

Last updated: June 25, 2024 [View the latest guidelines online](#)

Manuscript Submission Requirements Checklists

These checklists aid in confirming that a submission is complete, which facilitates the peer-review and editorial process and increases the likelihood of a successful outcome. Incomplete or noncompliant submissions are returned to authors.

Content Expectations

1. The content of the manuscript clearly demonstrates relevance to the teaching and learning of chemistry, and the audience is clearly defined.
2. The various manuscript types have been reviewed and the appropriate type selected. The submitted manuscript is of appropriate length and includes all components pertaining to the selected manuscript type. Articles that are to be reviewed as Chemical Education Research should follow the [Content Requirements for Chemical Education Research Manuscripts](#).
3. A thorough literature review has been conducted in order to place the submission within the context of previously published work, especially with respect to the chemical education literature.

ACS Paragon Plus Submission Requirements

1. All files are current and [supportable](#) and have been properly [designated by file type](#) within ACS Paragon Plus.
2. Within ACS Paragon Plus, the Custom Questions have been answered, including those about conflict of interest, unpublished work, and previous submissions.
3. The [ACS Ethical Guidelines](#) have been read and are understood.
4. The abstract field in ACS Paragon Plus has been filled in; no citations or display elements are included in the abstract text.
5. The authors' names in ACS Paragon Plus match those in the manuscript file.
6. The required cover letter, addressed to the Editor-in-Chief, describes the relevance of the work and intended audience.

Manuscript File

1. The author guidelines have been reviewed, and the [document template](#) has been used. Using the document template helps ensure that necessary components are included; [templates for display elements \(figures and structures\)](#) are also available.
2. All markup elements within files such as tracked changes, comments, and highlights have been removed and the track changes feature has been turned off.
3. Language and usage are standard. (Authors may wish to improve the language in the manuscript by consulting an [English editing service](#).)
4. The [manuscript](#) includes an appropriate, descriptive title; names of authors, affiliations, and the corresponding author's e-mail address; approx. 5-8 keywords; and an abstract.
5. A graphical abstract providing a "quick visual representation" of the paper has been provided (if desired) and is original work differentiated from other figures.

6. Appropriate headings and subheadings have been included to indicate the overall structure and progression of ideas of the manuscript.
7. Citations and references are complete, including article titles and use of DOIs. Previously published material has been cited and has not been excessively used.
8. Unpublished work that has been cited has been uploaded for editorial review.

Display Elements

1. Display elements appear after their mention in the text and are comprehensible without regard to the text.
2. Display elements are numbered sequentially, are correctly designated (e.g., figure, table, equation, scheme, box) in the text, and are appropriately captioned or titled.
3. Specifications for display elements have been reviewed and followed.
4. Tables include appropriate titles, column headings, and notes; use table footnotes rather than annotating cell entries or table titles to convey details. Tables should be constructed using the table tool or function.
5. Permission has been obtained for display elements that have been reproduced or adapted from other sources. Appropriate credit lines have been incorporated into captions, and documentation pertaining to permissions has been uploaded.

Supporting Information

1. Supporting Information for Publication has been provided separately from the main text and is discussed in the main text, and the contents of each file have been listed and file format(s) designated under an “Associated Content” section in the manuscript (see the [document template](#)). Supporting Information is required for Laboratory Experiment, Activity, and Demonstration manuscripts; provide these materials in an editable format (e.g., a Word file) so that those adopting the lab or activity can adapt them. Supporting Information is optional for the other manuscript types. If the track changes feature was used, ensure that all changes are accepted and comments resolved, and that the track changes feature is off.
2. No parts of the main manuscript are duplicated in the Supporting Information.
3. The Supporting Information is original material produced by the authors for the purposes of JCE and has not been previously published elsewhere.

Permissions and Copyright

1. It is understood that the American Chemical Society has strict [policies](#) regarding the use of material from other sources and that “fair use” is not considered to be a sufficient criterion. Material from Wikipedia, Flickr, or similar websites containing material with non-commercial Creative Commons licenses is not acceptable.
2. Permissions have been obtained from copyright holders (including those that provide freely available content) to reproduce material not originated by the authors. Such material includes photographs, illustrations, screenshots, images of instrumentation, and materials produced by students. Documentation has been uploaded in ACS Paragon Plus.
3. [Model releases](#) have been signed by people who are identifiable in photographs (including authors). Releases have been uploaded in ACS Paragon Plus.
4. Trademarked product names (whether in images or in the text) have been replaced by

descriptive generic names where possible.

5. Logos, brand names, trademarks, and company images in screenshots, photographs, and spectra have been obscured by blurring, cropping, or masking.
6. Necessary credit lines are included in figure captions and table or box notes.
7. Informed consent (and institutional review board [IRB] approval, if applicable) has been obtained for [studies involving human subjects](#), and the manuscript indicates that such consent and approval has been obtained. If student work is used, documentation indicating that students have granted their consent has been provided.

Scope of the Journal

The [Journal of Chemical Education](#) (JCE) is co-published by the ACS Division of Chemical Education and the American Chemical Society Publications division. Launched in 1924, JCE is the world's premier chemical education journal. JCE is published online and in print and has electronic archival content available from 1924 (Vol. 1) to the present.

The *Journal of Chemical Education* publishes peer-reviewed articles and related information as a resource to those in the field of chemical education and to those institutions that serve them. The journal typically addresses chemical content, laboratory experiments, instructional methods, and pedagogies. JCE serves as a means of communication among people across the world who are interested in the teaching and learning of chemistry. The global audience includes instructors of chemistry from middle school through graduate school, professional staff who support these teaching activities, as well as some scientists in commerce, industry, and government.

The criteria for a publishable manuscript include these areas of evaluation: scholarship, novelty, pedagogy, utility, and presentation. To be considered for publication by the *Journal of Chemical Education*, a manuscript must:

- Demonstrate scientific and scholarly rigor, supported by up-to-date citations to relevant literature and guided by a rationale for how the work fits into existing knowledge.
- Exhibit novelty through original scholarship or a creative or innovative practice.
- Have pedagogical content and educational relevance and insight that demonstrate a positive impact on teaching and learning while articulating audience level, use with students, and details for adopting and adapting the material, if applicable.
- Be useful to JCE readers by showing a connection to teaching and learning within the context of curricula or coursework.
- Present well-developed ideas in a comprehensive, organized discussion written in clear, concise English and making effective use of display elements (figures, schemes, tables, etc.).
- Adhere to the requirements and JCE protocols outlined in this document for each respective manuscript type and be submitted according to ACS publishing policies.
- Be submitted electronically using [ACS Paragon Plus](#)

JCE does not publish science research papers (or papers exclusively covering scientific content) unless they have a direct link to the teaching and learning of chemistry.

Manuscript Types

JCE publishes a wide variety of scholarly content categorized by manuscript type. All manuscripts must be designated as a particular type upon submission. Word counts associated with each manuscript type are a recommended word limit; these word counts exclude display elements,

manuscript references, and Supporting Information, which is material published separately only online.

Activity

An Activity (3000 words) describes a hands-on activity at any level (from elementary through the university level) that can be done in the classroom or laboratory or in an informal setting. Activities are intended to introduce engaging and thought-provoking ideas or topics and to spark discussion. They need to have been done with students in a teaching or outreach setting and to have been evaluated and used several times in order to substantiate claims of success. They should not be proposals.

The ways in which the activity has been implemented in the context of a curriculum should be described. Details such as the total number of students who completed the activity, how long it took students to complete the activity, and whether they worked individually or in groups should be included, as should student results. The range of student results should be stated in addition to typical student results (an average value). Problems that instructors might encounter should be mentioned, and other information that would assist an instructor with implementing the activity should be provided. There should also be an assessment of how the activity improved the learning process of students. Any potential hazards and safety precautions must be addressed in a dedicated Hazards section in the manuscript.

Supporting Information to aid in the use of the activity by others is required—for example, notes for instructors (including sources for materials used) and actual student handouts. Materials used should be inexpensive, nonhazardous, and readily available.

Permissions and documentation are required in order to reproduce material created by students. (See Use of Student Work section.)

Article

An Article (5000 words) describes a novel educational idea or approach, content for the classroom or laboratory, pedagogical advance, or educational research. Invited Articles may review a broad topic area that has wide applicability. Articles can target specific constituencies (i.e., precollege or introductory or advanced college students), address a specific content area, describe a new pedagogy or teaching method, or provide results on an innovation or chemical education research study.

Chemical Education Research

Articles specific to reporting the research pertaining to teaching and learning chemistry (chemical education research, CER) should be identified as such in the cover letter. CER manuscripts must be written and will be reviewed using the [Specific Content Requirements for Chemical Education Research Manuscripts](#). Because of these requirements for CER manuscripts, the recommended word limit for this category of article is 7000.

Commentary

Scholarly discussions of a topic of interest to the chemical education community that include the opinions of the author(s) are published using the manuscript type Commentary (2,000 words or as

agreed to by the editorial office). The manuscript should provide sufficient information for readers to understand the topic or formulate their own opinions.

Communication

Communications (3000 words) generally update or extend topics addressed in manuscripts that have already been published. The ways in which the update is interesting, useful, and novel should be made clear. Manuscripts of this type are not intended as precursors to Articles. For Communications pertaining to laboratory experiments and activities, the focus should be on student experiences and student results with regard to the update. The details of the lab or activity must be included in the Supporting Information, as should materials that have been used with students.

Demonstration

A description, explanation, and procedure for an actual or virtual demonstration for teaching chemistry concepts, Demonstrations (3000 words) must reflect best practices related to safety (i.e., handling and storage of chemicals) and to hazards (i.e., fires, explosions, noxious fumes), as well as provide complete information that will enable others to use the demonstration in their settings. Hazards and safety precautions must be addressed in a dedicated Hazards section. Providing Supporting Information is required; including a video of the demonstration as Supporting Information is encouraged.

Editorial

Editorials (1000 words) are opinion pieces by the Editor-in-Chief, an Associate Editor, or a guest writer invited by the Editor-in-Chief.

Laboratory Experiment

Laboratory Experiment (4000 words) manuscripts are intended to help readers visualize their students performing an experiment. Thus, labs are expected to have been done by students as part of an actual laboratory course or learning experience and to have been evaluated and used several times in order to substantiate claims of success. They should not be proposals. Labs should be novel and placed within the context of similar experiments that have been published. The pedagogical effectiveness of the reported experiment must be made clear.

Information about how the experiment was conducted with students should be provided, including the number of students who participated, whether the students worked individually or in groups, the number of times the experiment was run, and the time it took to complete the experiment. The focus should not be on procedures; rather, procedures should be summarized and details provided in the Supporting Information. Hazards and safety precautions must be addressed in a dedicated Hazards section in the manuscript.

There should also be an assessment of how the experiment improved the learning process of students and whether the pedagogical goals were achieved. Typical assessments include exam questions, pre- and postlab quizzes, assignments, and laboratory reports. If laboratory reports are used for assessment of achieving the pedagogical goals for an experiment, authors should state what specific information in the lab reports was used to assess achievement of each of the pedagogical goals, and how well students did on those aspects of the reports. Student surveys are

not considered adequate tools. Limitations of the experiment (e.g., the use of expensive or uncommon equipment or professionally fabricated materials) should be noted as an indication of whether it can be used in certain settings.

Supporting Information must accompany the manuscript; it should contain material that a reader would find necessary to set up, adapt, and carry out the lab in a particular instructional environment. Materials such as student handouts, instructor notes, detailed procedures, safety information, CAS numbers, pre- and postlab assessments, and data (representative student data; “idealized” author data are optional) are particularly useful. Student handouts and instructor notes should be placed in separate files. It is appropriate to mention developmental work in instructor notes. An editable version of the Supporting Information (i.e., Word document) should be provided; this format is convenient for instructors who adapt or modify the lab.

For experiments involving recombinant DNA work, authors should consult their institutional biosafety committees (IBCs) for the biosafety level (i.e., BSL-1, BSL-2, BSL-3) of the work in the experiment; for student experiments it will probably be BSL-1, but authors should confirm this with the IBC and register the experiment with the committee. For experiments involving study subject animals, please see the [ACS Ethical Guidelines](#).

Letter to the Editor

A manuscript type that allows readers to respond to a piece that has been published in *JCE*, Letter to the Editor (1000 words) should contribute to or elicit discussion on a subject without overstepping the bounds of professional courtesy. The author(s) of the publication referred to may be invited to submit a reply. Letter to the Editor will typically be peer-reviewed.

Technology Report

A Technology Report (3000 words) provides a scholarly description of a website, software application, media item, or other use of technology that enhances teaching and learning. The technology described should have been used with students and the results reported. The manuscript text describes the item and its intended use with students and provides the URL for Web-based resources, as appropriate. For all other applications described, the file related to the described technology should be included as Supporting Information for publication (e.g., Excel worksheet, Flash animation, specific application codes, scripts, Mathematica program file).

ACS Researcher Resources

While this document will provide basic information on how to prepare and submit the manuscript as well as other critical information about publishing, we also encourage authors to visit the [ACS Researcher Resources](#) for additional information on everything that is needed to prepare (and review) manuscripts for ACS journals and partner journals, such as

- [Mastering the Art of Scientific Publication](#), which shares editor tips about a variety of topics including making your paper scientifically effective, preparing excellent graphics, and writing cover letters.
- Resources on [how to prepare and submit a manuscript](#) to ACS Paragon Plus, ACS Publications' manuscript submission and peer review environment, including details on selecting the applicable [Journal Publishing Agreement](#).
- [Sharing your research](#) with the public through the ACS Publications open access program.

- [ACS Reviewer Lab](#), a free online course covering best practices for peer review and related ethical considerations.
- [ACS Author Lab](#), a free online course that empowers authors to prepare and submit strong manuscripts, avoiding errors that could lead to delays in the publication process.
- [ACS Inclusivity Style Guide](#), a guide that helps researchers communicate in ways that recognize and respect diversity in all its forms.

Manuscript Preparation

Submit with Fast Format

All ACS journals and partner journals have simplified their formatting requirements in favor of a streamlined and standardized format for an initial manuscript submission. Read more about the requirements and the benefits these serves authors and reviewers [here](#).

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 at the point of relevance. Separate graphics can be supplied later at revision, if necessary.
- 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. For information about the required components of different reference types, please refer to the [ACS Style Quick Guide](#).
- Supporting Information must be submitted as a separate file(s).

Document Templates and Format

The templates facilitate the peer review process by allowing authors to place artwork and tables close to the point where they are discussed within the text. Learn more about document templates [here](#).

General information on the preparation of manuscripts may also be found in the [ACS Guide to Scholarly Communication](#).

Acceptable Software, File Designations, and TeX/LaTeX

See the list of [Acceptable Software](#) and appropriate [File Designations](#) to be sure your file types are compatible with ACS Paragon Plus. Information for manuscripts generated from [TeX/LaTeX](#) is also available.

Cover Letter

A cover letter must accompany every manuscript submission. During the submission process, you may type it or paste it into the submission system, or you may attach it as a file.

A cover letter for the attention of the Editor-in-Chief describing the relevance of the submission and intended audience should be provided. Any previous manuscript identification numbers should be referenced, and any changes that have been made to the manuscript should be summarized in the cover letter.

Manuscript Text Components

Title

The title should clearly and concisely reflect the emphasis and content of the manuscript and be accessible to a broad audience. The title should not contain esoteric terms, symbols, trademark names, institution names, abbreviations, or uncommon acronyms, and part or series numbers. Proscribed terms include “new”, “first”, and “green”. Indicate the audience and the setting if that is significant. A well-crafted title aids in successful information retrieval.

Author List

Include all those who made substantial contributions to the work and to the preparation of the manuscript. To facilitate indexing and retrieval and for unique identification of an author, use given (first) names, initials, and surnames (e.g., John R. Smith) or first initials, second names, and surnames (e.g., J. Robert Smith). Because all author names are automatically imported into the electronic Journal Publishing Agreement, all author names must be entered into ACS Paragon Plus. Do not use only initials with surnames (e.g., J. R. Smith), as this causes indexing and retrieval difficulties and interferes with unique identification of an author.

One author must be designated as the person to whom correspondence should be addressed, indicated by an asterisk after that author's surname and inclusion of an e-mail address in the manuscript file. The corresponding author is responsible for ensuring that all authors have approved the manuscript before submission and for all subsequent revisions.

Note that all authors listed should have made significant and substantial intellectual contributions to the work. Students should not be listed as coauthors unless their authorship meets the criteria outlined in the [ACS Ethical Guidelines](#): see section B(11) for further details. Students may be recognized in the Acknowledgments section for their contributions.

Author Affiliation

For each author, include an institutional affiliation (department or unit and address) where the work was done. If the present affiliation of an author differs from the one at which the work was done, the new affiliation and address should be given in an author information note at the end of the manuscript file. Authors should ensure that the information in their ACS Paragon Plus account is up to date.

Institution Identification

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

The abstract (approximately 250 words or fewer) should summarize the important points made in the manuscript. Include the abstract text in the manuscript file. No cited literature or display elements should appear in the abstract. A well-written abstract aids in successful information retrieval and is the first aspect of a submission that will be reviewed.

Keyword Terms

Provide significant keywords to aid the reader in literature retrieval. Please consider the use of words different from those in the title to expand the discoverability of the article. The keywords are published immediately before the text, following the abstract. Note that the keyword term “Chemical Education Research” is reserved for manuscripts that are intended for review using the [specific criteria for CER described online](#).

Main Text

Manuscript content should adhere to the criteria for the manuscript type selected. The Journal expects that manuscripts will be written in literate, grammatically correct, scientific English; the absence of these qualities inhibits and detracts from the effectiveness of the review and evaluation process and may lead to substantial delays. An informal tone and overuse of first-person pronouns, especially used as adjectives or possessives (e.g., “my”, “mine”, “our”, “ours”) and second-person pronouns (e.g., “you”, “your”) should be avoided.

Text should be presented in one column with numbered pages, and organized using headings and subheadings (without numbers, references, or acronyms in the headings). Abbreviations and acronyms should be used sparingly and should be defined at their first occurrence. Other than headings, present the text in black.

Whenever possible, use systematic nomenclature as recommended by IUPAC for chemical compounds and SI units, including in table column headings. (See the [IUPAC “color books”](#), which include nomenclature and terminology guides.) Present analyzed data in an accurate, complete, yet concise manner. Express results with indications of their reliability. This includes appropriate use of significant figures, as well as statistical parameters (e.g., standard deviation, p-values indicating statistical significance, and measures of effect size). Terms, variables, and symbols should be defined within the text (rather than in a list of abbreviations). The Journal does not publish appendices. Such material should be removed from the main text of the manuscript and uploaded as separate Supporting Information. Authors must emphasize any unexpected, new, and/or significant hazards or risks associated with the reported work. This information should be in a separate Hazards section.

Hazards and Safety Precautions

Any manuscript type should contain a Hazards section if it describes the use of or exposure to hazardous chemicals or the use of equipment or procedures that present health or safety risks. A Hazards section is required in Demonstration and Laboratory Experiment manuscript types and in Communication manuscripts if they pertain to these manuscript types. Hazards and safety precautions relating to the handling or use of chemicals or the manipulation of materials or equipment must be completely and clearly described in this section.

Authors describing laboratory procedures, activities, and demonstrations are urged to consult the following resources to determine the appropriate and accepted standards for chemical laboratory

safety practice:

- [*Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards, Updated Version*](#), from the National Research Council details standards for chemical laboratory safety practice.
- [The ACS Center for Lab Safety](#) hosts many resources including a laboratory safety resource specifically written for [secondary schools](#) and one written specifically for [academic institutions](#) from two-year colleges through graduate school.
- [Safety Guidelines for Chemical Demonstrations](#) from the ACS Division of Chemical Education outlines current best practices with a checklist of key issues for demonstrators.

The Journal does not publish manuscripts that involve the use of domestic (i.e., kitchen) microwave ovens because such use is potentially hazardous and poses safety concerns. The Journal also does not publish manuscripts in which authors describe the use of or exposure to chemicals known to be toxic, such as *n*-hexane, benzene, and others, unless the author presents a convincing case that such use or exposure does not pose a risk to health and safety.

In manuscripts that discuss procedures in which products are formed, the author must provide hazard and safety information about these compounds, inasmuch as in some cases they may be more hazardous than the reactants. If the hazards of the products of a reaction are not known, the author should state the hazards or safety concerns that might be assumed.

Display Elements

Display elements (figures, tables, equations, schemes, boxes, charts, structures, and reactions) should be self-explanatory, that is, understandable independent of the text. They must be created using the appropriate tool (e.g., the table tool, equation editor for equations, ChemDraw for chemical structures), numbered sequentially by type using arabic numerals, and cited in the text discussion. Each multipart figure, scheme, or equation must be assembled into a single object, and lines should not be placed around the entire display element. Display elements may be resized during production; for further details about the graphics specifications for display elements, see **Appendix 2: Preparing Graphics**. Any references that are cited in a caption need to be clarified with a credit line; that is, the caption must make clear whether the graphic has been adapted or reproduced from another source or is original but based on material from another source (see Copyright and Permissions for more information). Display elements in the Supporting Information should be numbered sequentially and discretely from those in the manuscript.

Specifications for preparing graphics are detailed below.

Acknowledgments

Include acknowledgments of grant and other financial support, technical assistance, colleagues' advice, and so on. Do not use professional titles or honorifics in this section. Persons other than the authors who are acknowledged for having created artwork should also provide documentation granting consent to use their work.

Supporting Information for Publication

Supporting Information (SI) is material (e.g., figures, raw data, movies, media files, lengthy tables, sample computer files, student handouts, details for setting up and performing an Activity,

Demonstration, or Laboratory Experiment) separate from the manuscript that will be published only online. Supporting Information, including separate materials for instructors and students, is required for Activities, Demonstrations, and Laboratory Experiments, and is optional for other manuscript types. The Supporting Information should be original material produced by the authors for publication in *JCE* and not previously published elsewhere or duplicated in the manuscript. Only those materials that are most relevant to the submission should be included, and the Supporting Information must be discussed in the text. If presentations are included, they are subject to the same policies concerning copyright and permissions as is other content.

For supplementary material that is not formally submitted as Supporting Information but is hosted on an author's website, a description of the material and the URL for the website should be included in a separate paragraph following the list of SI files. In addition, the URL may be provided by citing this material in the manuscript and including a corresponding reference in the References section.

See the Supporting Information section for additional details.

References

A thorough literature review should be conducted, and the submission should be placed within the context of previously published work, including that which has appeared in *JCE*. Citations and references should follow the publication style found in [The ACS Style Guide](#). Titles are required for all works cited; please provide complete publication information, including an issue number where applicable, and a DOI. Unpublished work that has been cited should be uploaded for editorial review. Reference call-out numbers in the text should be superscripted sequential Arabic numerals. Journal names are abbreviated according to the [Chemical Abstracts Service Source Index](#) (CASSI). Page ranges for articles as well as book citations should also be provided. Rather than providing URLs in the main text of the manuscript, add a citation for each discrete URL and include it sequentially in the References section with an "accessed" statement: "(accessed [Month] 20XX)." References to resources only in a language other than English will be largely inaccessible to *JCE* readers; including sufficient references to English-language resources will benefit readers and increase the value of the manuscript.

Textual material that might otherwise constitute a footnote or endnote must be incorporated into the References section and presented using complete sentences.

Supporting Information

This information is provided to the reviewers during the peer-review process (for Review Only) and is available to readers of the published work (for Publication). Supporting Information must be submitted at the same time as the manuscript. See the list of [Acceptable Software by File Designation](#) and confirm that your Supporting Information is [viewable](#).

If the manuscript is accompanied by any supporting information files for publication, these files will be made available to readers. A brief, nonsentence description of the actual contents of each file, including the file type extension, is required. This description should be labeled Supporting Information and should appear before the Acknowledgement and Reference sections. Examples of sufficient and insufficient descriptions are as follows:

Examples of sufficient descriptions: "Supporting Information: ^1H NMR spectra for all compounds

(PDF)” or “Additional experimental details, materials, and methods, including photographs of experimental setup (DOC)”.

Examples of insufficient descriptions: “Supporting Information: Figures S1-S3” or “Additional figures as mentioned in the text”.

When including supporting information for review only, include copies of references that are unpublished or in-press. These files are available only to editors and reviewers.

Research Data Policy

All ACS journals strongly encourage authors to make the research data underlying their articles publicly available at the time of publication.

Research data is defined as materials and information used in the experiments that enable the validation of the conclusions drawn in the article, including primary data produced by the authors for the study being reported, secondary data reused or analyzed by the authors for the study, and any other materials necessary to reproduce or replicate the results.

The [ACS Research Data Policy](#) provides additional information on Data Availability Statements, Data Citation, and Data Repositories.

Data Requirements

Equations

An equation object must contain only one equation. For the best results, present each equation at single-column width, which avoids ambiguity as to where it is placed in the text stream. For chemical equations, use a representation that accommodates reaction and equilibrium arrows. Italicize mathematical variables and follow other mathematical conventions in accordance with ACS publication standards and practices as detailed in the [ACS Math Style Sheet](#).

Language and Editing Services

A well-written paper helps share your results most clearly. ACS Publications' [English Editing Service](#) is designed to help scientists communicate their research effectively. Our subject-matter expert editors will edit your manuscript for grammar, spelling, and other language errors so your ideas are presented at their best.

Preparing Graphics

The quality of illustrations in ACS journals and partner journals depends on the quality of the original files provided by the authors. Figures are not modified or enhanced by journal production staff. All graphics must be prepared and submitted in digital format.

Graphics should be inserted into the main body whenever possible. Please see Appendix 2 for additional information.

Any graphic (figure chart, scheme, or equation) that has appeared in an earlier publication should include a [credit line](#) citing the original source. Authors are responsible for [obtaining written](#)

[permission](#) to re-use this material.

Figure and Illustration Services

The impact of your research is not limited to what you can express with words. Tables and figures such as graphs, photographs, illustrations, diagrams, and other visuals can play a significant role in effectively communicating your findings. Our [Artwork Editing](#) and [Graphical Abstract](#) services generate publication-ready figures and Table of Contents (TOC) graphics that conform to your chosen journal's specifications. For figures, this includes changes to file type, resolution, color space, font, scale, line weights, and layout (to improve readability and professional appearance). For TOC graphics, our illustrators can work with a rough sketch or concept or help extract the key findings of your manuscript directly for use as a visual summary of your paper.

Preparing for Submission

Manuscripts, graphics, supporting information, and required forms, as well as manuscript revisions, must all be submitted in digital format through [ACS Paragon Plus](#), which requires an ACS ID to log in. Registering for an ACS ID is fast, free, and does not require an ACS membership. Please refer to Appendix 1 for additional information on preparing your submission

Prior Publication Policy

JCE considers for publication only original work that has not been previously published and is not under consideration for publication elsewhere. Material published jointly by the Journal and the Publications Division of the ACS is subject to the terms of the Journal Publishing Agreement, signed on behalf of all authors. Exceptions to this policy are described below.

Preprints, Theses, and Dissertations

JCE authors are allowed to deposit an initial draft of their manuscript in a preprint repository such as [ChemRxiv](#), [arXiv](#), or [bioRxiv](#). Please note that any use of a preprint server needs to be disclosed in the cover letter during submission and, as appropriate, state how the manuscript has been adjusted/updated between deposition and submission. Upon publication in *JCE*, authors should add a link from the preprint to the published article via the Digital Object Identifier (DOI). Some preprint servers, including ChemRxiv and bioRxiv, add this link for authors automatically after publication. The ACS Publications policy on theses and dissertations is available [online](#).

Proceedings of Conferences and Symposia

Publication of a preprint or extended abstract in an ACS division meeting preprint book, in either print or electronic format, does not preclude consideration of a manuscript for publication, provided that the manuscript includes significant new information and data beyond what was in the preprint or extended abstract. It is the author's responsibility to provide the Editor with copies of any relevant preprint(s). The Editors will make the decision on the suitability of the paper for publication. Upon publication in *JCE*, authors are advised to add a link from the preprint to the published paper via the citation and Digital Object Identifier (DOI).

Websites

JCE will consider for publication a paper that has been posted on an electronic site available to the general public, provided that the site is the personal site of the author or that of a funding agency

(i.e., government or non-profit foundation) and is not connected to a commercial site that holds copyright to the material. Authors must notify *JCE* at the time of submission if the material has been available on the Internet or equivalent electronic media.

Editorial Policies

Initial Processing

JCE editors initially evaluate each submitted manuscript to determine whether it should be sent for peer review based on its meeting publication requirements and adherence to the stated criteria for its Manuscript Type. Submissions that do not comply with protocols will be returned to authors (or “unsubmitted”).

The Journal does not conduct preassessments prior to formal submission, nor are presubmission inquiries regarding proposals considered outside the ACS Paragon Plus environment. The *JCE* Editorial Office is unable to provide information pertaining to analytics. Authors can track statistics pertaining to their own articles in the [ACS Researcher Resources](#).

Using Material from Other Sources

The American Chemical Society has strict policies regarding the use of material from other sources. Permissions are not needed for material that the author produced or that is copyrighted by ACS. Authors must obtain permissions from copyright holders to use figures, illustrations, or photographs from other sources that appear in the author’s manuscript and Supporting Information, even if the author produced the content originally. Documentation must be uploaded into ACS Paragon Plus before a manuscript can be sent to reviewers. See the Copyright and Permissions section for additional information.

Appropriate Material

The following material is suggested for use:

- Photographs, illustrations, and figures created by the authors. [Model releases](#) must be signed by people who are identifiable in photographs, including authors.
- Figures for which ACS owns the copyright and that have been published previously in an ACS journal. Citations and credit lines are needed.
- Work for which formal permission has been obtained (including student work; see the Use of Student Work section). Authors must obtain permission from the copyright owner. Credit lines are needed.

Inappropriate Material

The following material is inappropriate:

- Logos (including commercial and institutional logos, logos on spectra, and logos shown on instrumentation in photographs). These images should be obscured by blurring, cropping, or masking.
- Trademarked product names or brand names (whether in images or in the text). These names should be replaced by generic names wherever possible.
- Stock photography, clip art, and cartoons (even if the images have been paid for).
- Images of currency (paper or coins), postage stamps, or flags from any country.
- Screenshots (or “captures”) from software companies, unless permission has been obtained

from the software producer (including those that provide freely available material). Interfaces are considered to be proprietary. Permission also is required for screenshots showing ACS content and content from YouTube and similar Web entities. Note that screenshots cannot show logos, brand names, or other content that has been copyrighted elsewhere.

- Material from Wikipedia, Flickr, or similar websites.
- Creative Commons content. Creative Commons licenses should be carefully scrutinized. Some versions of the license permit the use of material for commercial purposes; others do not. Use of material in ACS journals is considered commercial because ACS sells subscriptions (“educational” use does not qualify). It is the responsibility of authors to carefully review the provisions of Creative Commons licenses, to follow any stipulations of the license, and to provide documentation to the journal's editorial office summarizing the license provisions and the ways in which the requirements have been met (in a letter, for example).
- Material from the Internet (unless produced by the author). Images pulled from the Internet cannot be used without permission from the original source, even if the source is cited.
- Art of unknown provenance that cannot be attributed to a specific source, especially that which has appeared in “old” publications.
- YouTube videos not created by the authors. Links may be included rather than providing videos.

Use of Student Work

If examples of student work (including anonymous work) are provided in the manuscript or the Supporting Information, documentation indicating that students have granted their consent should be uploaded along with the submission files. Documentation may include institutional review board (IRB) forms or permission statements from the students themselves. Full student names should not appear in the manuscript or Supporting Information.

Requests to reproduce content published in *JCE* are handled via the [RightsLink](#) permission system.

Peer Review

Those manuscripts that meet the initial requirements are assigned to an Associate Editor (AE). The AE sends the manuscript to reviewers for them to evaluate according to the following criteria:

- Scholarship (scientific and scholarly rigor)
- Novelty (originality, innovation, creativity)
- Pedagogy (educational relevance, insight)
- Utility (usefulness to readers, rationale)
- Presentation (organization, comprehensiveness, readability)

[Reviewers may recommend](#) “publish as is”, “minor revision”, “major revision”, or “do not publish”. After the reviewers have submitted their comments and suggestions, the AE evaluates their arguments and recommendations and makes a decision whether to approve, request a minor or major revision, or reject the manuscript. The AE adjudicates based on the reviewer comments; however, the reviews are not to be considered “votes”, and the review process is not one of “majority rules”. Very few manuscripts are published as originally submitted; nearly all are recommended for revision and are improved in response to reviewer suggestions before being accepted and published.

Because of the many submissions the Journal receives—and because manuscripts are unique and require varying levels of attention—definitive processing times cannot be guaranteed. Authors are notified once their manuscripts proceed to the next stage.

Types of Decisions

Decision types include revision, reject and resubmit, reject, and accept. Decisions are based on reviews and assessments made by the *JCE* Editorial Office. All resubmissions and revisions must be formally processed via the ACS Paragon Plus environment.

Revision

The Editor-in-Chief (EIC) or AE may request a minor or major revision at any point during the peer-review process. The revised manuscript must be accompanied by a cover letter that acknowledges the revision as well as a separate author response document that contains a detailed, itemized list of changes made to the manuscript and reasons why a reviewer's suggestion or concern does not merit a change. Reiterate reviewer comments and follow each with a response. In this way, the editors can refer to a single document rather than having to revisit separate documents. The author's response may also be entered or pasted into a text box provided by ACS Paragon Plus for this purpose. Ensure that the latest files have been uploaded and that there are no extraneous files. Files showing changes may be uploaded for review purposes. However, "clean" files should be provided. If the track changes feature in Word has been used, ensure for the manuscript file and Supporting Information file(s) that all changes have been accepted and comments resolved, and that the track changes feature has been turned off.

Reject and Resubmit

The EIC or AE may reject a submission with editorial or external peer review, yet invite a revision based on the merit of the submission. Typically, the decision letter will contain a list of suggested improvements. A thorough cover letter and a document containing itemized responses to reviewer comments must accompany the resubmission. Previous manuscript identification numbers should be referenced, and the changes that have been made to the manuscript should be clearly stated in the cover letter. The revised manuscript will be handled as a new submission and will be given a new receipt date.

Reject

The EIC or AE may reject a manuscript based on either editorial or external peer review at any point during the peer-review process after determining that the submission is not within the scope or objectives of the Journal. If there is no invitation to resubmit, permission from the AE should first be sought before resubmitting a previously rejected manuscript. Previous manuscript identification numbers should be referenced, and the changes that have been made to the manuscript should be clearly stated in the cover letter.

Accept

When the EIC or AE is satisfied with the submission, it is formally accepted, and the files are forwarded to ACS for production and publication. ACS contacts authors regarding page proofs, which should be reviewed carefully. After page proofs are approved, the manuscript will be

published online as an [Article ASAP available through the ACS website](#). Once a manuscript appears on the Web it is considered published. Any change to the manuscript will need to be submitted to the *JCE* Editorial Office as an Addition and Correction.

Providing Potential Reviewer Names

When submitting their manuscripts to ACS Paragon Plus, authors may suggest reviewers and are encouraged to provide the names, affiliations, e-mail addresses, and a few words explaining their qualifications to review the manuscript. These reviewers' names will be added to the unranked list of suggested reviewers for the submission. Editors may choose to invite any, all, or none of the suggested reviewers to evaluate the submission. Including suggested reviewers assists the Journal in expanding its reviewer pool. Authors are encouraged to avoid suggesting reviewers from the authors' institutions. Do not suggest reviewers who may have a [real or perceived conflict of interest](#). Whenever possible, suggest academic email addresses rather than personal email addresses.

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 or partner journal and suggest that the authors consider transferring the submission. [Manuscript Transfer](#) simplifies and shortens the process of submitting to another ACS journal or partner 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.

Note that each journal is editorially independent. Transferring a manuscript is not a guarantee that the manuscript will be accepted, as the final publication decision will belong to the editor of the next journal.

PRODUCTION AND PUBLICATION

Proofs via ACS Direct Correct

Correction of the galley proofs is the responsibility of the Corresponding Author. The Corresponding Author of an accepted manuscript will receive e-mail notification and complete instructions when page proofs are available for review via [ACS Direct Correct](#). Extensive or important changes on page proofs, including changes to the title or list of authors, are subject to review by the editor.

It is the responsibility of the Corresponding Author to ensure that all authors listed on the manuscript agree with the changes made on the proofs. Galley proofs should be returned within 48 hours in order to ensure timely publication of the manuscript.

Publication Date and Patent Dates

Accepted manuscripts will be published on the ACS Publications Web site as soon as page proofs are corrected and all author concerns are resolved. The first date on which the document is published on the Web is considered the publication date.

Publication of manuscripts on the Web may occur weeks in advance of the cover date of the issue

of publication. Authors should take this into account when planning their patent and intellectual property activities related to a document and should ensure that all patent information is available at the time of first publication, whether ASAP or issue publication.

All articles published ahead of print receive a unique Digital Object Identifier (DOI) number, which is used to cite the manuscript before and after the paper appears in an issue.

ASAP Publication

Manuscripts will be published on the “ASAP Articles” page on the web as soon as page proofs are corrected and all author concerns are resolved. ASAP publication usually occurs within a few working days of receipt of page proof corrections, which can be several weeks in advance of the cover date of the issue.

Post-Publication Policies

The American Chemical Society follows guidance from the [Committee on Publication Ethics](#) (COPE) when considering any ethical concerns regarding a published article, Retractions, and Expressions of Concern.

Additions and Corrections

Additions and Corrections may be requested by the author(s) or initiated by the Editor to address important issues or correct errors and omissions of consequence that arise after publication of an article. All Additions and Corrections are subject to approval by the Editor, and should bring new and directly relevant information and corrections that fix scientific facts. Minor corrections and additions will not be published. Readers who detect errors of consequence in the work of others should contact the corresponding author of that work.

Additions and Corrections must be submitted as new manuscripts via ACS Paragon Plus by the Corresponding Author for publication in the “Addition/Correction” section of the Journal. The corresponding author should obtain approval from all coauthors prior to submitting or provide evidence that such approval has been solicited. The manuscript should include the original article title and author list, citation including DOI, and details of the correction.

Retractions

Articles may be retracted for scientific or ethical reasons and may be requested by the article author(s) or by the journal Editor(s), but are ultimately published at the discretion of the Editor. Articles that contain seriously flawed or erroneous data such that their findings and conclusions cannot be relied upon may be retracted in order to correct the scientific record. When an article is retracted, a notice of Retraction will be published containing information about the reason for the Retraction. The originally published article will remain online except in extraordinary circumstances (e.g. where deemed legally necessary, or if the availability of the published content poses public health risks).

Expressions of Concern

Expressions of Concern may be issued at the discretion of the Editor 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.

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.

Sharing Your Published Article

At ACS Publications, we know it is important for you to be able to share your peer reviewed, published work with colleagues in the global community of scientists. As sharing on sites known as scholarly collaboration networks (SCNs) is becoming increasingly prevalent in today's scholarly research ecosystem, we would like to remind you of the many ways in which you, a valued ACS author, can [share your published work](#).

Publishing open access makes it easy to share your work with friends, colleagues, and family members. In addition, ACS Publications makes it easy to share your newly published research with ACS Articles on Request (see below). Don't forget to promote your research and related data on social media, at conferences, and through scholarly communication networks. Increase the impact of your research using the following resources: [Altmetrics](#), [Figshare](#), [ACS Certified Deposit](#)

E-Prints

When your article is published in an ACS journal or partner journal, corresponding authors are provided with a link that offers up to 50 free digital prints of the final published work. This link is valid for the first 12 months following online publication, and can be shared via email or an author's website. After one year, the access restrictions to your article will be lifted, and you can share the [Articles on Request](#) URL on social media and other channels. To access all your Articles on Request links, log in to your ACS Researcher Resources account and visit the "My Published Manuscripts" page.

Reprints

[Article](#), [journal](#), and [commercial](#) reprints are available to order.

Appendix 1: PREPARING FOR SUBMISSION

We've developed ACS' publishing and editorial policies in consultation with the research communities that we serve, including authors and librarians. Browse our policies below to learn more.

Ethical Guidelines

ACS editors have provided [Ethical Guidelines](#) for persons engaged in the publication of chemical research—specifically, for editors, authors, and reviewers. Each journal also has a specific [policy on prior publication](#).

OFAC Compliance

As a U.S.-based non-profit organization, the American Chemical Society (ACS) is required to comply with U.S. sanctions laws and regulations administered by the [U.S. Treasury Department's Office of Foreign Assets Control](#) (OFAC). While these laws and regulations permit U.S.-based publishers like ACS to engage in publishing-related activities with authors located in sanctioned regions in many cases, ACS may be prohibited under U.S. law from engaging in publishing-related activities in some cases, including, but not limited to, instances where an author or the institution with which an author is affiliated is located in a particular sanctioned region or has been designated by OFAC as a [Specially Designated National](#) (SDN) pursuant to certain U.S. sanctions programs. ACS reserves the right to refrain from engaging in any publishing-related activities that ACS determines in its sole discretion may be in violation of U.S. law.

Safety Considerations

Authors must emphasize any unexpected, new, and/or significant hazards or risks associated with the reported work. This information should be in the Experimental Section of a full article and included in the main text of a letter. Statement examples can be found in the [Safety Statement Style Sheet](#) and additional information on communicating safety information from the *ACS Guide to Scholarly Communication* [is freely available here](#).

Conflict of Interest Disclosure

A statement describing any financial conflicts of interest or lack thereof is published in each ACS journal and partner journal article.

During the submission process, the Corresponding Author must provide a statement on behalf of all authors of the manuscript, describing all potential sources of bias, including affiliations, funding sources, and financial or management relationships, that may constitute conflicts of interest. If the manuscript is accepted, the statement will be published in the final article.

If the manuscript is accepted and no conflict of interest has been declared, the following statement will be published in the final article: "The authors declare no competing financial interest."

Plagiarism

In publishing only original research, ACS is committed to deterring plagiarism, including self-plagiarism. ACS Publications uses CrossCheck's iThenticate software to screen submitted manuscripts for similarity to published material. Note that your manuscript may be screened during the submission process.

Further information about plagiarism can be found in Part B of the [Ethical Guidelines to Publication of Chemical Research](#). See also the [press release](#) regarding ACS' participation in the CrossCheck initiative.

Authorship, Author List, and Coauthor Notification

Authors are required to obtain the consent of all their coauthors prior to submitting a manuscript.

The submitting author accepts the responsibility of notifying all coauthors that the manuscript is being submitted.

During manuscript submission, the submitting author must provide contact information (full name, email address, institutional affiliation, and mailing address) for all of the coauthors. Because all of the author names are automatically imported into the electronic [Journal Publishing Agreement](#), the names must be entered into ACS Paragon Plus. (Note that coauthors are not required to register in ACS Paragon Plus.) Author affiliation should reflect where the work was completed, even if the author has since left that institution. Authors may include a note with a current address if their institution has changed since the work was completed.

To expedite the processing of your manuscript, please format your author and affiliation information according to the guidelines in this link:

<https://pubsapp.acs.org/paragonplus/submission/author-address-information.pdf>.

Criteria for authorship can be found in Part B of the [Ethical Guidelines to Publication of Chemical Research](#). Artificial intelligence (AI) tools do not qualify for authorship. The use of AI tools for text or image generation should be disclosed in the manuscript within the Acknowledgment section with a description of when and how the tools were used. For more substantial use cases or descriptions of AI tool use, authors should provide full details within the Methods or other appropriate section of the manuscript.

If any change in authorship is necessary after a manuscript has been submitted, confirmation is required that all of the authors (including those being added or removed) have been notified and have agreed to the change. To provide this confirmation, authors are asked to complete and sign an [authorship change form](#) and provide the completed form to the appropriate editorial office.

Authors with a single name: If you, or any of your coauthors, have only one name, please follow these steps for proper submission to ACS Paragon Plus:

1. First (Given) Name Field: Enter an asterisk (*) into the "First (Given) Name" field.
2. Last (Family) Name Field: Enter your single name into the "Last (Family) Name" field.

If your paper is accepted, the asterisk (*) will be removed from the published version of the paper.

Patent Activities and Intellectual Property

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

Open Researcher and Contributor ID (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.

ORCID iDs should not be typed into the manuscript. ACS publishes only those ORCID iDs that have been properly verified and linked **before the manuscript is accepted**. After your ORCID iD is linked, it will be displayed automatically in all subsequently accepted manuscripts for any/all ACS journals. We do not publish ORCID iDs provided during proof review or via other communications after a manuscript is accepted for publication.

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 you wish to associate your existing ORCID iD with your ACS Paragon Plus account, you may do so by clicking on “Edit Your Profile” from your ACS Paragon Plus account homepage and following the ORCID-related links. Learn more at www.orcid.org.

Copyright and Permissions

To obtain forms and guidelines for completing the Journal Publishing Agreement or obtaining permissions from copyright owners, and to explore a Copyright Learning Module for chemists, click [here](#).

Funder Reporting Requirement

Authors are [required to report funding sources](#) and grant/award numbers. Enter **ALL** sources of funding for **ALL** authors in **BOTH** the Funder Registry Tool in ACS Paragon Plus and in your manuscript to meet this requirement.

Open Access Compliance

ACS offers options by which authors can fulfill the requirements for open access and deposition into repositories for funded research. Visit our ACS Open Science site to see [how to fulfill requirements for specific funders](#) and to find out if you are eligible to publish under a [Read + Publish agreement](#) between ACS and your institution. You can also find out more about [Open Access Compliance](#) and [ACS Open Science initiatives](#).

Diversity and Inclusion Statement

During manuscript submission, ACS journal authors have the option to submit a statement sharing information related to diversity and inclusion that is relevant for their paper. If supplying a diversity and inclusion statement, the corresponding author must provide this on behalf of all authors of the manuscript during the submission process. These statements include but are not limited to analysis of citation diversity and acknowledgment of indigenous land on which research was conducted. Statements expressing political beliefs are not permitted and may be removed by the journal office. All statements are subject to final review by the Editor.

- **Citation Diversity Statement:** The citation diversity statement should appear in the Acknowledgements section of the manuscript. ACS recommends including the following: (1) the importance of citation diversity, (2) the proportion of citations by gender and race/ethnicity for the first and last authors, (3) the method used to determine those proportions and its limitations, and (4) steps taken to by the authors to improve citation diversity in the article. We

recognize that one limitation of the current methods is that it cannot account for intersex, non-binary, and transgender people, or Indigenous and mixed-race authors. (Adapted from [BMES/Springer Guidelines](#))

- **Land acknowledgment:** The land acknowledgment statement should appear in the Acknowledgements section of the manuscript. The statement should link to the institutions' formal land acknowledgments on which the research took place, if possible. Further guidance for creating these statements can be found here: <https://nativegov.org/news/a-guide-to-indigenous-land-acknowledgment/>.

Appendix 2: Preparing Graphics

Resolution

Digital graphics pasted into manuscripts should have the following minimum resolutions:

- Black and white line art, 1200 dpi
- Grayscale art, 600 dpi
- Color art, 300 dpi

Size

Graphics must fit a one- or two-column format. Single-column graphics can be sized up to 240 points wide (3.33 in.) and double-column graphics must be sized between 300 and 504 points (4.167 in. and 7 in.). The maximum depth for all graphics is 660 points (9.167 in.) including the caption (allow 12 pts. For each line of caption text). Lettering should be no smaller than 4.5 points in the final published format. The text should be legible when the graphic is viewed full-size. Helvetica or Arial fonts work well for lettering. Lines should be no thinner than 0.5 point.

Color

Color may be used to enhance the clarity of complex structures, figures, spectra, and schemes, etc., and color reproduction of graphics is provided at no additional cost to the author. Graphics intended to appear in black and white or grayscale should not be submitted in color.

Type of Graphics

Table of Contents (TOC)/Abstract Graphic

Consult the Guidelines for [Table of Contents/Abstract Graphics](#) for specifications.

Our team of subject-matter experts and graphical designers can also help generate a compelling TOC graphic to convey your key findings. Learn more about our [Graphical Abstract service](#).

Figures

A caption giving the figure number and a brief description must be included below each figure. The caption should be understandable without reference to the text. It is preferable to place any key symbols used in the artwork itself, not in the caption. Ensure that any symbols and abbreviations

used in the text agree with those in the artwork.

Charts

Charts (groups of structures that do not show reactions) may have a brief caption describing their contents.

Tables

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 in the narrative, when many numbers must be presented, or when more meaningful inter-relationships 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.

Schemes

Each scheme (sequences of reactions) may have a brief caption describing its contents.

Chemical Structures

Chemical structures should be produced with the use of a drawing program such as ChemDraw.

Cover Art

Journal of Chemical Education authors are encouraged to submit images to be considered for use on the journal's front cover or [Supplementary Covers](#) at the time of submission of their revised manuscript. If your article is accepted for publication, your suggestion may also be selected for use on one of the journal's covers. Images chosen for the front cover will be published at no cost to the author. If your art is selected for the front cover, ACS will send you information about how to request one complimentary 18" by 24" printed poster featuring your work.

Authors should submit high-resolution, engaging, relevant images to be considered for use as cover art, including images showing students (and people generally) engaged in chemistry. Table of Contents graphics are rarely suitable as cover art. Authors must ensure that all images for consideration have been created by them or, if not, that the appropriate permissions for commercial use have been secured.

Image files should be submitted as TIF, JPG, PNG, or EPS files (not PDF or PPT) with a resolution of at least 300 dpi for pixel-based images. Cover art should be 8.19 in. × 10 in. (20.80 cm × 25.4 cm), and submission of "layered" artwork is encouraged. Please note that the journal title will cover the top 2 in. (5.08 cm) of the image. Authors should submit the cover image, along with a short, clear legend (less than 50 words) explaining the image, as supplementary files to ACS Paragon Plus with their revised manuscript

If you wish to be considered only for the front cover, and not a paid supplementary cover, please respond NO accordingly to the Journal Covers question in ACS Paragon Plus. For more information on the Supplementary Covers program, please [see this webpage](#). All art submitted for

consideration for a supplementary cover will also be considered for a front cover.

Web Enhanced Objects (WEO)

The Web editions of ACS journals allow readers to view multimedia attachments such as animations and movies that complement understanding of the research being reported.

WEOs should be uploaded in ACS Paragon Plus with 'Web Enhanced Object' selected as the file designation. Consult the list of [compatible WEO formats](#).