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;
- 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:
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- various thermal processes (slow and fast pyrolysis, torrefaction, carbonization, high pressure pyrolysis, catalytic pyrolysis, deoxygenation, hydropyrolysis, 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.

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- characterization and application of pyrolysis products, unless clearly related to/aimed at understanding the influence/details of pyrolysis processes and conditions;

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INTRODUCTION

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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.

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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.

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Organometallic and Inorganic Compounds: for new compounds sufficient experimental details must be included to allow another researcher to reproduce the synthesis and characterization. X-ray diffraction may often be the most unambiguous method of structure determination, but because of potential misidentification of atoms, the X-ray diffraction structure alone may not suffice as the only means of characterization. Evidence for elemental constitution must be provided by elemental analysis (e.g. combustion analysis, microprobe analysis), or mass spectrometry. NMR data should be reported for soluble compounds (and where relevant for solids, e.g. char, by solid-state NMR and 2D 1H-13C solid state NMR). IR spectroscopy may be used to support the presence of functional groups, but in most cases IR spectroscopy alone is not sufficient to characterize structures.

**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 α1-α2 doublets occurs, the identification of the d spacing for each line as dα1, dα2 gives a measure of the quality of the diffraction pattern. When an indexing of the data is electron offered, the observed and calculated 1/d2 values should
be listed along with the observed relative intensities (a listing of d spacings is then superfluous), the calculated 1/d2 values to the limit of the data quoted. Where possible and justified by the data, crystal systems should be specified, and possible space groups may be listed. IR spectroscopy may be used to support the presence of functional groups, but in most cases IR spectroscopy alone is not sufficient to characterize materials.

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

**Biomass, bio-oil, biochar, wastes, coal, etc.**: Elemental analysis (C, H, O, N, S as appropriate) and details of organic and mineral content should be provided with full details of the analytical procedure (e.g. combustion analysis, electron microprobe analysis), methods of digestion/mineralisation, inductively coupled plasma (ICP) parameters, XRD, ICP-MS, atomic emission spectroscopy (AES), scanning electron microscopy (SEM) and/or energy dispersive X-ray spectroscopy (SEM-EDS), X-ray powder diffraction (XRD) as appropriate.

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length \( l \); metre: m
mass \( m \) kilogram kg; gram g
time; second s; minute min; hour h
thermodynamic temperature \( T \); kelvin K
Celsius temperature \( t \); degree Celsius 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 \( P \); watt W
volume \( V \); m\(^3\); litre l, L
chemical potential (partial molar Gibbs energy) \( \mu \) J mol\(^{-1}\)
viscosity: dynamic \( \eta \) Pa s; kinematic \( \mu \) m s\(^{-1}\)

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); \( 10^{2} \) h (hecto); \( 10^{3} \) k (kilo); \( 10^{6} \) M (mega); \( 10^{9} \) G (giga); \( 10^{12} \) T (tera); \( 10^{15} \) P (peta); \( 10^{18} \) E (exa)

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