THE JOURNAL OF PHYSICAL CHEMISTRY Letters

Editorial

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Mastering the Art of Scientific Publication

Twenty Papers with 20/20 Vision on Publishing

As new researchers generate their first results, they face the challenge of mastering the art of scientific publication in order to present their results and to draw attention to their new scientific findings. *Whether or not we want to describe science in such terms, scientific publishing is competitive in nature, and thus younger scientists must vie with their more experienced peers for recognition.* While the electronic age has made the publication process easier and quicker, optimizing the structure of a scientific paper requires a certain degree of skill and proficiency.[1] ACS Publications has been actively engaged in disseminating the basics of publication through Publication 101 videos and editorials and, in continuation of this spirit, we have assembled this virtual issue (http://pubs.acs.org/page/vi/art_of_scientific_publication.html). This issue draws together, in one place, these editorials that summarize the key steps involved in writing an effective paper, journal submission, review processes, and postpublication efforts. The twenty editorials assembled for this virtual issue provide further details on each of these topics. These topics may also be useful as part of the curriculum for the training of students and young researchers in any academic department.

The Choice of a Journal. The destination journal must be carefully considered either during the writing of the manuscript or upon its completion. This decision should be based on the scope of the journal and not simply metrics such as impact factor or Google Scholar ranking.[2] By identifying the appropriate journal, authors can maximize the impact of their published paper as it is more likely to be read by researchers working in the field. It is important to get the submission process right by providing all of the necessary information including, for example, author addresses, affiliations, preferred reviewers, funding agency(ies), and prior publication history.[3] The corresponding author is responsible for coordinating the publication efforts and ensuring that all coauthors are in agreement on the submission of the manuscript.[4] Prepare a cover letter that summarizes the key findings and justifies why, in the authors' opinion, the work would draw the attention of journal readership.[5] Submissions that do not meet the criteria set by the journal are returned to the authors.[6,7]

By identifying the appropriate journal, authors can maximize the impact of their published paper.

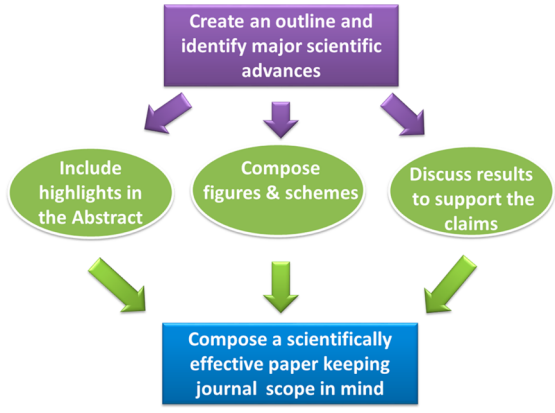
As a first step, it is important for the authors to look through the destination journal and its author instructions to confirm that the paper they are writing meets the journal scope, formatting, and other requirements. (Spend sufficient time to get a sense of the "flavor" of the journal.) Authors should write the paper with the broad readership of the journal in mind, not just readers in his/her own scientific community. The paper should constructively highlight the new findings without the use of hyperbole (avoid claims of novelty, and terms such as high efficiency, being the first, green, superior, etc.). If the authors can present a compelling scientific story that appeals to a broad readership, the paper *will* draw favorable attention from the reviewers, editors, and ultimately, the readers. Impact can be increased through effective presentation of results.[1]

A scientific paper should present new scientific advances and include in-depth discussion of the results in an effective manner.

It is important to note that there is a clear distinction between a scientific paper and a scientific report. A scientific paper should present new scientific advances and include in-depth discussion of the results in an effective manner. A few publishers have introduced journals whose primary output is scientific reports that are technically sound papers but are not specifically evaluated for novelty. The majority of scientific journals, however, aim to publish new scientific findings that fit within the scope of their journals.

Composing an Effective Scientific Paper. The key step in composing a paper is to organize the data with a carefully articulated outline, which will lead to an interesting, cogent scientific story (Chart 1).[1] This step should be followed by creating an attractive yet simple title that draws the attention of readers who may not be familiar with the specific research field.[8−11] The third step is to compose a short abstract that will be easily understood and appreciated by the journal readership.[1,9] The key finding emerging from the study should stand

Chart 1. Key Steps in Composing a Scientifically Effective Paper[a]



[a]Reproduced from ref 1.

Published: October 16, 2014

 © 2014 American Chemical Society dx.doi.org/10.1021/jz502010v | *J. Phys. Chem. Lett.* 2014, 5, 3519−3521

Table 1. Twenty Tips for Writing a Well-Composed Scientific Paper

	MANUSCRIPT PREPARATION TIPS
1	Assemble all the data and create an outline
2	Identify important scientific findings
3	Select data/figures/schemes/tables that support the scientific story
4	Select a journal based on the scope of your work, and not based on the journal's impact factor
5	Write a creative and attractive title that accurately represents scientific content
6	Write an abstract that clearly identifies the key scientific finding(s) and appeals to broad readership
7	Keep the abstract brief with minimal experimental details
8	Provide a good background and motivation that led to the research activity in the Introduction
9	Raise some degree of curiosity in the last paragraph of the Introduction
10	Discuss the results with a sequence that makes a nice story
11	Include a healthy scientific discussion, quantitative analysis, a model or a mechanistic scheme to explain the results
12	Draw figures with readable fonts. Make sure axis titles and units are correct and all data plots are clearly marked and explained in the caption
13	Provide experimental conditions or computational parameters in figure captions
14	Check the figure numbers and citations in the text to ensure correct referencing
15	Include complete experimental details so that the experiments can be reproduced elsewhere
16	Include name of the funding agency and others whose assistance made this work possible
17	Include additional details, as needed, in the supporting information
18	Make sure the references, formatted according to journal requirements, are accurate, and present a balance between seminal work and recent advances
19	Explain briefly the significance and scope of the work in the cover letter
20	Submit the manuscript and follow through the review process. Provide all the requested information during submission

out clearly in the abstract. Avoid making unnecessary claims or using hyped phrases as they often become the target of criticism from the reviewers and readers. The table of contents (TOC) graphic is another key component of the paper because it is your opportunity to make a good first impression on potential readers.[10,11] A short, simple illustration or scheme that highlights the theme of the paper will best draw attention to your paper. Do not just copy a figure from your paper or include excessive amounts of text in the TOC graphic; remember, the paper provides the detailed information so the TOC graphic does not have to.

The construction of the figures and schemes is another important step.[12−14] A careful and scientifically accurate representation of the data gives the impression that the data were similarly obtained in a careful and accurate manner. Editors, reviewers, and readers are human and may logically equate sloppy figures with sloppy data/experiments/theory. Experimental or analysis details should be included in the captions and each trace clearly identified. Verify that you have referred to all figures and tables in the manuscript text and that the referencing is correct. Confusion arising from incorrect or missing referrals often leads to negative recommendations from the reviewers. If you are reproducing a previously published figure or a table, be sure to cite the previous publication with credit for the graphic, as well as to obtain and to provide copyright permission, as required.

The construction of the figures and schemes is another important step.

The Citations or References section is another important part of any publication as it provides the necessary background and represents related advances in the field. The citations also reflect the scope of the study and whether the journal that is being considered for submission is appropriate. Hence, a careful balance of citations between seminal work and recent advances becomes important in projecting the importance of the work.[15] Excessive self-citations in the manuscript should be avoided because the reader may infer that the research is narrow in scope and not appealing to a wide range of researchers.

The Importance of the Experimental or Methods Section. This section is critical as it enables others to "do what you do", to follow up, to continue your work, and to further the impact of your science.[13,14] Provide as much detail as possible, and use the (essentially unlimited) space of the Supporting Information section to provide photographs, video, and helpful text that will assist others in reproducing your work. Such details and additional information will enable your research to stand the test of time.[2]

dx.doi.org/10.1021/jz502010v | J. Phys. Chem. Lett. 2014, 5, 3519−3521

Sailing through the Review Process. Once a paper is submitted to an ACS journal, it goes through a series of administrative and editorial checks. Because the editors are practicing scientists, they are able to judge the merit of the paper and to decide whether the submitted paper represents significant scientific advance that will appeal to the broader readership of the journal. Once the editorial review is complete, papers are either sent out for peer review or are returned to the author explaining the reasons behind the rejection. Please refer to a recent editorial for a detailed description of the review process involved in one of our journals.[16]

After peer reviews are received, the editor makes a decision on the paper. The most common decisions are minor revision, major revision, rejection, or referral to another journal. Because ACS journals often honor reviews from their sister ACS journals, the author should consider submitting their paper to a more appropriate ACS journal if the editor recommends submission to another journal.[3] Papers returned for revision require careful and well thought-out responses by the authors. A point-by-point response to reviewers' comments and changes made to the manuscript should be included when submitting the revised version.[17]

For accepted papers, the authors will receive galley proofs within a week. It is the authors' responsibility to check the proof for accuracy and correct any mistakes. Addition of new authors at this stage is strongly discouraged and delays publication. The availability of social media and multimedia offers our authors an important platform to promote published work. ACS Publications offer a variety of features, such as *ACS LiveSlides* or videos, as additional tools for communicating important research findings.[18]

It is important to realize that a well-composed manuscript with a compelling scientific story that can appeal to the journal's readership sees a higher rate of success.

Finally, we would like to remind and ensure all our authors that the editors of ACS journals are committed to evaluating every submission carefully.[19,20] It is important to realize that a well-composed manuscript with a compelling scientific story that can appeal to the journal's readership sees a higher rate of success (as measured, for instance, by the number of citations it receives over its lifetime[2]). Such scientifically sound papers also see a long-term impact after publication. The 20 publications assembled for this virtual issue and the 20 tips (Table 1) should provide authors the necessary 20/20 vision for preparing their next manuscripts.

Prashant V. Kamat, Deputy Editor
University of Notre Dame, Notre Dame, Indiana, United States
Jillian M. Buriak, Editor-in-Chief
University of Alberta, Edmonton, Alberta, Canada
George C. Schatz, Editor-in-Chief
Northwestern University, Evanston, Illinois, United States
Paul S. Weiss, Editor-in-Chief
University of California, Los Angeles, California, United States

AUTHOR INFORMATION

Notes

Views expressed in this editorial are those of the authors and not necessarily the views of the ACS.

SUPPORTING READINGS

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