



### TABLE OF CONTENTS

---

- **Description** p.1
- **Impact Factor** p.1
- **Abstracting and Indexing** p.2
- **Editorial Board** p.2
- **Guide for Authors** p.3



ISSN: 0021-9517

### DESCRIPTION

---

*Journal of Catalysis* is the premier scholarly publication in the field of **catalysis** and an indispensable source of information for chemists and chemical engineers in both industrial and academic fields. Over the last decade, *Journal of Catalysis* has been ranked among the top five **chemical engineering** journals in terms of impact and relevance. During this period, it has published some of the most important contributions to **physical chemistry** and the science and applications of catalysis.

*Journal of Catalysis* publishes original, rigorous, and scholarly contributions in the fields of **heterogeneous catalysis** and **homogeneous catalysis**. These include studies that relate **catalytic function** to fundamental chemical processes at surfaces and in **metal complexes**, novel concepts in **surface chemistry**, the **synthesis** and catalytic function of novel **inorganic solids** and **complexes**, spectroscopic methods for structural characterization, and theoretical methods of direct interest and impact in the science and applications of **catalysts** and **catalytic processes**.

*Journal of Catalysis* publishes manuscripts of archival value because of their significant fundamental and conceptual contributions to our understanding and practice of catalytic chemistries. The journal features authoritative articles, priority communications, research notes, and letters to the [Editors](#).

*Journal of Catalysis* also publishes Priority Communications and Research Notes. Priority Communications contain unique, exciting, and novel results that provide compelling evidence for rapid publication; while results in such communications may be of a preliminary nature, experimental details must be fully documented and the results reliably reproduced. Research Notes typically contain data and concepts that resolve in a concise but rigorous manner issues raised in previous publications.

### IMPACT FACTOR

---

2016: 6.844 © Clarivate Analytics Journal Citation Reports 2017

## ABSTRACTING AND INDEXING

---

Scopus  
Biological Abstracts  
Chem Inform  
Chemical Abstracts  
Chemical Engineering Abstracts  
Current Contents/Physics, Chemical, & Earth Sciences  
Engineering Index  
Literature Abstracts/Catalysts and Catalysis  
Research Alert  
Science Citation Index

## EDITORIAL BOARD

---

### ***Editor-in-Chief:***

**J.A. Lercher**, Technische Universität München, Garching, Germany

### ***Editors:***

**M. Beller**, Universität Rostock, Rostock, Germany  
**G.J. Hutchings**, Cardiff University, Cardiff, Wales, UK  
**M.T. Koper**, Universiteit Leiden, Leiden, Netherlands  
**H. Liu**, Peking University, Beijing, China  
**S.T. Oyama**, University of Tokyo, Tokyo, Japan  
**F.H. Ribeiro**, Purdue University, West Lafayette, Indiana, USA  
**J. Sauer**, Humboldt-Universität Berlin, Berlin, Germany  
**B.M. Weckhuysen**, Utrecht University, Utrecht, Netherlands

### ***Senior Editors:***

**J. Armor**, GlobalCatalysis.com, Orefield, Pennsylvania, USA  
**G.L. Haller**, Yale University, New Haven, Connecticut, USA  
**R. Prins**, Eidgenössische Technische Hochschule (ETH) Zürich, Zurich, Switzerland

### ***Associate Editors:***

**A. Bhan**, University of Minnesota, Minneapolis, USA  
**K. Takane**, King Abdullah University of Science and Technology (KAUST), Thuwal, Saudi Arabia

### ***Editorial Board:***

**C.R. Apesteguía**, Instituto de investigaciones en Catálisis y Petroquím (INCAPE), Santa Fe, Argentina  
**M.A. Barteau**, University of Michigan, Ann Arbor, Michigan, USA  
**A.T. Bell**, University of California at Berkeley, Berkeley, California, USA  
**A. Corma Canós**, Universitat Politècnica de València, Valencia, Spain  
**R. J. Davis**, Virginia Commonwealth University, Charlottesville, Virginia, USA  
**K.P. de Jong**, Utrecht University, Utrecht, Netherlands  
**W.N. Delgass**, Purdue University, West Lafayette, Indiana, USA  
**K. Domen**, University of Tokyo, Tokyo, Japan  
**J. Dumesic**, University of Wisconsin at Madison, Madison, Wisconsin, USA  
**H.-J. Freund**, Fritz Haber Institut der Max Planck Gesellschaft, Berlin, Germany  
**B.C. Gates**, University of California, Davis, Davis, California, USA  
**E. Iglesia**, University of California at Berkeley, Berkeley, California, USA  
**I. Ivanova**, M.V. Lomonosov Moscow State University, Moscow, Russian Federation  
**J.S. Lee**, Pohang University of Science and Technology, Pohang, Gyeongbuk, The Republic of Korea  
**C. Li**, Chinese Academy of Sciences (CAS), Dalian, China  
**J.K. Nørskov**, Stanford University, Menlo Park, California, USA  
**D.E. Resasco**, University of Oklahoma, Norman, Oklahoma, USA  
**S.L. Soled**, Exxonmobil Research & Engineering Company, Annandale, New Jersey, USA  
**H. Topsøe**, Haldor Topsøe A/S, Lyngby, Denmark  
**H. Toulhoat**, Institut Français du Pétrole (IFP), Rueil Malmaison, France  
**B. Wichterlova**, Academy of Sciences of the Czech Republic, Prague 8, Czech Republic

## GUIDE FOR AUTHORS

---

### *Your Paper Your Way*

We now differentiate between the requirements for new and revised submissions. You may choose to submit your manuscript as a single Word or PDF file to be used in the refereeing process. Only when your paper is at the revision stage, will you be requested to put your paper in to a 'correct format' for acceptance and provide the items required for the publication of your article.

**To find out more, please visit the Preparation section below.**

### INTRODUCTION

The *Journal of Catalysis* publishes original, rigorous, and scholarly contributions in the fields of heterogeneous and homogeneous catalysis. These include studies that relate catalytic function to fundamental chemical processes at surfaces and in metal complexes, novel concepts in surface chemistry, the synthesis and catalytic function of novel inorganic solids and complexes, spectroscopic methods for structural characterization, and theoretical methods of direct interest and impact in the science and applications of catalysts and catalytic processes.

*Journal of Catalysis* publishes manuscripts of archival value because of their significant fundamental and conceptual contributions to our understanding and practice of catalytic chemistries. The journal features authoritative articles, priority communications, research notes, and letters to the Editors. *Journal of Catalysis* is the premier scholarly publication in the field of catalysis and, over the last decade, it has been ranked among the top ten chemistry journals in terms of impact and relevance. During this period, it has published some of the most important contributions to the science and applications of catalysis and throughout its fifty-year history, it has been an indispensable source of information for chemists and chemical engineers in both industrial and academic fields.

*Journal of Catalysis* does not accept preliminary publications. It prefers full articles of scholarly in-depth studies and publishes short articles only in special cases, as Priority Communications or Research Notes. Priority Communications contain unique, exciting, and novel results that provide compelling evidence for rapid publication; while results in such communications may be of a preliminary nature, experimental details must be fully documented and the results reliably reproduced. Research Notes typically contain data and concepts that resolve in a concise but rigorous manner issues raised in previous publications

### *Types of Paper*

Research Notes, Letters to the Editor, and Priority Communications should have a maximum of 14 double-spaced typewritten manuscript pages (including tables and figures). Accepted Research Notes will not receive publication priority over regular articles. All Research Notes should include an abstract of 60-100 words.

Letters to the Editor will be considered for priority publication under the following conditions: (a) Letters must be related to some statement made in a recently published article in this journal; (b) in cases of conflicting views on any topic, no more than one letter from each author will be accepted.

The handling editor will evaluate the suitability of an article for consideration as a Priority Communication according to the following criteria: (a) The article contains unique, exciting, and obviously novel results with a clear requirement for rapid publication; (b) articles may be of preliminary nature, but experimental details of the preparation and conditions must be fully documented so that the experiment can be repeated. Priority Communications should include an abstract of 60-100 words; Introduction, Methods, Results, and Discussion sections; a maximum of 3 figures and/or tables in total; and a References section with only the most essential references included. Manuscripts submitted for publication as Priority Communications must be accompanied by a letter explaining why the material deserves rapid publication. Manuscripts accepted as Priority Communications will be printed as quickly after acceptance as possible. Manuscripts that are judged not to warrant priority publication may be considered for publication as Research Notes.

### *Submission checklist*

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

**Ensure that the following items are present:**

One author has been designated as the corresponding author with contact details:

- E-mail address
- Full postal address

All necessary files have been uploaded:

*Manuscript:*

- Include keywords
- All figures (include relevant captions)
- All tables (including titles, description, footnotes)
- Ensure all figure and table citations in the text match the files provided
- Indicate clearly if color should be used for any figures in print

*Graphical Abstracts / Highlights files* (where applicable)

*Supplemental files* (where applicable)

Further considerations

- Manuscript has been 'spell checked' and 'grammar checked'
- All references mentioned in the Reference List are cited in the text, and vice versa
- Permission has been obtained for use of copyrighted material from other sources (including the Internet)
- A competing interests statement is provided, even if the authors have no competing interests to declare
- Journal policies detailed in this guide have been reviewed
- Referee suggestions and contact details provided, based on journal requirements

For further information, visit our [Support Center](#).

## **BEFORE YOU BEGIN**

### ***Ethics in publishing***

Please see our information pages on [Ethics in publishing](#) and [Ethical guidelines for journal publication](#).

### ***Declaration of interest***

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. [More information](#).

### ***Plagiarism***

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, without the written consent of the copyright-holder.

Articles and any other material published in the *Journal of Catalysis* represent the opinions of the author(s) and should not be construed to reflect the opinions of the editor(s) or the publisher. Manuscripts that do not meet the general criteria or standards for publication in the *Journal of Catalysis* will be immediately returned to the authors, without detailed review. At their discretion, editors may request from the corresponding author a statement describing specific original contributions made by each co-author.

### **Submission declaration and verification**

Submission of an article implies that the work described has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see '[Multiple, redundant or concurrent publication](#)' section of our ethics policy for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service [Crossref Similarity Check](#).

### **Changes to authorship**

Authors are expected to consider carefully the list and order of authors **before** submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors **after** the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

### **Copyright**

Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see [more information](#) on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. [Permission](#) of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has [preprinted forms](#) for use by authors in these cases.

For open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' ([more information](#)). Permitted third party reuse of open access articles is determined by the author's choice of [user license](#).

### **Author rights**

As an author you (or your employer or institution) have certain rights to reuse your work. [More information](#).

#### *Elsevier supports responsible sharing*

Find out how you can [share your research](#) published in Elsevier journals.

### **Role of the funding source**

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

#### *Funding body agreements and policies*

Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the Open Access Publication Fee. Details of [existing agreements](#) are available online.

### **Open access**

This journal offers authors a choice in publishing their research:

## **Subscription**

- Articles are made available to subscribers as well as developing countries and patient groups through our [universal access programs](#).
- No open access publication fee payable by authors.

## **Open access**

- Articles are freely available to both subscribers and the wider public with permitted reuse.
- An open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For open access articles, permitted third party (re)use is defined by the following [Creative Commons user licenses](#):

### *Creative Commons Attribution (CC BY)*

Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.

### *Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)*

For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The open access publication fee for this journal is **USD 3600**, excluding taxes. Learn more about Elsevier's pricing policy: <https://www.elsevier.com/openaccesspricing>.

### *Green open access*

Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our [green open access page](#) for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. [Find out more](#).

This journal has an embargo period of 24 months.

### *Elsevier Researcher Academy*

[Researcher Academy](#) is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

### *Language (usage and editing services)*

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the [English Language Editing service](#) available from Elsevier's WebShop.

## **Submission**

Submission to this journal proceeds totally online. Use the following guidelines to prepare your article. Via the homepage of this journal (<http://ees.elsevier.com/jcat/>) you will be guided stepwise through the creation and uploading of the various files. The system automatically converts source files to a single Adobe Acrobat PDF version of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF at submission for the review



process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor's decision and requests for revision, takes place by e-mail and via the author's homepage, removing the need for a hard-copy paper trail.

#### *Referees*

Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our [Support site](#). Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

#### **Additional Information**

**Manuscripts must be submitted by the senior author, who must accept responsibility on behalf of all authors for all ethical requirements. The author submitting the manuscript will be listed as the corresponding author in the published version of each accepted manuscript.**

There are no submission fees or page charges. Each manuscript must be accompanied by a letter addressed to the specific editor and outlining the basic findings of the paper and its significance. If the manuscript refers to recently submitted manuscripts or papers in press (with the *Journal of Catalysis* or other journals), then a copy of each manuscript must be supplied so that the reviewers can judge the new manuscript in its proper context.

Revised manuscripts should be returned including revision notes. The revision notes should address the issues raised in the referee report and clearly state per page (indicate paragraph and line) which changes have been made. Additional materials may be requested at the discretion of the editor.

**Authors requested to revise their submission to *Journal of Catalysis* will be given 4 weeks in which to submit the revised submission. Revised submissions received after 4 weeks from the time at which the revision was requested will be considered as new submissions.**

**We also ask that for all manuscripts with 7 or more authors to include in the cover letter a list of each author's individual contribution to the manuscript.**

#### **PREPARATION**

##### **NEW SUBMISSIONS**

Submission to this journal proceeds totally online and you will be guided stepwise through the creation and uploading of your files. The system automatically converts your files to a single PDF file, which is used in the peer-review process.

As part of the Your Paper Your Way service, you may choose to submit your manuscript as a single file to be used in the refereeing process. This can be a PDF file or a Word document, in any format or layout that can be used by referees to evaluate your manuscript. It should contain high enough quality figures for refereeing. If you prefer to do so, you may still provide all or some of the source files at the initial submission. Please note that individual figure files larger than 10 MB must be uploaded separately.

#### *References*

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.

#### **Formatting requirements**

There are no strict formatting requirements but all manuscripts must contain the essential elements needed to convey your manuscript, for example Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, Artwork and Tables with Captions.

If your article includes any Videos and/or other Supplementary material, this should be included in your initial submission for peer review purposes.

Divide the article into clearly defined sections.

Use line numbering throughout your paper.

### *Figures and tables embedded in text*

Please ensure the figures and the tables included in the single file are placed next to the relevant text in the manuscript, rather than at the bottom or the top of the file. The corresponding caption should be placed directly below the figure or table.

### **Peer review**

This journal operates a single blind review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. [More information on types of peer review.](#)

### **REVISED SUBMISSIONS**

#### *Use of word processing software*

Regardless of the file format of the original submission, at revision you must provide us with an editable file of the entire article. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the [Guide to Publishing with Elsevier](#)). See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

### **Article structure**

#### *Subdivision - numbered sections*

Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

#### *Introduction*

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

### **Materials and Methods**

Experimentals and methods should be sufficiently detailed to enable the experiments to be reproduced. Authors should draw attention to any particular chemical or biological hazards that may be involved in carrying out the experiments described. Any relevant safety precautions should be described; if an accepted code of practice has been followed, a reference to the relevant standards should be given.

#### *Results*

Results should be clear and concise.

### **Discussion**

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. Results and Discussion may be combined and may be organized into subheadings.

#### *Conclusions*

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.

#### *Appendices*

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.

### **Essential title page information**

- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-



case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.

- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**

- **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

### **Abstract**

A concise and factual abstract is required (**maximum length: 150 words**). The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separate from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, they must be cited in full, without reference to the reference list. Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

### **Graphical Abstract**

Authors must supply a graphical abstract at the time the paper is first submitted. The abstract should summarize the contents of the paper in a concise, pictorial form designed to capture the attention of a wide readership and for compilation of databases. Authors must provide images that clearly represent the work described in the paper. The content of the graphical abstract will be typeset and should be kept within an area of 5 cm by 17 cm. Authors must supply the graphic separately as an electronic file.

### **Highlights**

Highlights are mandatory for this journal. They consist of a short collection of bullet points that convey the core findings of the article and should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point). You can view [example Highlights](#) on our information site.

### **Keywords**

Immediately after the abstract, provide a maximum of 10 keywords, avoiding general and plural terms and multiple concepts (avoid, for example, "and," "of"). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

### **Abbreviations**

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

### **Acknowledgements**

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proofreading the article, etc.). Include information on grants received.

### **Formatting of funding sources**

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### *Footnotes*

Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors build footnotes into the text, and this feature may be used. Should this not be the case, indicate the position of footnotes in the text and present the footnotes themselves separately at the end of the article.

### **Artwork**

#### *Electronic artwork*

##### *General points*

- Make sure you use uniform lettering and sizing of your original artwork.
- Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Indicate per figure if it is a single, 1.5 or 2-column fitting image.
- For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.
- Please note that individual figure files larger than 10 MB must be provided in separate source files. A detailed [guide on electronic artwork](#) is available.

**You are urged to visit this site; some excerpts from the detailed information are given here.**

##### *Formats*

Regardless of the application used, when your electronic artwork is finalized, please 'save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

EPS (or PDF): Vector drawings. Embed the font or save the text as 'graphics'.

TIFF (or JPG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.

TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.

TIFF (or JPG): Combinations bitmapped line/half-tone (color or grayscale): a minimum of 500 dpi is required.

##### **Please do not:**

- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low.
- Supply files that are too low in resolution.
- Submit graphics that are disproportionately large for the content.

### **Color Artwork**

Please make sure that artwork files are in an acceptable format (TIFF, EPS or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable colour figures then Elsevier will ensure, at no additional charge, that these figures will appear in colour on the Web (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in colour in the printed version. For colour reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article. Please indicate your preference for colour in print or on the Web only. For further information on the preparation of electronic artwork, please see <http://www.elsevier.com/artworkinstructions>.

**Please note: Because of technical complications which can arise by converting colour figures to "grey scale" (for the printed version should you not opt for colour in print) please submit in addition usable black and white versions of all the colour illustrations. Color figures should not be submitted unless the Authors are willing to assume all costs associated with color reproduction. If color reproduction is essential and the authors intend to argue for a waiver of charges, the Editor should be consulted upon manuscript submission.**

#### *Figure captions*

Ensure that each illustration has a caption. A caption should comprise a brief title (**not** on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

## Tables

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

## References

### *Citation in Text; Proof of 'in press' required*

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either "Unpublished results" or "Personal communication". Citation of a reference as "in press" implies that the item has been accepted for publication and a copy of the title page of the relevant article must be submitted.

**Authors must supply a full-text copy of all unpublished references (including "Personal Communications" and papers "in press"). These references will be included in your submission and will be verified by the reviewers of your manuscript. Any submission that does not comply with this requirement will be rejected by the Editors.**

### *Web references*

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

### *Data References*

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

[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. <http://dx.doi.org/10.17632/xwj98nb39r.1>.

### *Reference management software*

Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support [Citation Style Language styles](#), such as [Mendeley](#) and [Zotero](#), as well as [EndNote](#). Using the word processor plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:

<http://open.mendeley.com/use-citation-style/journal-of-catalysis>

When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

### *Reference formatting*

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

## Reference Style

References should be individually numbered in the order in which they are cited in the text (including tables assuming they will be located where they are first mentioned in the text), and listed in numerical sequence on separate sheets at the end of the paper, typed in double spacing. The numbers (no alphabetical characters) should appear in the text at the appropriate places in square brackets [ ]. In the reference list, periodicals [1], books [2], multiauthor books with editors [3], proceedings [4], and patents [5] should be cited in accordance with the following examples:

- [1] M. Inoue, H. Kominami, T. Inui, *Appl. Catal. A* 121 (1995) 1.
- [2] Nielsen, *An Investigation on Promoted Iron Catalysts for the Synthesis of Ammonia*, Jul. Giellerups Forlag, Copenhagen, 1968, p. 72.
- [3] M.V. Sargent, F.M. Dean, in: A.R. Katrizky, C.W. Rees (Eds.), *Comprehensive Heterocyclic Chemistry*, Pergamon Press, Oxford, 1977, p. 599.
- [4] F.E. Wagner, M. Karger, F. Probst, B. Schutter, in: P. Jena, C.B. Satterthwaite (Eds.), *Electronic Structure and Properties of Hydrogen in Metals*, Proc. NATO Int. Symp., Richmond, VA, 4-6 March 1982, Plenum, New York, 1983, p. 581.
- [5] J. Ciric, US Patent 3 972 983 (1976), to Mobil Oil Corporation.

Authors' and editors' names should be given as initials followed by surname. The names of all authors (and/or all editors) should be listed in the reference list; "et al." should not be used here. Abbreviations for the titles of journals should follow the system used by Chemical Abstracts. Each reference should be complete in itself; therefore *ibid.* should not be used in the reference list.

### *Journal abbreviations source*

Journal names should be abbreviated according to the [List of Title Word Abbreviations](#).

## Video

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. . In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including [ScienceDirect](#). Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our [video instruction pages](#). Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

## AudioSlides

The journal encourages authors to create an AudioSlides presentation with their published article. AudioSlides are brief, webinar-style presentations that are shown next to the online article on ScienceDirect. This gives authors the opportunity to summarize their research in their own words and to help readers understand what the paper is about. [More information and examples are available](#). Authors of this journal will automatically receive an invitation e-mail to create an AudioSlides presentation after acceptance of their paper.

## Data visualization

Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions [here](#) to find out about available data visualization options and how to include them with your article.

## Supplementary material

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to

supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

### **Research data**

This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the [research data](#) page.

#### *Data linking*

If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the [database linking page](#).

For [supported data repositories](#) a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

#### *Mendeley Data*

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. Before submitting your article, you can deposit the relevant datasets to *Mendeley Data*. Please include the DOI of the deposited dataset(s) in your main manuscript file. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the [Mendeley Data for journals page](#).

#### *Data in Brief*

You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for *Data in Brief* as an additional item directly alongside the revised version of your manuscript. If your research article is accepted, your data article will automatically be transferred over to *Data in Brief* where it will be editorially reviewed and published in the open access data journal, *Data in Brief*. Please note an open access fee of 500 USD is payable for publication in *Data in Brief*. Full details can be found on the [Data in Brief website](#). Please use [this template](#) to write your Data in Brief.

#### *MethodsX*

You have the option of converting relevant protocols and methods into one or multiple MethodsX articles, a new kind of article that describes the details of customized research methods. Many researchers spend a significant amount of time on developing methods to fit their specific needs or setting, but often without getting credit for this part of their work. MethodsX, an open access journal, now publishes this information in order to make it searchable, peer reviewed, citable and reproducible. Authors are encouraged to submit their MethodsX article as an additional item directly alongside the revised version of their manuscript. If your research article is accepted, your methods article will



automatically be transferred over to MethodsX where it will be editorially reviewed. Please note an open access fee is payable for publication in MethodsX. Full details can be found on the MethodsX website. Please use [this template](#) to prepare your MethodsX article.

#### *Data statement*

To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the [Data Statement page](#).

#### **Additional Information**

When preparing the manuscript, use double spacing and wide (3 cm) margins. (Avoid full justification; i.e., do not use a constant right-hand margin.) Ensure that each new paragraph is clearly indicated. Present tables and figure legends on separate pages at the end of the manuscript. If possible, consult a recent issue of the journal to become familiar with layout and conventions. Number all pages consecutively.

#### Chemical reaction data

For heterogeneous catalysis, presentation should include reaction rates normalized by catalyst surface area, surface area of the active phase, or number of active surface atoms or catalytic sites, as appropriate. Typical rate units are  $\text{mol s}^{-1} \text{m}^{-2}$  or, in the case of surface atom normalization to produce turnover frequencies,  $\text{s}^{-1}$ . For homogeneous catalysis, rates should typically be reported as turnover frequencies. Comparisons of selectivities should be made at similar conversions. Catalytic measurements need to be carried out under kinetically limited conditions. Confirming tests need to be carried out and reported, especially for all reactions occurring in the liquid phase.

### **AFTER ACCEPTANCE**

#### **Online proof correction**

Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.

If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.

We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

#### **Offprints**

The corresponding author will, at no cost, receive a customized [Share Link](#) providing 50 days free access to the final published version of the article on [ScienceDirect](#). The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier's [Webshop](#). Corresponding authors who have published their article open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

### **AUTHOR INQUIRIES**

Visit the [Elsevier Support Center](#) to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.

You can also [check the status of your submitted article](#) or find out [when your accepted article will be published](#).