The method for liquid chromatography should be presented: injection volume, column type and reference, solvent(s) gradient and flow-rate(s), temperature of the column, conditions for the detectors (notably ionization conditions for MS).

Calibration methods used for all analytical methods must be specified: the authors should indicate the standards used (concentration, etc.), response factors (in Supplementary material), and volumes of internal standards, if used. Internal calibration is preferred to external calibration for the quantification of liquid products from pyrolysis reactions.

Information on transient compounds or reactive intermediates that cannot be isolated in pure form may be given, but it is important to explicitly distinguish between stable and unstable compounds.

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Materials

Solid state materials which do not exist in solution may be best characterized by X-ray crystal structure or X-ray powder diffraction (XRD) (see also solid-state NMR above). Elemental analysis (combustion, microprobe) and evidence for homogeneity should also be reported. XRD data should be accompanied by details of the experimental technique, i.e. the source of X-rays, radiation, wavelength, filters or monochromators, camera diameter, the type of X-ray recording, and the technique used for measuring intensities. In cases of unindexed listing of the data, the d spacings of all observed lines should be listed in sequence, together with their relative intensities. If filtered radiation is used, efforts should be made to identify residual β lines. Where resolution into α_1 - α_2 doublets occurs, the identification of the d spacing for each line as $d\alpha_1$, $d\alpha_2$ gives a measure of the quality of the diffraction pattern. When an indexing of the data is electron offered, the observed and calculated $1/d^2$ values should

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Note that thermal analysis data (TGA etc) without supporting spectroscopic and analytical product characterization are not acceptable.

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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).

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mass m kilogram kg; gram g

time t ; second s; minute min; hour h

thermodynamic temperature T ; kelvin K

Celcius temperature t ,* degree Celcius C

amount of substance n ; mole mol

molar mass M ; kg mol⁻¹

concentration (amount) c ; mol dm⁻³, mol l⁻¹

molality m ; mol kg⁻¹

pressure p ; pascal Pa

energy E ; joule J
heat q, Q ; joule J
power, heat flow rate P, \dot{q} ; watt W
volume V ; m^3 ; litre l, L
chemical potential (partial molar Gibbs energy) $\mu\text{J mol}^{-1}$
viscosity: dynamic η Pa s ; kinematic μ m s^{-1}

Prefixes

10^{-1} d; 10^{-2} c (centi); 10^{-3} m (milli); 10^{-6} μ (micro); 10^{-9} n (nano); 10^{-12} p (pico); 10^{-15} f (femto);
 10^{-18} a (atta)

10 da (deca); 10^2 h (hecto); 10^3 k (kilo); 10^6 M (mega); 10^9 G (giga); 10^{12} T (tera); 10^{15} P (peta);
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