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## 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 Within ACS Paragon Plus, the Custom Questions have been answered, including those about conflict of interest, unpublished work, and previous submissions.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 [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:  $^1\text{H}$  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

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## 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.

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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.

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