Review-Ready Submission

Beginning in 2018, all ACS journals have simplified their formatting requirements in favor of a streamlined and standardized review-ready format for an initial manuscript submission. This change allows authors to focus on the scientific content needed for efficient review rather than on formatting concerns. It will also help ensure that reviewers are able to focus on the scientific merit of a submission during the peer review process. Review-Ready Submission will also reduce the effort needed to revise formatting should a manuscript be transferred as a submission to a different ACS journal. Authors will be asked to attend to any journal-specific formatting requirements during manuscript revision.

Manuscripts submitted for initial consideration must adhere to these standards:

- Submissions must be complete with clearly identified standard sections used to report original research, free of annotations or highlights, and include all numbered and labeled components.
- Figures, charts, tables, schemes, and equations should be embedded in the text. Separate graphics can be supplied at revision.
- When required by a journal’s structure or length limitations, manuscript templates should be used.
- References can be provided in any style, but they must be complete, including titles.
- Supporting Information should be submitted as a separate file(s).
Author names and affiliations on the manuscript must match what is entered into ACS Paragon Plus.

Scope and Editorial Policy

I. General Considerations

ACS Catalysis is an interdisciplinary journal publishing original research on and at the interfaces of heterogeneous catalysis, homogeneous catalysis, and biocatalysis. The journal is devoted to reports of new and original experimental and theoretical research on molecules, macromolecules or materials that are catalytic in nature (exhibiting catalytic turnover), and the catalysts should be characterized to the extent possible by turnover frequencies and fundamental kinetic parameters. Manuscripts that are essentially reporting data or applications of data are, in general, not suitable for publication in ACS Catalysis. While papers focusing on catalytic turnover (catalysis) will form the core of the journal, highly impactful papers characterizing catalytic materials or molecules (catalysts) will also be considered. All manuscripts are subject to evaluation by the Editor and/or Associate Editors prior to external peer review, and manuscripts sufficiently lacking in novelty or new insights may be rejected without external peer review. In such instances, these decisions will be made expediently so as to not delay publication elsewhere. Before publication, all manuscripts, including invited contributions, are subject to critical, anonymous peer review. Reviewers are advisory to the Editor. It is understood that the final decision relating to a manuscript’s suitability rests solely with the Editor.

ACS Catalysis considers for publication only original work that has not been previously published and is not under consideration for publication elsewhere. When submitting a manuscript, an author should inform the Editor of any prior dissemination of the content in print or electronic format. This includes electronic posting of conference presentations, posters, and preprints on institutional repositories, prepublication databases, and other Web sites. Posting of submitted manuscripts to preprint servers or databases (e.g. ChemRxiv, ArXiv) does not conflict with ACS Catalysis' prior publication policies, but should be disclosed to the Editor at time of submission. It is the author’s responsibility to provide the Editor with copies of any relevant preprint(s).

ACS Catalysis authors are allowed to deposit an initial draft of their manuscript in a preprint service such as ChemRxiv, arXiv, bioRxiv, or the applicable repository for their discipline prior to submission. Authors should supply author list (tagged as usual), accessed date and preprint identifier. Article title is optional additional information.

Notice: Manuscripts in their final, edited form will be published on the “Articles ASAP” page on the Journal Web site as soon as page proofs are corrected and all author concerns are resolved. Publication on the Web usually occurs within 1–4 working days of receipt of page proof corrections, and this can be up to a month in advance of the cover date of the issue. In addition, Just Accepted manuscripts are posted online in their initial accepted form prior to technical editing (if the author chooses this option). See the section entitled “Just Accepted Manuscripts” of this document for details. Authors should take this schedule into account when planning intellectual and patent activities as well as news releases related to a manuscript (see the “Patent Activities and Intellectual Property Issues in the Preparation of Manuscripts” section of this
document). The actual date on which an accepted paper is published on the Web is recorded on
the Web version of the manuscript and on the first page of the PDF version.

Corresponding authors will receive 50 free electronic reprints via an Electronic Reprint URL.
There are no page charges associated with ACS Catalysis.

II. Types of Manuscripts

ACS Catalysis publishes the following types of papers: Letters, Articles, Perspectives, Reviews,
and Viewpoints. Accounts, Correspondence, and Additions and Corrections are also published.

A. Letters are short articles that report results whose immediate availability to the science and
engineering community is deemed important. Letters are restricted to 2000 words or the
equivalent (8 double-spaced typewritten pages of text and 4–5 figures). A brief abstract of less
than 100 words should be included. Letters often will be complete publications, but follow-up
publication may occasionally be justified when the research is continued and a more complete
account of the work is deemed necessary. Special efforts will be made to expedite the reviewing
and the publication of Letters. The time for proofreading the galley proofs is relatively short. For
this reason, authors of Letters should ensure that manuscripts are in final, error-free form when
submitted. A template for Letters is available
(http://pubs.acs.org/page/accacs/submission/templates.html).

B. Articles should cover their subjects with thoroughness, clarity, and completeness but should
be as concise as possible. Abstracts to Articles are typically limited to 300 words and should
summarize the significant results and conclusions.

C. Perspectives are short reviews of recent developments in an established or developing topical
area. Authors of perspectives are asked to provide a critical assessment of the field of interest,
rather than a compilation and summary of literature reports. Perspectives will typically be 5–20
pages in length, depending on the topic being covered. Authors may be invited by the Editor to
submit Perspectives. Unsolicited Perspectives will be considered, as well; however, authors
interested in submitting a Perspective are strongly encouraged to contact the Editor prior to
manuscript preparation and submission to seek conditional approval of the proposed review
topic. One-page proposals should be sent to the Editor-in-Chief, Christopher Jones
(EIC@catalysis.acs.org) for consideration.

D. Reviews are comprehensive, critical examinations of a selected topic, typically over a defined
time period. Unsolved problems and emerging areas should be highlighted. A Review should
consist of a maximum of 40 pages (approximately 65000 characters) of main text, footnotes,
literature citations, tables, and legends. Most Reviews are expected to be substantially shorter in
length, but the length will be dictated by the subject matter to some degree. Authors may be
invited by the Editor to submit Reviews. Unsolicited Reviews will be considered, as well;
however, authors interested in submitting a Review are strongly encouraged to contact the Editor
prior to manuscript preparation and submission to seek conditional approval of the proposed
review topic. One-page proposals should be sent to the Editor-in-Chief, Christopher Jones
(EIC@catalysis.acs.org) for consideration.
E. **Viewpoints** appear mostly as a result of an invitation from the Editor and will be so designated. Viewpoints may be general commentaries and tutorials of immediate interest to the broad readership. These articles normally will be in highly active research areas, and they are not intended to be reviews of the literature. The author will be asked to provide a clear, concise, and critical status report of the field as an introduction, and the author's own insights or contributions to the field should constitute the main body of the article. Viewpoints will typically range from 3 to 6 journal pages in length and have no abstract included. However, a Table of Contents graphic is required for this type of manuscript (see below for further information). Authors in highly active research fields of broad interest in catalysis are encouraged to propose Viewpoints. Unsolicited Viewpoints will be considered, as well; however, authors interested in submitting a Viewpoint are strongly encouraged to contact the Editor prior to manuscript preparation and submission to seek conditional approval of the proposed topic. One-page proposals should be sent to the Editor-in-Chief, Christopher Jones, (EIC@catalysis.acs.org) for consideration.

F. **Accounts** are reviews of a prominent catalysis researcher's scientific contributions, published to mark the researcher's retirement or other notable event/anniversary. They should include details of the researcher's career, including their scientific and technical influences and positions held, with the main body of the piece discussing the major new findings or advances he/she made over his/her career. In the majority of cases, these will be organized chronologically. Contributions are not written by the subject of the contribution, but are instead typically written by current or former associates of the scientist or engineer. Accounts adopt a format similar to Perspectives, being typically 6–20 journal pages in length and using figures, schemes, and tables where possible as well as photographs where appropriate. Note that permission must be obtained for use of all pictures and figures. Accounts will be published infrequently by the journal and are published on an invitation-only basis.

G. **Correspondence/Rebuttal.** Correspondence is a technical contribution providing, with supporting material, a respectful but alternative point of view to one that has appeared in ACS Catalysis. The author of the original publication may be invited to write a Rebuttal. The Correspondence and Rebuttal will appear in the same issue of the journal.

H. **Additions and Corrections** should be submitted by the corresponding author if errors of consequence are detected in the published paper. An addition or correction may be submitted via the ACS Paragon Plus Environment (select “Additions and Corrections” as the manuscript type). All Additions and Corrections are subject to approval by the Editor, and minor corrections and additions will not be published. Additions and Corrections may not be submitted by anyone other than the corresponding author of the paper requiring correction. The corresponding author should obtain approval from all coauthors prior to submitting an addition or correction. Readers who detect errors of consequence in the work of others should contact the corresponding author of that work.

**Expression of Concern**

The American Chemical Society (ACS) follows guidance from the Committee on Publication Ethics (COPE) when considering expressions of concern; for more information see: [http://publicationethics.org/](http://publicationethics.org/). In accordance with COPE guidelines, expressions of concern may be issued if:
• there is inconclusive evidence of research or publication misconduct by the authors;
• there is evidence that the findings are unreliable but the authors’ institution will not investigate the case;
• an investigation into alleged misconduct related to the publication either has not been, or would not be, fair and impartial or conclusive;
• an investigation is underway but a judgment will not be available for a considerable time.

Expressions of concern are published at the discretion of the Editor-in-Chief. Upon completion of any related investigation, and when a final determination is made about the outcome of the article, the expression of concern may be replaced with a retraction notice or correction.

**III. Functions of Reviewers**

The Editor requests the scientific advice of reviewers who are active in the area of research and development covered by the manuscript. The reviewers act only in an advisory capacity, and the final decision concerning a manuscript is the responsibility of the Editor. The reviewers are asked to comment not only on the scientific content but also on the manuscript’s suitability for *ACS Catalysis*. With respect to Letters, the reviewers are asked to comment specifically on the urgency of publication. **Authors must suggest, when submitting a manuscript, names and e-mail addresses of at least four scientists who could give a competent and objective evaluation of the work.** These suggested reviewers must be neither former mentors or mentees, nor collaborators or coauthors from the past five years. All reviews are anonymous, and the reviewing process is most effective if reviewers do not reveal their identities to the authors. An exception arises in connection with a manuscript submitted for publication in the form of a comment on the work of another author. Under such circumstances, the first author will, in general, be allowed to review the communication and to write a rebuttal. The rebuttal and the original communication will typically be published together in the same issue of the journal.

**IV. Revised Manuscripts**

A manuscript sent back to an author for revision should be returned to the Editor as soon as possible. The revision deadlines for Articles, Perspectives, Reviews, and Viewpoints are as follows:

- Minor revisions: 21 days
- Major revisions: 45 days
- Reject and resubmit: 90 days

Owing to their shorter format and higher degree of urgency, the revision deadlines for Letters are as follows:

- Minor revisions: 14 days
- Major revisions: 21 days
- Reject and resubmit: 60 days
If a revision is not received by the given deadline, the manuscript will be considered withdrawn unless an agreement has been reached with the Editor for an extension of the deadline. Revised manuscripts are sometimes sent back to the original reviewers, who are asked to comment on the revisions. If only minor revisions are involved, in most cases, the Editor will examine the revised manuscript in light of the recommendations of the reviewers without seeking further opinions. A letter from the author must accompany the revised manuscript and provide a detailed account of how the author has responded to the reviewer’s comments. This letter should include the reviewers’ comments and a “point-by-point” response to each, including any changes made, from the authors. The dates of receipt of both the original and revised manuscripts will appear in publication.

V. Manuscript Transfer

If your submission is declined for publication by this journal, the editors might deem your work to be better suited for another ACS Publications journal and suggest that the authors consider transferring the submission. Manuscript Transfer simplifies and shortens the process of submitting to another ACS journal, as all the coauthors, suggested reviewers, manuscript files, and responses to submission questions are copied by ACS Paragon Plus to the new draft submission. Authors are free to accept or decline the transfer offer.

Once a transfer is accepted, authors will then complete the submission to the new journal in ACS Paragon Plus. During the submission process, they will have the opportunity to revise the manuscript and address comments received from editors or reviewers. Requirements of the new journal may be different, so authors should also check the Author Guidelines for the new journal and make any needed revisions in order to conform to those requirements. Please keep in mind that the reviews, reviewer identities, and decision letter will all be transferred to the new journal. Authors are encouraged to identify changes made to the manuscript in a cover letter for the new journal.

Note that transferring a manuscript is not a guarantee that the manuscript will be accepted, as the final publication decision will belong to the editor in the new journal. For complete details, see http://pubs.acs.org/page/policy/manuscript_transfer/index.html.

Preparation of Manuscripts

Submission of Manuscripts

Manuscripts must be submitted via the ACS Paragon Plus Environment (http://acsparagonplus.acs.org). Complete instructions and an overview of the electronic online (Web) submission process are available through the secure ACS Paragon Plus Web site. Authors will view the PDF version of their manuscripts prior to formal submission to the Editor. In response to the request for revision from the Editor, authors must also submit all revisions and final, accepted manuscripts via the ACS Paragon Plus Environment. The supported platforms and word processing packages are listed in the ACS Catalysis Web home page via http://pubs.acs.org/catalysis. To use Web submission, authors must be able to provide electronic versions of text and graphics. Any Supporting Information should also be submitted electronically.
The web submission site employs state-of-the-art security mechanisms to ensure that all electronically submitted papers are secure. These same security mechanisms are also utilized throughout the peer-review process, permitting access only to editors and reviewers who are assigned to a particular manuscript.

Authors are asked to embed graphics in the text. A mechanism is also provided for submitting an electronic cover letter to the Editor. Authors will be sent a message by e-mail acknowledging receipt of the manuscript. **Manuscripts submitted as e-mail attachments will not be accepted.**

**ORCID**

Authors submitting manuscript revisions are required to provide their own personal, validated ORCID iD before completing the submission, if an ORCID iD is not already associated with their ACS Paragon Plus user profiles. This iD may be provided during original manuscript submission or when submitting the manuscript revision. All authors are strongly encouraged to register for an ORCID iD, a unique researcher identifier. The ORCID iD will be displayed in the published article for any author on a manuscript who has a validated ORCID iD associated with ACS when the manuscript is accepted.

With an ORCID iD, you can create a profile of your research activities to distinguish yourself from other researchers with similar names, and make it easier for your colleagues to find your publications. If you do not yet have an ORCID iD, or wish to associate your existing ORCID iD with your ACS Paragon Plus account, you may do so by following the ORCID-related links in the Email/Name section of your ACS Paragon Plus account. Learn more at [http://www.orcid.org](http://www.orcid.org).

**Journal Publishing Agreement**

A properly completed and signed Journal Publishing Agreement must be submitted for each manuscript. ACS Paragon Plus provides an electronic version of the Agreement that will be available on the My Authoring Activity tab of the Corresponding Author's Home page once the manuscript has been assigned to an Editor. A PDF version of the Agreement is also available, but **Authors are strongly encouraged to use the electronic Journal Publishing Agreement.** If the PDF version is used, **all pages of the signed PDF Agreement must be submitted.** If the Corresponding Author cannot or should not complete either the electronic or PDF version for any reason, another Author should complete and sign the PDF version of the form. Forms and complete instructions are available at [http://pubs.acs.org/page/copyright/journals/index.html](http://pubs.acs.org/page/copyright/journals/index.html). The signed Journal Publishing Agreement also indicates that the Author acknowledges the ACS’s Ethical Guidelines to Publication of Chemical Research ([http://pubs.acs.org/ethics](http://pubs.acs.org/ethics)).

**Table of Contents and Abstract Graphics**

A graphic must be included with each manuscript for the Table of Contents (TOC), which will also be used as the Abstract graphic. This graphic should capture the reader’s attention and, in conjunction with the manuscript title, should give the reader a quick visual impression of the essence of the paper without providing specific results. The graphic should be in the form of a structure, graph, drawing, SEM/TEM photograph, or reaction scheme. The author must submit a graphic in the actual size to be used for the TOC (135 points in height × 240 points in width for single-column; 135 points in height × 420 points in width for double column) that will fit in an area 1.87 in. high and 3.33 in. wide (4.77 cm × 8.46 cm). Larger images will be reduced to fit
within those dimensions. Type size of labels, formulas, or numbers within the graphic must be legible. Tables or spectra are not acceptable. Provide the TOC graphic upon submission of the paper as the last page of the manuscript.

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**Conflict of Interest Disclosure**

A statement describing any financial conflicts of interest or lack thereof is published with each manuscript. During the submission process, the corresponding author must provide this statement on behalf of all authors of the manuscript. The statement should describe all potential sources of bias, including affiliations, funding sources, and financial or management relationships, that may constitute conflicts of interest (please see the ACS Ethical Guidelines: [http://pubs.acs.org/ethics](http://pubs.acs.org/ethics)). The statement will be published in the final article. If no conflict of interest is declared, the following statement will be published in the article: “The authors declare no competing financial interest.”

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**Author List**

During manuscript submission, the submitting author must provide contact information (full name, email address, institutional affiliation and mailing address) for all of the co-authors. Because all of the author names are automatically imported into the electronic Journal Publishing Agreement, the names must be entered into ACS Paragon Plus in the same sequence as they appear on the first page of the manuscript. (Note that co-authors are not required to register in ACS Paragon Plus.) The author who submits the manuscript for publication accepts the responsibility of notifying all co-authors that the manuscript is being submitted. Deletion of an author after the manuscript has been submitted requires a confirming letter to the Editor-in-Chief from the author whose name is being deleted. For more information on ethical responsibilities of authors, see the [Ethical Guidelines to Publication of Chemical Research](http://pubs.acs.org/ethics).
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Authors may want professional assistance with improving the English, figures, or formatting in their manuscript before submission. ACS ChemWorx Authoring Services can save you time and improve the communication of research in your manuscript. You can learn more about the services offered at http://es.acschemworx.acs.org.

Cover Letter
A letter **must** accompany the manuscript, and it **must** contain the following elements. Please provide these elements in the order listed.

- A paragraph explaining why your manuscript is appropriate for *ACS Catalysis*. This paragraph should clearly indicate what key advance(s) is/are described in the work.
- If the manuscript was previously rejected by *ACS Catalysis*, provide the manuscript number of the rejected manuscript and a detailed response to each reviewer’s comments.
- If the manuscript was previously declined by any other ACS journal, provide the name of the journal, the manuscript number, an explanation of the basis for the rejection, and a statement granting *ACS Catalysis* permission to obtain the Editor’s decision letter and reviews for the declined manuscript. Please provide a detailed response to each reviewer’s comments as outlined in Section IV, Revised Manuscripts. If some version of the manuscript was previously submitted to a non-ACS journal, this submission must be noted in the cover letter, although further details regarding the review process are not required unless the authors choose to include them.
- A statement confirming the manuscript, or its contents in some other form, has not been published previously by any of the authors and/or is not under consideration for publication in another journal at the time of submission.
- A description of any supporting information and/or Review-Only Material.
- The names and e-mail addresses of at least four possible reviewers. These suggested reviewers must not be former mentors or mentees nor collaborators or coauthors from the past five years.

Submission Details
The following information is required for manuscript submission in the ACS Paragon Plus Environment:

- **Type of manuscript** (Letter, Article, Perspective, Review, Viewpoint, Correspondence, or Addition and Correction)
- **Manuscript title**
- **Abstract**
- **Verification of authorship or submitting agent**
- **Name and contact information (including e-mail address) of the Corresponding Author**
• Name(s) and contact information (including e-mail address) of all other authors

Precautions for handling dangerous material or for performing hazardous procedures should be explicitly stated.

Preparing and Submitting Manuscripts Using TeX/LaTeX

Authors including math, display or in-text, in their manuscripts are encouraged to consult the ACS Guidelines for Presenting Mathematical Information. This style sheet provides brief discussion of formatting related to the presentation of mathematical formulas, complete with examples of ACS style and layout. This document was developed to help authors anticipate how mathematical expressions will be formatted in the published version of the paper.

ACS Publications currently supports TeX/LaTeX Version 2.0.2 and earlier. Authors who submit manuscripts composed in TeX/LaTeX should submit a PDF file of the manuscript along with the native TeX/LaTeX manuscript package as a ZIP Archive. Use of the freely available achemso style package to help prepare your submission is strongly encouraged. The achemso package provides the official macros (achemso.cls) and BibTeX styles (achemso.bst and biochem.bst) for submission to ACS journals. The package and instructions are available from CTAN, the Comprehensive TeX Archive Network. For complete information on submitting TeX/LaTeX files, see Preparing and Submitting Manuscripts Using TeX/LaTeX.

Submitting Artwork for the Journal Cover

ACS Catalysis features a different image on the cover of each issue. The image is usually related to work that is published in that particular issue. Authors are encouraged to submit images to be considered for use on future covers at the time of the initial submission of their manuscript.

Images to be considered for the cover should be submitted as TIF, JPG, PNG or EPS files with a resolution of at least 300 dpi for pixel-based images. The image size is 6.9 in × 7.87 in., 17.5 cm × 20 cm, or 2100 × 2400 pixels. More information may be found in the Digital Image Guidelines for Journal Cover Graphics in the ACS Paragon Plus Environment. Please include a separate Journal Publishing Agreement (for unpublished images) or written permission to reproduce in all media (for previously published images) for each image submitted, the name of the person who created the image, and a brief description of the image. Copyright and Permission Request forms are available on the Publications Division Web site, at http://pubs.acs.org/copyright.

Just Accepted Manuscripts

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information, please refer to the Just Accepted FAQ, accessible from http://help.acs.org. Note that publishing a manuscript as Just Accepted is not a means by which to comply with the NIH Public Access Mandate.

**Patent Activities and Intellectual Property Issues**
Authors are responsible for ensuring that all patent activities and intellectual property issues are satisfactorily resolved prior to first publication (Just Accepted, ASAP, or in issue). Acceptance and publication will not be delayed for pending or unresolved issues of this nature.

**Related Work by Author**
All related work under consideration for publication in any medium must be cited in the manuscript and the Editor informed at the time of submission. When related work by any of the authors is not available because it is in press (accepted), submitted, or in preparation for submission to ACS Catalysis or another journal, a copy of each related paper should be uploaded as “Supporting Information for Review Only” at the time of submission for use by the reviewers and the Editors. If a cited reference has already appeared on the Web, indicate that it is published electronically (“ASAP” for ACS journals) and give the DOI number for convenient access. The full journal citation should be completed during manuscript revision or page proof correction, if possible.

**Elements of Manuscripts**
Authors should consult a recent issue of ACS Catalysis and The ACS Style Guide, 3rd ed. (2006) Oxford University Press, Order Department, 201 Evans Road, Cary, NC 27513, for formal guidance. Any author who is not fluent in idiomatic English is urged to obtain assistance with manuscript preparation from a fluent colleague or the ACS ChemWorx English Editing Service because manuscripts with grammar deficiencies are sometimes handicapped during the scientific review process.

**Title**
Titles should clearly and concisely reflect the emphasis and content of the paper. Titles are of great importance for current awareness and information retrieval and should be carefully constructed for these purposes. Titles of manuscripts may not contain the word “First”, “Novel”, “Superb”, “Excellent”, “Exceptional”, “Outstanding” or other similar descriptive words, nor any part number or series number without permission from the Editor.

**Author List**
Bylines should include all those who have made substantial contributions to the work. To facilitate indexing and retrieval and for unique identification of an author, use first names, initials, and surnames (e.g., John R. Smith) or first initials, second names, and last names (e.g., J. Robert Smith). At least one author must be designated with an asterisk to indicate the person to whom readers may send correspondence. There should be no more than three corresponding authors per paper. Deceased persons who meet the criterion for inclusion as co-authors should be so included, with a footnote indicating the date of death.
Institution Address
The author affiliation(s) listed should be the institution(s) where the work was conducted. If the present address of an author differs from that at which the work was done, the current address should be given in a footnote. The e-mail address(es) of the corresponding author or authors must also be provided as a separate line below the institution addresses.

Many Funders and Institutions require that institutional affiliations are identified for all authors listed in the work being submitted. ACS facilitates this requirement by collecting institution information during manuscript submission under Step 2: Authors and Affiliations in ACS Paragon Plus.

Abstract
All Articles, Letters, Perspectives, and Reviews must be accompanied by an abstract, including an Abstract (TOC) graphic, which should state briefly the purpose of the research (if this is not contained in the title), the principal results, and major conclusions. Abstracts of manuscripts may not contain the words “superb”, “excellent”, “exceptional”, “outstanding”, or other similar descriptive words unless rigorously supported by a thorough comparison with the state-of-the-art in the manuscript.

Keywords
All Articles, Letters, Perspectives, and Reviews must be accompanied by 5–8 keywords. These keywords will appear in the PDF version of the article and will also be used as a search term in the HTML version of the article.

Text
All sections of the paper must be presented in a clear and concise manner. Authors should include an introductory statement outlining the scientific motivation for the research. The statement should clearly specify the questions for which the answers are sought as well as the connection of the present work with previous and current work in the field. In both Letters and Articles, the introduction should be a separate section of the paper. In the discussion section, the author should discuss the significance of his/her observations, measurements, or computations. Conclusions of manuscripts may not contain the words “superb”, “excellent”, “exceptional”, “outstanding” or similar descriptive words unless the claim is rigorously supported by a thorough comparison with the state-of-the-art in the manuscript. The author should also point out how they contribute to the scientific objectives indicated in the introduction. Tabulation of experimental results is encouraged whenever it leads to a more effective presentation or economical use of space. Authors are encouraged to make extensive use of the Supporting Information format, because this material is now widely available on the Web at http://pubs.acs.org.

Plagiarism. Manuscripts must be original with respect to concept, content, and writing. It is not appropriate for an author to reuse wording from other publications, including one’s own previous publications, whether or not that publication is cited.

Figures. All figures must be mentioned in the text in consecutive order and must be numbered with Arabic numerals. A caption giving the figure number and a brief description, preferably
only one or two sentences, must be included. The caption should be understandable without reference to the text. It is preferable to place a symbol key or graphical legend in the artwork itself, not in the caption. Ensure that any symbols and abbreviations used in the text agree with those in the artwork. Authors are required to ensure that similar figures have similar resolution and quality (all black and white figures should have resolution similar to each other; all color figures should have resolution similar to each other). See the section under “Artwork” for details.

**Schemes.** Sequences of reactions are called schemes and should be numbered consecutively with Arabic numerals. Schemes may have brief titles describing their contents and footnotes, if needed, for further detail.

**Charts.** Groups of structures that do not show reactions are called charts and should be numbered consecutively with Arabic numerals. Charts may have brief titles describing their contents and footnotes, if needed, for further detail.

**Tables.** Tables may be created using a word-processor’s text mode or table format feature. The table format feature is preferred. Ensure that each data entry is in its own table cell. If the text mode is used, separate columns with a single tab and use a line feed (return) at the end of each row.

Tables should be numbered consecutively with Arabic numerals and placed in the text near the point of first mention. Each table must have a brief (one phrase or sentence) title that describes the contents. The title should be understandable without reference to the text. Details should be put in footnotes, not in the title. Tables should be used when the data cannot be presented clearly as narrative, when many numbers must be presented, or when more meaningful interrelationships can be conveyed by the tabular format. Tables should supplement, not duplicate, information presented in the text and figures. Tables should be simple and concise.

Define nonstandard abbreviations in footnotes. Footnotes in tables should be given letter designations and be cited in the table by italic superscript letters. The sequence of letters should proceed by line rather than by column. If a reference is cited both in the text and in a table, a lettered footnote which refers to the numbered reference in the text should be placed in the table.

In setting up tables, authors should keep in mind the type area of the *ACS Catalysis* page (17.8 cm × 23.5 cm) and the column width (8.5 cm) and should make tables conform to the limitations of these dimensions.

**Compound Characterization, Experimental and Computational Data**

Authors are required to provide sufficient information (as described in more detail below) to establish the identity of a new compound, its purity, and its yield. Sufficient experimental details must also be included to allow another researcher to reproduce the synthesis. **Safety:** Authors must emphasize any unexpected, new, and/or significant hazards or risks associated with the reported work. This information should be in the experimental details section of the full article or communication. Characterization data and experimental details must be included in either the paper or the Supporting Information. Guidelines for reporting NMR data are available online at
Note that, when possible, unambiguous peak assignments should be given for all NMR spectra.

**Guidelines for Characterization of Organometallic and Inorganic Compounds.**

(a) Routine Compounds

Compounds in this category are those that have literature precedent. Sufficient data must be provided to identify and verify the structure of such compounds, and the original preparation should be cited in either the Experimental Section or the Supporting Information. When possible, representative spectra should be provided in the Supporting Information.

(b) Novel or Unexpected Compounds

Compounds in this category are those that either (i) exhibit an unprecedented type of structure, or (ii) are obtained by unexpected reaction. Such compounds require more detailed characterization to ensure their validity and purity. In the majority of cases, evidence for elemental constitution must be provided by elemental analysis. If accurate elemental analysis data are not possible, a clear statement to this effect must be included within the text of the manuscript and other methods to establish purity and identity given (e.g., mass spectrometry data and representative NMR data should be provided in the Supporting Information). Please note that, in many cases, spectroscopic data are insufficient to establish purity owing to the presence of undetectable species. In addition to elemental analysis and/or mass spectrometry data, spectroscopic techniques should be used to provide sufficient characterization (including NMR, IR, UV–vis or EPR spectroscopy). To the extent possible, resonances from NMR data should be assigned to specific chemical functionality. While an X-ray diffraction structure is not considered definitive proof of elemental composition, it is acceptable evidence for composition, providing that the results of other physical methods concerning the characterization are conclusive.

(c) Solid State Materials

Compounds in this category are those that have no existence in solution. Solid state materials, such as heterogeneous catalysts, must be characterized in such a way as to sufficiently describe their structure and composition. Atomic ratios and elemental compositions must be provided for solid state materials. X-ray diffraction data should be provided for crystalline materials.

(d) Compounds That Have Not Been Isolated

Compounds that have not been isolated in pure form (e.g. reaction intermediates, intractable mixtures, or unstable species) may be published. However, in these circumstances, an explicit statement must be given indicating that the compounds have not been isolated. Only in exceptional circumstances will a paper be published in which none of the new compounds reported has been isolated and fully characterized.
(e) Purity and Yield

The yield and purity of all molecular species must be reported, including the methods used to determine them. The yield of a compound obtained in an NMR tube reaction should be determined using an internal standard.

**Guidelines for Characterization of Organic Compounds**

(a) Sample Quality

For new substances, evidence of the homogeneity of the purified sample should be included. Elemental analysis is sufficient. If no analysis was performed, then sufficient other evidence (for example, $^1$H NMR, $^{13}$C NMR, HPLC, GLPC, gel electrophoresis, etc.) must be included as figures in the Supporting Information.

(b) Molecular Weight

Evidence of molecular weight should be provided, especially if elemental analysis is not performed. Low-resolution MS data under conditions that minimize fragmentation are acceptable. If there is a specific need to distinguish alternative formulas with the same molecular mass (within one amu), then HRMS data are necessary.

(c) Miscellaneous

Numerical listings of characteristic spectroscopic data should be included to support assigned structures, changes in functionality, unusual chromophores, etc. Methods of purification used to prepare samples for characterization should be described. For crystalline samples, information about the method of crystallization should be included (solvents; mp; etc.). For non-racemic, chiral substances, data to allow correlation of absolute configuration should be given, preferably including $[\alpha]_D$ values. If correlation data are provided based on HPLC or GLPC methods, then retention times for both enantiomers must be provided, together with solvent and flow rate information, and identification of the chiral support.

(d) Intermediates on Solid Phase; Combinatorial Chemistry

Validation of methods and characterization of new substances in a statistically significant sampling should be provided. Resin-bound intermediates need not be characterized if acceptable end product quality (as defined in a–c above) is demonstrated.

**Kinetic and Equilibrium Data**

The reporting of kinetic data and equilibrium binding data for proteins, nucleic acids, and other species should preferably include a description of the identity of the catalyst or binding molecule, its origin, purity of composition, and any modifications, such as mutations, post-translational modifications, or other modifications made to facilitate expression and purification. The method of assay and the exact experimental conditions of the assay should be provided as a reference to previous work, with or without modifications, or fully described if a new assay. Conditions essential to reproduce the results, such as the temperature, pH, and pressure (if other
than atmospheric) of the assay should be included. Terms such as “not detectable” (ND) should be avoided. Instead, an estimate of the limit of detection based on the sensitivity and error analysis of the assay should be provided. Authors are referred to the STRENDAC (Standards for Reporting Enzymology Data) Commission of the Beilstein Institut (http://www.strenda.org/documents.html) for an example of detailed guidelines.

**Structural Data for Proteins and Nucleic Acids**

Atomic coordinates and structure factors for proteins determined by X-ray crystallography and coordinates determined by NMR should be deposited with the Protein Data Bank, Research Collaboratory for Structural Bioinformatics at Rutgers University. Theoretical model depositions are no longer accepted for inclusion in the PDB archive. Structures of nucleic acids should be deposited with the Nucleic Acid Database. It is the responsibility of the author to obtain a file name (PDB ID or NDB ID) for the molecule; the file name must appear in the published manuscript. A manuscript will be sent out for review without the file name only after receipt from the submitting author of a written statement that the coordinates will be deposited. If a file name has not yet been obtained upon acceptance of a paper, it must be added in proof. Atomic coordinates and structure factors for all structures must be released immediately upon publication of the paper.

**Single Crystal Diffraction Data**

Manuscripts reporting the determination of one or more structures by X-ray diffraction must adhere to the following requirements:

Abstract. The abstract may summarize geometric features of unusual interest but should not contain unit cell parameters.

Main Body of Manuscript. Tables of essential interatomic distances and angles are not required but may be submitted (metric information for standard structural components should not be included).

For structures with anisotropically refined atoms, a figure displaying the thermal ellipsoids should ordinarily be presented; a spherical-atom representation may be substituted if necessary for clarity. If a spherical atom view is chosen for the manuscript, a thermal ellipsoid figure should be included in the Supporting Information. In cases when intermolecular interactions are relevant to the discussion, a view of the unit cell may be included.

An Article should list for each structure the formula, formula weight, crystal system, space group, color of crystal, unit cell parameters, temperature of data collection, and values of Z, R, and GOF; a brief description of data collection, and solution and refinement of the structure, should be placed in the Supporting Information. Tables of atom coordinates and thermal parameters will not be printed.
**CIF Submission Instructions**

If single crystal X-ray structures are reported, authors are required to submit X-ray crystallographic data to be published as Supporting Information. The information required for each structure should be submitted in the electronic Crystallographic Information File (CIF) format. Such files should be submitted electronically as described below.

CIFs must be uploaded at the same time the manuscript is submitted via the Web, with the file designation Supporting Information for Publication. The CIF for each structure should be uploaded as a separate Supporting Information file. CIFs should be saved in the text-only (plain ASCII) format, with a .cif extension before being submitted. No information other than the CIF itself should be included inside the file. CIFs may NOT be furnished as Microsoft Word, Corel WordPerfect, or PDF files.

Before submission, CIFs must be checked using the CheckCIF utility on the Web at [http://checkcif.iucr.org/](http://checkcif.iucr.org/). A copy of the output should be retained in case it is requested by an Editor. Authors with appropriate software may alternatively use IUCRVAL or the CHECK validation tool in PLATON.

If CIFs are not available, the required data should be furnished in neatly formatted tables with informative titles that identify the name or the structure number of the compound.

**Powder Diffraction Data**

No special instructions apply to the use of X-ray powder diffraction in a routine manner to characterize heterogeneous catalysts. However, for new crystalline materials or for crystalline materials previously uncharacterized by this technique, specific guidelines are given here. In such cases, data from X-ray powder measurements should be accompanied by details of the experimental technique: source of X-rays, the radiation, its wavelength, filters or monochromators, camera diameter, the type of X-ray recording, and the technique 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. In cases where filtered radiation is used, every effort 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 offered, the observed and calculated 1/d² values should be listed along with the observed relative intensities (it is superfluous to give d spacings in this instance). All calculated 1/d² values should be listed (exclusive of systematic absences), to the limit of the data quoted. If possible, the crystal system should be specified. Possible space groups may also be listed if the data warrant it. Relevant information about the specimen used should be included.

**Computations**

When computational results are an essential part of a manuscript, sufficient detail must be given, either within the paper or in the Supporting Information, to enable readers to reproduce the calculations. This includes data such as force field parameters and equations defining the model (or references to where such material is available in the open literature). If the software used for
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**Dedications**

All dedications must appear in the Acknowledgment section and are subject to approval by the Editor.

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A brief statement in non-sentence format, which lists the contents of material placed in Supporting Information, should be included at the end of the manuscript (after the Acknowledgment and before the References and Footnotes). For instructions on what material should be provided as Supporting Information and on preparing it for publication, see the “Supporting Information” section below.

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