How to write a scientific paper

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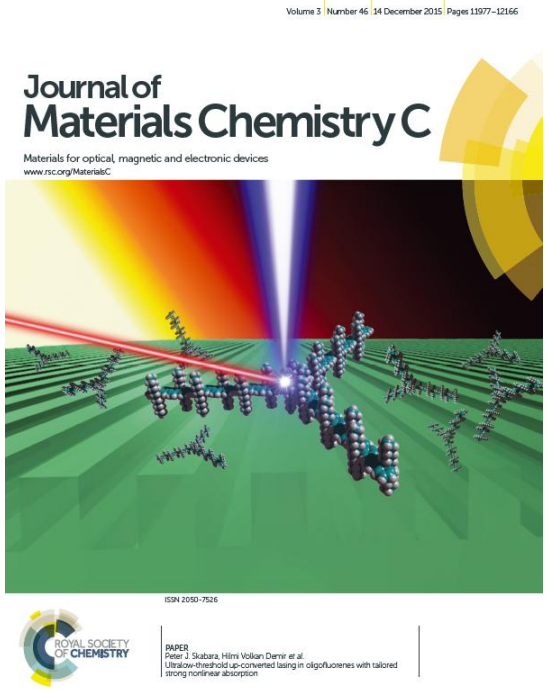
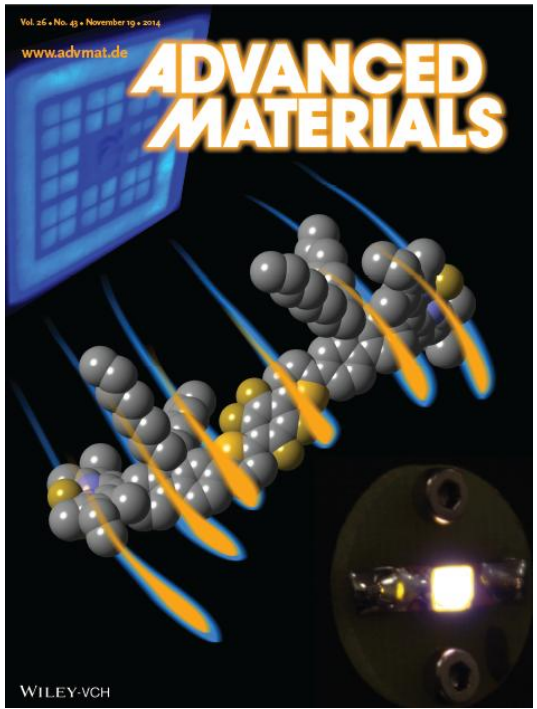
25 August 2025





Key points to consider

- Understanding the Structure (IMRaD format - Introduction, Methods (aka Experimental), Results, and Discussion)
- Crafting a Clear Message (Identifying the research question, key findings, and the central message of the paper)
- Adhering to Journal Guidelines (Selecting the right journal, following formatting requirements, and understanding the submission process)
- Effective Writing Techniques (Tips for clarity, conciseness, proper citation, and avoiding common pitfalls like plagiarism)
- Review and Revision (The importance of peer feedback, editing for readability, and responding to reviewers' comments professionally).

Choosing the right journal

- Scope – does it match your work?
- Impact factor and other metrics
- Are you reaching the right market (i.e. readership)?
- Journal reputation
- How ambitious should you be?

Tips for publishing – incl. quality & impact

Are you ready to publish?

- Consider publishing if your work makes a significant advance:
  - over your prior work
  - other people's work
- Have you done something new and interesting ?
- Is there anything challenging in your work ?
- Is the work directly related to a current hot topic ?
- Have you provided solutions to a difficult problem ?

Tips for publishing – incl. quality & impact

Are you ready to publish?

A good manuscript has:

- Good content that is useful and exciting
- Good presentation of the data, which is clear and logically constructed

What makes a good presentation?

- The paper has a clear, useful, and exciting message
- It is presented and constructed in a logical manner
- The reviewers and editors can easily grasp the significance

Tips for publishing – incl. quality & impact

- A good cover letter can help the Editor to decide if a paper goes for review – rejection rates can be high for the highest IF journals; give your paper a chance at the first stage.
- Check author names.
- Think carefully about your graphical abstract.
- Choose appropriate keywords.
- Think about your graphs/images in papers:
  - Consistency in labels
  - Is the graph/image clear?
  - Main paper or SI section?

Tips for publishing – incl. quality & impact

Title of the manuscript – so simple, but the first thing readers look at - the title should be short and straightforward enough to appeal to a general reader, but detailed enough to properly reflect the contents of the article.

- Keep it as short as possible
- Use easily recognisable words and phrases that can be read quickly
- Use keywords and familiar, searchable terms – these can increase the chances of your article appearing in search results. Around 70% of readers (RSC) find articles through search engines
- Use general terms for compounds and procedures rather than specific nomenclature or very specialised terms
- Avoid using non-standard abbreviations and symbols

Which of the following is better?

Alkylation of active methylene compounds with alcohols catalysed by an iridium complex

Active methylene compounds are alkylated with ROH under catalysis of $[IrCl(cod)]_2$

Tips for publishing – incl. quality & impact

Abstract

Along with the title, the abstract is the first part of your manuscript that editors, reviewers and potential readers will see. It will help readers to decide whether your article is of interest to them.

Therefore, it's important that it clearly and concisely summarises the main findings of your research and why they are important.

The abstract is a single paragraph which should:

- be around 50 to 250 words
- be concise and easy to read with recognisable words and phrases
- use familiar, searchable terms and keywords
- set out the main objectives and results of the work; it should give the reader a clear idea of what has been achieved
- emphasise (but not overstate) the potential impact of the research and why it is important (compared to other research in its field)
- avoid including detailed information on how the research was carried out – this should be described in the main part of the manuscript

Tips for publishing – incl. quality & impact

Introduction

- Give a clear motivation for the work. Explain why before explaining how.
- Explain what is novel compared to what is already available in the literature
- High level description of your approach. Why is it important? Why is it difficult?
- What are the alternatives? Why is yours different or better?
- What are the gaps and how are you going to fill them? What is your “silver bullet”?
- At the end of the introduction the reader knows the problem and maybe the solution you propose.

Tips for publishing – incl. quality & impact

Other sections:

- Experimental
  - Provide descriptions of the experiments in enough detail so that a skilled researcher is able to repeat them
  - Suitable characterisations of compounds must be included

- Results & discussion
  - Organised into an orderly and logical sequence
  - Only the most relevant results should be described in the text

- Results & discussion
  - Explain the meaning of your results and why they are important
  - State the impact of your results compared with recent work and relate it back to the problem or question you posed in your introduction
  - Ensure claims are backed up by evidence and explain any complex arguments
  - Apply critical analysis

Tips for publishing – incl. quality & impact

Other sections:

At the end – Summary or Conclusion?

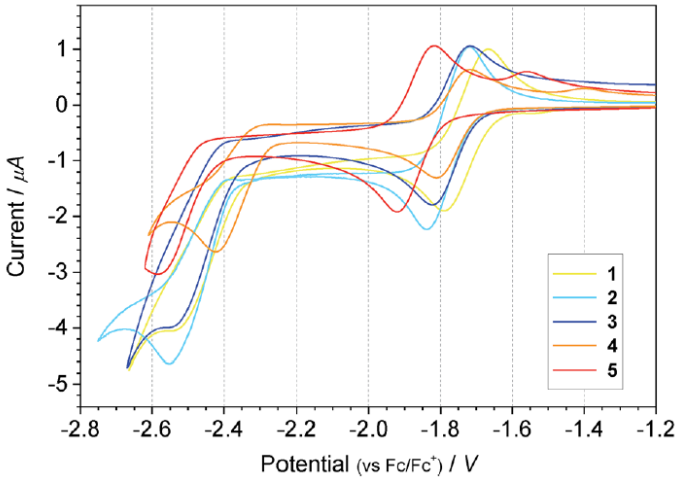
References – make sure you've used the correct format. Software?

Author Contributions (optional). Conflicts of interest. Data availability. Acknowledgements. Table of contents graphic/text.

Check - a good paper tells a story that captivates the reader – will yours?

Tips for publishing – incl. quality & impact

- Think about your graphs/images
  - Consistency in labels
  - Is the graph/image clear?
  - Main paper or SI section?



- Make sure you proof-read your manuscript properly (and also make sure that your co-authors engage in the process). Also, proof-read the proofs rigorously!

- Become a reviewer – professional development by self-learning

Examples unlikely to succeed

Anything with mistakes in the abstract, or where the abstract and introduction do not address the following points:

- What have you done that is new and interesting?
- What problem did you solve?
- Why is it important?
- How does it relate to prior work?

Examples unlikely to succeed

- We have made a new material and measured its fluorescence spectrum. It could be used in OLEDs. *You need to show and prove it has an advantage over other materials*
- We have made an OLED with maximum brightness 297.368 Cd m^{-2}
- We have made a new compound by changing methyl to ethyl. *Unless it transforms its properties and (preferably) you know why*

Think about how the paper helps the community to advance.

Ethics – publish and peril!

- Co-authors – who should be included, or perhaps not
- Plagiarism - self and other work
- Critique of other, related work
- Publishing the same material twice
- Manipulation of data
- Reproduction of graphics from other papers
- Citations – making sure you acknowledge key papers
- Seeing a competitor's work during review
- Citation clubs
- Self-citation

Who will be your Editor?
Journal of Materials Chemistry C
Associate Editors – snapshot 2017

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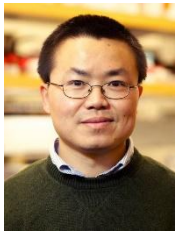


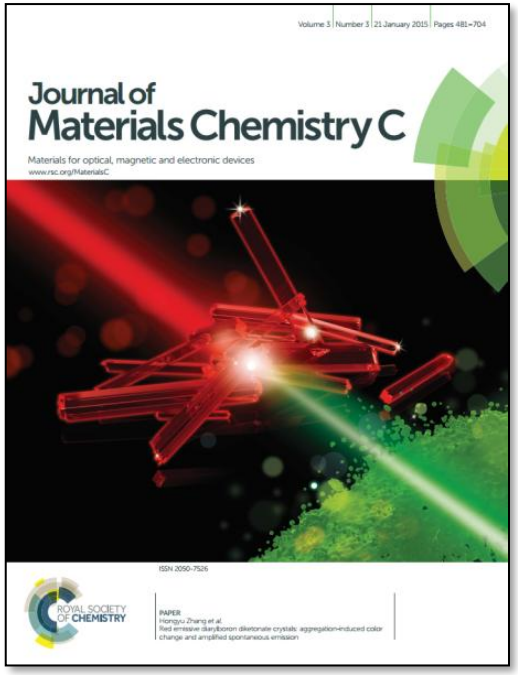
Professor Yadong Yin
University of California Riverside

Professor Martyn McLachlan
Imperial College London

Journal of Materials Chemistry C

Scope

An interdisciplinary journal, publishing work of international significance on all aspects of materials chemistry related to optical, magnetic and electronic devices



- ***Display technologies:*** *e.g. LEDs and OLEDs, and liquid crystals*
- ***Sensors:*** *e.g. chemical and optical sensing technologies*
- ***Printing:*** *e.g. inkjet, screen, 3D, electronics and security*
- ***Optics:*** *e.g. nonlinear optics, photonics, and electro- and photochromic*
- ***Electronics:*** *e.g. photovoltaics, transistors, semiconductors, thermoelectrics, and plasmonics*
- ***Magnetics:*** *e.g. spintronics, ferroelectrics and multiferroics*
- ***Information storage technologies****: e.g. memory devices*

All JMCs apply the same acceptance criteria and quality of articles

- Associate Editors and in-house peer-review.
- If you are unsure of scope, seek advice before submission.
- Acceptance criteria:
  - Must have chemistry. Novelty can be in synthesis or properties/applications
  - Impact

Typical journey for a successful manuscript

- Submission – might not be as quick as you think – orcid numbers, email addresses, copyright issues, number of authors, author approval
- Editor initial screening
- Peer review
- Revision
- Copyright and payment
- Proof-reading
- Marketing your paper – cover image, spreading the word

Responding to reviewers

In your cover letter to the Editor you should:

- Thank the Editor and the reviewers for their time spent on your manuscript
- Summarise how you have responded to the comments –e.g. manuscript with track changes, manuscript as a clean version, responses in red text, etc.
- Respond to each point for each reviewer separately
- Be polite in your response – very important
- Try and comply with as many suggested changes as you can
- Consider any further experiments requested – if they are quick and easy then do just do them; if they would take months or if you don't have the capability, then say so
- If you don't agree with a comment, make sure your counter-argument is supported by strong rationale, fact or (even better) references

Some things for budget holders to note…

- Unexpected charges - colour

  Wiley (2015, see table):

*Quick cost lookup table for colour figures in print and online:			
No. of colour figs	Cost	No. of colour figs	Cost
1	£150	6	£400
2	£200	7	£450
3	£250	8	£500
4	£300	9	£550
5	£350	10	£600

  Wiley EMBO Molecular Med:

1 color figure	595.00 Euro
2 color figures	990.00 Euro
3 color figures	1485.00 Euro
4 color figures	1980.00 Euro

  Springer Nature: €360/ £320/ $430 per figure for reproduction in full colour.

- Open Access – big change in recent years, compliance with funder regulations. Can be free (e.g. Beilstein Journal of Organic Chemistry), or very costly.

Some things for budget holders to note…

NEWS · 24 NOVEMBER 2020

Nature journals reveal terms of landmark open-access option

The journals will charge authors up to €9,500 to make research papers free to read, in a long-awaited alternative to subscription-only publishing.

Holly Else

Nature and 32 other subscription titles in the Nature family will offer open-access publishing from 2021. Credit: *Nature*

PDF version

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Nature to join open-access Plan S, publisher says

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Open-access Plan S to allow publishing in any journal

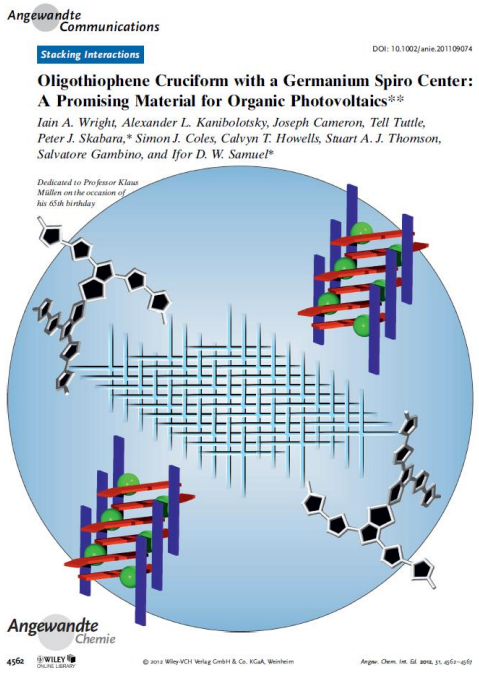
Plan S, which began in 2021, aims to make scientific and scholarly works free to read and reproduce as soon as they are published. Research funders that have signed up to it include the World Health Organization, Wellcome in London, the Bill & Melinda Gates Foundation in Seattle, Washington, and 17 national funders, mostly in Europe. The European Commission also says it will follow the plan.

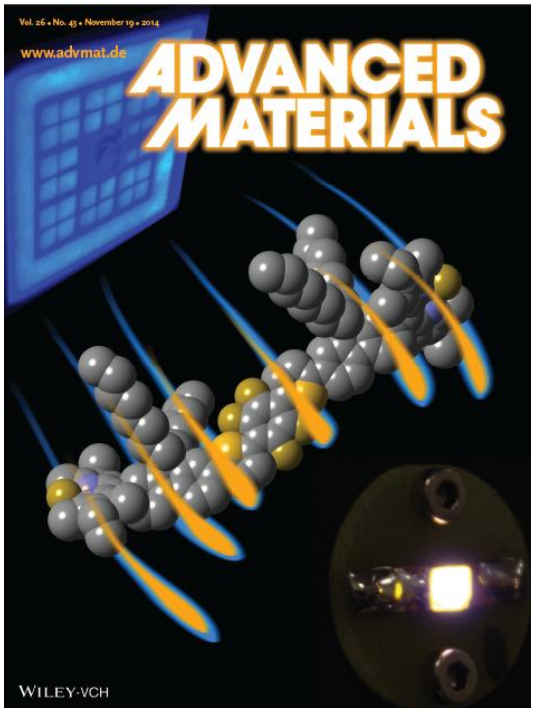
Some things for budget holders to note…

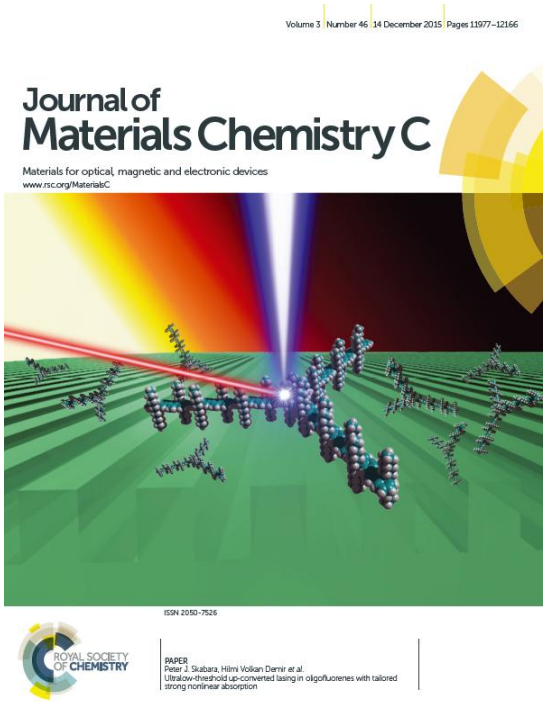
Cover images – are they worth it?

Outside/inside front cover: £1500 (€1,740)

Outside/inside back cover: £1250 (€1,450)







Citation data, self-marketing, etc.

- Impact factors
- H-index
- Types of publications – primary, review, book chapters – is writing a book chapter really worth it?
- Esteem indicators – book editor, guest editor of a special issue

DORA - https://sfdora.org/

What is DORA?

The Declaration on Research Assessment (DORA) recognizes the need to improve the ways in which researchers and the outputs of scholarly research are evaluated.

The idea to write the declaration was developed in 2012 during at the Annual Meeting of the American Society for Cell Biology in San Francisco. It has become a worldwide initiative covering all scholarly disciplines and all key stakeholders including funders, publishers, professional societies, institutions, and researchers.

We encourage all individuals and organizations who are interested in developing and promoting best practice in the assessment of researchers and scholarly research to sign DORA.

Issues with IF include:

- citation distributions within journals are highly skewed,
- the properties of the Journal Impact Factor are field-specific: it is a composite of multiple, highly diverse article types, including primary research papers and reviews,
- Journal Impact Factors can be manipulated (or “gamed”) by editorial policy,
- data used to calculate the Journal Impact Factors are neither transparent nor openly available to the public.

Many organisations have signed up to DORA, internationally.

Citation impact

- Journal Impact Factor
- 5-year Journal Impact Factor
- Immediacy Index
- Eigenfactor® Score
- Article Influence Score

Usage

- Downloads
- Altmetric mentions

Journal Impact Factor

The Journal Impact Factor is defined as all citations to the journal in the current JCR year to items published in the previous two years, divided by the total number of scholarly items (these comprise articles, reviews, and proceedings papers) published in the journal in the previous two years. Though not a strict mathematical average, the Journal Impact Factor provides a functional approximation of the mean citation rate per citable item. A Journal Impact Factor of 1.0 means that, on average, the articles published one or two years ago have been cited one time. A Journal Impact Factor of 2.5 means that, on average, the articles published one or two years ago have been cited two and a half times. The citing works may be articles published in the same journal. However, most citing works are from different journals, proceedings, or books indexed in Web of Science Core Collection. (Source: Clarivate Analytics)

5-year Journal Impact Factor

The 5-year journal Impact Factor, available from 2007 onward, is the average number of times articles from the journal published in the past five years have been cited in the JCR year. It is calculated by dividing the number of citations in the JCR year by the total number of articles published in the five previous years. (Source: Clarivate Analytics)

Immediacy Index

The Immediacy Index is the average number of times an article is cited in the year it is published. The journal Immediacy Index indicates how quickly articles in a journal are cited. The aggregate Immediacy Index indicates how quickly articles in a subject category are cited. The Immediacy Index is calculated by dividing the number of citations to articles published in a given year by the number of articles published in that year. Because it is a per-article average, the Immediacy Index tends to discount the advantage of large journals over small ones. However, frequently issued journals may have an advantage because an article published early in the year has a better chance of being cited than one published later in the year. Many publications that publish infrequently or late in the year have low Immediacy Indexes. For comparing journals specializing in cutting-edge research, the immediacy index can provide a useful perspective. (Source: Clarivate Analytics)

Eigenfactor® Score

The Eigenfactor Score calculation is based on the number of times articles from the journal published in the past five years have been cited in the JCR year, but it also considers which journals have contributed these citations so that highly cited journals will influence the network more than lesser cited journals. References from one article in a journal to another article from the same journal are removed, so that Eigenfactor Scores are not influenced by journal self-citation. (Source: Clarivate Analytics)

Article Influence Score

The Article Influence Score determines the average influence of a journal's articles over the first five years after publication. It is calculated by multiplying the Eigenfactor Score by 0.01 and dividing by the number of articles in the journal, normalized as a fraction of all articles in all publications. This measure is roughly analogous to the 5-Year Journal Impact Factor in that it is a ratio of a journal's citation influence to the size of the journal's article contribution over a period of five years. (Source: Clarivate Analytics)

Downloads

Downloads reflect the number of times full text or PDF versions of articles are accessed directly from the journal website and Springer Link. Downloads are defined as HTML, LookInside, PDF, and Epub clicks. Please note that this does not include article downloads from mirror databases such as PubMed Central. These download counts comply with the COUNTER5 standard. COUNTER5 is the fifth iteration of the "Code of Practice," from Counter Metrics, which is a not-for-profit organization financially sustained by its global community of members, including libraries, consortia, publishers, aggregators, and technology providers.

Altmetric mentions

Total number of mentions (e.g. X, Facebook, Reddit, Blogs, News articles, Policy documents, and Faculty of 1000 reviews) for articles published in the specified timeframe, as provided by Altmetric.

If you would like a copy of this presentation, email me to request a pdf by the end of this week:

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