

# American Chemical Society (ACS) Documentation Style

## Introduction

American Chemical Society (ACS) is the documentation style most commonly used for papers in the field of chemistry. This handout offers examples for the general format of ACS research papers, including in-text citations, reference pages, and figures. Most of the information in this document was gathered from the ACS Style Guide (2006), which can be found in the Writing Center. If none of these examples seem appropriate, or if further information is required, please consult a tutor or the full-text version of the ACS Style Guide, 3rd Edition (2006).

## General ACS Guidelines

The title should accurately describe the paper's content in concise and grammatically correct language. It should use precise terms (e.g., *aluminum* rather than *metal*), and avoid jargon, symbols, formulas, and abbreviations. Do not begin a title with *The*.

The byline, or list of authors, should include all significant research contributors, even if the text was written by only one person. Provide the full given name of each author (e.g., Robert J. Smith or R. John Smith). Do not include titles such as *Professor* or *Doctor*.

Organize the paper into standard sections: abstract, introduction, experimental details or theoretical basis, results, discussion, and conclusions.

## Abstract

Every paper should include an abstract of approximately one paragraph, or 80 to 200 words. The abstract should indicate the research topic and address the experimental process, key findings, and major conclusions.

Abstracts should not include equations or structures that do not fit on the line of text, nor should it refer to sources, tables, or figures. Use abbreviations and acronyms only when necessary, and define abbreviations on initial use.

## In-Text Citations

### General Guidelines

In-text citations may use any of three formats, but the same format must be used throughout the paper:

1. Numerical references with superscript numbers. These citations follow the authors name, if mentioned, or the relevant clause or sentence. They are placed outside the punctuation.

As Parker<sup>4</sup> has noted, research indicates a minimal amount of condensation is expected.

-OR-

Research indicates a minimal amount of condensation is expected.<sup>4</sup>

2. Numerical references with italic numbers in parentheses on the line of text. These citations follow the author's name, if mentioned, or the relevant clause or sentence. They are placed inside the punctuation.

Chen (9) blames the perceived slowdown in global climate change on bad data.

-OR-

The perceived slowdown in global climate change may be due to bad data (9).

When using numerical reference citations, number sources consecutively, beginning with the number 1, in the order in which they are cited. If a reference is cited more than once, use the original reference number in all subsequent citations.

3. Author-date references, with the year of publication in parentheses. The author's surname may be incorporated into the sentence, as in the first example below. Alternatively, the author's surname, followed by a comma, may appear inside the parentheses preceding the year of publication, as shown in the second example below. In both cases, the material in parentheses is placed inside the punctuation.

Some plants display an ability to hear a predator coming (Kroser, 2012).

-OR-

Kroser (2012) notes that some plants display an ability to hear a predator coming.

### Multiple Authors

To cite a reference with two authors, give both names joined by the word *and*.

Jamy and Price<sup>12</sup>

Crane and Baker (6)

(Jernigan and Pare, 2015)

When citing a reference that has more than two authors, give the first name listed, followed by *et al*.

Plant et al.<sup>32</sup>

Horne et al. (3)

(Warner et al., 2007)

## Multiple References

### *Numerical References*

When citing more than one reference at the same point in the text, list the reference numbers in order and separate them by commas. If the references are part of a consecutive series, use a dash for a range of three or more. Examples:

in the literature<sup>3,7,10</sup>  
were indicated<sup>4-6,9</sup>

in the literature (3, 7, 10)  
were indicated (4 –6, 9)

When the citation involves more than one reference by the same principal author and various coauthors, use the principal author's name followed by *and co-workers* or *and colleagues*. Examples:

Johns and co-workers<sup>4,9</sup>  
Krenning and colleagues (14-16)

### *Author-Date References*

When citing more than one reference at the same point in the text, the references should be listed alphabetically by the first author's surname and separated by a semicolon. Example:

(Blaine, 2008; Fromm and Nolan, 2012; Troy et al., 2010)

When citing more than one reference by the same author at the same point in the text, the name is not repeated. List the name followed by the year of each reference in ascending order. Separate years with a semicolon. If the author has more than one reference in the same year, add lowercase letters to the years to differentiate them. Examples:

(Trapp, 2009, 2012; Varner, 2014)  
(Zollmer, 2008a, 2008b)  
(Bleckner, 2015; Bleckner and Fritz, 2015)

## Reference List

A reference list should follow the body of the paper on a separate page. This list must provide sufficient information for a reader to identify and locate the source documents. Do not include in the reference list works that are not cited in the paper.

The first line of each entry should be left justified. All subsequent lines in that entry should be indented one-half inch from the left margin using a hanging indent.

Papers using a numerical citation system list references in numerical order. Papers using the author-date citation system list references in alphabetical order by author's last name. When listing multiples references by the same author, list them in chronological order. If two or more sources by the same author share the same publication year, add consecutive lowercase letters to the years.

Abbreviate all journal names according to the *Chemical Abstracts Service Source Index (CASSI)*. The appropriate journal abbreviations can be found at [cassi.cas.org](http://cassi.cas.org).

## References

### Journal Article

#### *Basic Format:*

Author 1; Author 2; Author 3, etc. Title of Article. *Journal Abbreviation* **Year**, *Volume*, Inclusive Pagination.

#### *Example:*

Reinke, A. A.; Gestwicki, J. E. Insight into Amyloid Structure Using Chemical Probes. *Chem. Biol. Drug Des.* **2011**, *77*, 399-411.

### Online Periodicals

#### *Basic Format:*

Author 1; Author 2; Author 3, etc. Title of Article. *Journal Abbreviation* [Online] **Year**, *Volume*, Inclusive pagination or other identifying information. URL (accessed Month Day, Year).

#### *Example:*

Jiang, Q.; Zhai, C.; Xiong, Z. Chemical Compound Classification Based on Improved Max-Min Kernel. *J. Chem. Pharm. Res.* [Online] **2014**, *6*, 368-372. [jocpr.com/vol6-iss2-2014/JCPR-2014-6-2-368-372.pdf](http://jocpr.com/vol6-iss2-2014/JCPR-2014-6-2-368-372.pdf) (accessed July 06, 2015).

Note: If the article was retrieved from a database provider, the name of the database provider should be listed before the URL and followed by a period.

### Books without editors

#### *Basic Format:*

Author 1; Author 2; Author 3; etc. Chapter Title. *Book Title*, Edition number; Series Information (if any); Publisher: Place of Publication, Year; Volume Number, Pagination.

#### *Example:*

Le Couteur, P.; Burreson, J. *Napoleon's Buttons: How 17 Molecules Changed History*; Jeremy P. Tarcher/Putnam: New York, 2003; pp 32-47.

### Books with editors

#### *Basic Format:*

Author 1; Author 2; Author 3; etc. Chapter Title. In *Book Title*, Edition Number; Editor 1, Editor 2, etc., Eds.; Series Information (if any); Publisher: Place of Publication, Year; Volume Number, Pagination.

#### *Example:*

Almlof, J.; Gropen, O. Relativistic Effects in Chemistry. In *Reviews in Computational Chemistry*; Lipkowitz, K. B., Boyd, D. B., Eds.; VCH: New York, 1996; Vol. 8, pp 206-210.

## Websites

### *Basic Format:*

Author (if any). Title of Site. URL (accessed Month Day, Year), other identifying information (if any).

### *Example:*

Northern Illinois University. Department of Chemistry and Biochemistry Home Page. <http://www.chembio.niu.edu> (accessed Nov 7, 2004).

## Patents

### *Basic Format:*

Patent Owner 1; Patent Owner 2; etc. Title of Patent. Patent Number. Date.

### *Example:*

Heller, A. Biological Fuel Cell and Methods. U.S. Patent 9,070,934, June 30, 2015.

## Federal Government Documents

### *Basic Format:*

Author 1; Author 2; etc. Chapter Title. *Document Title*; Government Publication Number; Publishing Agency: Place of Publication, Year; Pagination.

### *Example:*

Gebhardt, S. E.; Thomas, R. G. *Nutritive Value of Foods*; Home and Garden Bulletin No. 72; U.S. Department of Agriculture, U.S. Government Printing Office: Washington, DC, 2002.

## State and Local Government Documents

### *Basic Format:*

Author 1; Author 2; etc. Chapter Title. *Document Title*; Publication Number or Type; Publishing Agency: Place of Publication, Date; Pagination.

### *Example:*

*Annual Report 2004: Moving Forward*; Santa Barbara County Air Pollution Control District: Santa Barbara, CA, 2005.

## Material Safety Data Sheets

### *Basic Formats:*

*Title*; MSDS Number; Manufacturing Company: Location of Company, Date.

*Title*; MSDS Number [Online]; Manufacturing Company: Location of Company, Date. URL (accessed Month Day, Year).

### *Examples:*

*Titanium Dioxide*; MSDS No. T3627; Mallinckrodt Baker: Phillipsburg, NJ, Nov 12, 2003.

*Acetic Anhydride*; MSDS No. A0338 [Online]; Mallinckrodt Baker: Phillipsburg, NJ, Feb 18, 2003. <http://www.jtbaker.com/msds/englishhtml/a0338.htm> (accessed Nov 10, 2004).

## Figures and Tables

### Using Figures and Tables

Figures communicate a point or idea quickly. In particular, they illustrate trends or relationships. Figures include graphs, photographs, sketches, and flow charts. Be certain to use the appropriate type of figure to convey the information clearly. For instance, use a line graphs to show trends; use pie charts to show portions of a whole.

Tables supply precise data or clarify relationships. Tables should be simple and concise, with consistent wording and symbols. Columns must be clearly labeled and properly aligned. Do not repeat in tables information that can be found in the text.

### Labeling Figures and Tables

Number figures and tables in two separate series (e.g., Table 1, Table 2, Table 3 and Figure 1, Figure 2, Figure 3). Number the items in each series sequentially in the order they appear in the text. Use a number combined with a letter to label parts of a figure or table (e.g., Figure 1A, Figure 1B, etc.).

#### *Figure Captions*

A brief caption must appear below each figure, preceded by the figure number in bold. The reader should be able to understand the caption without reference to the text. Use similar wording when captioning related figures. Symbols and abbreviations should be consistent among captions, figures, and text. Examples:

**Figure 2.** Mass spectrum obtained when laboratory ambient air containing 2.5 ppm of **1** was introduced in to the MS system.

**Figure 6.** Variable-temperature NMR spectra of **3d** in CD<sub>2</sub>Cl<sub>2</sub> solution at 500 MHz.

#### *Table Titles*

A brief title must appear above each table, preceded by the table number in bold. The reader should be able to understand the title without reference to the text. Use similar wording when titling related tables. Symbols and abbreviations should be consistent among titles, tables, and text. Examples:

**Table 8.** Short-term exposure limits for organic contaminants.

**Table 11b.** Kinetic data for first-order reactions.

### Referencing Figures and Tables

Figures and tables should appear only after specific reference to them in the text, and they must appear in the same order in which they are referenced. Refer to figures and tables using their full labels, and capitalizing the word *Figure* or *Table* when it is followed by the figure number. Example:

This process is illustrated in Figure 4.

## Citing Sources Used in Figures

To use a figure that has been published elsewhere, written permission must be obtained from the copyright owner, and the written permission must be submitted along with the work. When citing previously published figures, the citations appear at the end of the caption in parentheses.

*Basic Formats:*

Reprinted with permission from ref XX. Copyright Year Copyright Owner's Name.

Reprinted with permission from Author Names (Year of Publication). Copyright Year Copyright Owner's Name.

*Examples:*

Reprinted with permission from ref 10. Copyright 2003 American Pharmaceutical Association.

Reprinted with permission from Camiola and Altieri (2006). Copyright 2006 American Institute of Physics.

Written permission must also be obtained if adapting or using part of a previously published figure. In this case, the citation replaces "reprinted" with "adapted".

*Basic Formats:*

Adapted with permission from ref XX. Copyright Year Copyright Owner's Name.

Adapted with permission from Author Names (Year of Publication). Copyright Year Copyright Owner's Name.

*Examples:*

Adapted with permission from ref 12. Copyright 2008 American Cancer Society.

Adapted with permission from Smith and Johnson (2003). Copyright 2003 American Chemistry Council.

If previously published data is used to create an original figure or table, you do not need permission, but you should reference the source of the data following the caption and inside parentheses.

*Example:*

(Data are from ref 7).