



Journal of Materials Science

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*The Journal of Materials Science publishes reviews and full-length papers recording original research on, or techniques for, studying the fundamental relationships between structure, processing, properties and performance of materials.*

## Instructions for authors

Please note that these Instructions include guidelines that are specific to the Journal of Materials Science. Where the Instructions differ from the generic Springer version found on Springer.com, the version given here takes precedence.

### Manuscript submission

#### Author representations

Submission of a manuscript implies: that the work described has not been published before in any format; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities — tacitly or explicitly — at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

#### Permissions

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) for both the print and online format and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors. From January 2017, the Journal of Materials Science requires that the corresponding authors have valid ORCIDs at the time of submission and all authors have valid ORCIDs at the time of revision.

#### Online submission

Authors must submit their manuscripts online via the Journal of Materials Science Editorial Manager website at: <https://www.editorialmanager.com/jmsc/>.

## Article types

### Regular articles

Regular articles report original research on, or techniques for studying, the fundamental relationships between structure, processing, properties and performance of materials.

Typical topics include, but are not limited to: metals, ceramics, glasses, polymers, electrical and electronic materials, composite materials, fibers, nanostructured materials, nanocomposites, and biological and biomedical materials.

The median typeset length for a regular research article published in the Journal in 2016 was 11 pages.

### Articles in special issues and themed sections

Special issues are collections of themed articles, sometimes arising from a conference, symposium or other notable event. Only full papers of the same standard as regular articles will be considered for publication in special issues.

Articles submitted to the Journal for inclusion in special issues are processed in the same manner as regular articles, but will typically involve a Guest Editor in addition to the normal Editorial Board.

### Reviews

Review articles are intended to be comprehensive summaries of the state-of-the-art in a particular aspect of materials science. The mean typeset length for a review article published in the Journal in the last three years was 20 pages. The median number of references in these articles was 110.

Prospective authors of reviews should contact the Editor-in-Chief before preparing their articles.

### Viewpoint articles

Viewpoint articles, introduced in 2016, are short personal perspectives on a topical area of general interest to the materials science community. Authors of Viewpoint articles are invited by the Editor-in-Chief. Suggestions for Viewpoint articles may be directed to the [Editor-in-Chief](#).

## Manuscript format

### Cover letter

All submissions must include a cover letter that includes:

- A confirmation of author representations that: the work described has not been published before; it is not under consideration for publication anywhere else; and publication has been approved by all co-authors and the responsible authorities at the institute(s) where the work has been carried out.
- A statement of the novelty and significance of the work and the relevance to the mission of the Journal of Materials Science.
- Names, affiliations and email addresses of at least three suitable referees, together with a brief statement of why they are qualified to evaluate the manuscript. Referees should be selected from countries other than those where the authors reside.

### Title page

The title page should include:

- The name(s) of the author(s), with symbols to link each name with that author's institutional affiliation and an asterisk to denote the corresponding author
- A concise and informative title
- The affiliation(s) and address(es) of the author(s)
- The e-mail addresses of all authors and the telephone number of the corresponding author

The use of abbreviations in titles is discouraged. These abbreviations can appear in the abstract and keywords to ensure the article is automatically indexed properly. Please see the [Journal's 2016 editorial on this topic](#) for more suggestions on crafting an appropriate title.

The author list should include only those who have made significant scientific contributions to the manuscript. These contributions must include conception and planning of the work that led to the manuscript or acquisition, analysis and interpretation of the data, or both; drafting or critical revision of the manuscript for important intellectual content, or both; and approval of the final submitted version of the manuscript. Others who have contributed to the work should be noted in the Acknowledgements.

Changes to the author list between initial submission and revision must be accompanied by an explanatory statement in the cover letter for the revision. These changes will be accepted at the discretion of the Editor and may lead to rejection of the manuscript.

### **Abstract**

The abstract should be 150 to 250 words. The content should state the main purposes and research questions of the study, the methods used, the main results, and the key conclusions. The structured abstract described in the web-based Instructions for Authors should not be used.

### **Keywords**

Authors should provide 4 to 6 keywords, which can be used for indexing purposes.

Effective keywords include abbreviations or phrases that may not appear in the title or abstract and that link the work to wider fields of research.

### **Main body**

Manuscripts describing original research will typically include the following sections:

- Introduction: a concise, up-to-date description of the background to provide a general reader of the Journal with enough context to understand the research being presented and its significance, as well as providing a clear statement of the research question and any hypotheses being explored.
- Materials and methods: techniques, materials and equipment described in sufficient detail for another trained researcher to be able to reproduce the experimental work reported. Methods that are identical to published procedures should still be summarized in brief and include a citation to the original work.
- Analysis: in submissions that have a significant theoretical or mathematical component, a description of the analytical procedures may be required.
- Results: a description of the analyses and measurements related to answering the central research questions.
- Discussion: the interpretation of the results, considering their significance, and putting them into a wider context through comparison to previously published research. The use of a combined "Results and Discussion" section is discouraged.
- Conclusions: a concise statement of the main conclusions drawn from the research reported in the manuscript.
- Acknowledgments: a list of people who contributed to the work in the manuscript but who are not named in the author list, and a list of funding sources that supported the research presented. The Acknowledgments should appear as a separate section before the reference list. The names of funding organizations should be written in full.
- Conflicts of interest: a statement that declares all relationships or interests of the manuscript's authors that could potentially influence or bias the submitted work. If no conflicts of interest exist, the authors must include a statement stating this. Details on potential conflicts of interest are included in the 'publishing ethics' section. Manuscripts that do not include a conflict of interest statement will be returned to the authors for amendment before any editorial consideration.
- Supplementary information: a brief description of any additional material omitted from the main body in the interest of presentation a clearer and more readable manuscript.

## Text

### Text formatting

Manuscripts should be submitted in Microsoft Word. PDF is *not* an acceptable format.

- Use a normal, plain font (e.g., 12-point Times Roman) for text.
- Use only one column.
- Use 1.5 or double-spaced text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Manuscripts with mathematical content can also be submitted in LaTeX.

- A [LaTeX macro package \(zip, 182 kB\)](#) is available for download. Full instructions on preparing a TeX submission for our editorial manager system are available on the [Editorial Manager site](#).

### Headings

No more than three levels of displayed headings should be used.

### Abbreviations

Abbreviations should be defined at the point of first use and be used consistently thereafter. Abbreviations defined in the abstract should be redefined in the main body of the submission.

### Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

### Equations

Some equations entered using Microsoft Equation do not convert correctly when a submission written in Microsoft Word is converted into a PDF by Editorial Manager. Authors are encouraged to double-check all equations before final submission and to use Insert|Equation... for better compatibility.

## Scientific style

- Internationally accepted signs and symbols for units (SI units) should be used throughout. Negative exponents should be used instead of a slash, e.g.,  $m\ s^{-2}$  rather than  $m/s^2$ .
- Nomenclature: Insofar as possible, authors should use systematic names similar to those used by Chemical Abstracts Service or [IUPAC](#).
- A decimal point (dot, full stop) should be used to mark the radix point instead of a comma, e.g., 0.5%.
- The following standard mathematical notation should be used for formulae, symbols, etc.:
  - Italics for single letters that denote mathematical constants, variables, and unknown quantities
  - Roman (upright) face for numerals, operators, and punctuation, and commonly defined functions or abbreviations, e.g., cos, det, e or exp, lim, log, max, min, sin, tan, d (for derivative)
  - Bold face for vectors, tensors, and matrices.

## References

### Citation

Reference citations in the text should be identified by numbers in square brackets; these should be placed before punctuation marks. Some examples:

1. This material is used in a wide variety of applications [3].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1–3, 7].

### Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list. The entries in the list should be numbered consecutively.

The Journal's reference style is given below, but any style that includes the same information will be considered. Journal article titles and end page numbers must be included. For publications assigned an article number rather than page numbers, the article number and number of pages should be given.

#### *Journal article*

- [1] O'Brien CJ and Foiles SM (2016) Exploration of the mechanisms of temperature-dependent grain boundary mobility: search for the common origin of ultrafast grain boundary motion, *J Mater Sci* 51:6607–6623.

Ideally, the names of all authors should be provided, but the usage of "et al" in long author lists (> 8 authors) will also be accepted:

- [2] Eichhorn SJ, Dufresne A, Aranguren M et al (2010) Review: current international research into cellulose nanofibres and nanocomposites, *J Mater Sci* 45:1-33.

Articles published online but not yet assigned page numbers may be cited using the DOI:

- [3] Kaplan WD, Chatain D, Wynblatt P, Carter WC (2013) A review of wetting versus adsorption, complexions, and related phenomena: the Rosetta stone of wetting, *J Mater Sci*. doi: 10.1007/s10853-009-3874-0

#### *Book*

- [4] Carter CB, Norton MG (2013) *Ceramic Materials: Science and Engineering* 2nd edn. Springer, New York

#### *Book chapter*

- [5] Nieh TG (2007) Deformation Behavior. In: Miller MK, Liaw P (eds) *Bulk Metallic Glasses*. Springer, New York, pp 147-161

#### *Online document*

- [6] Barthelmy D (2007) Cryptomelane. <http://webmineral.com/data/Cryptomelane.shtml>. Accessed 28 July 2013

#### *Dissertation*

- [7] Blanford CF (2000) Synthesis and electron microscopy of inorganic and hybrid organic-inorganic mesoporous and macroporous materials. PhD Dissertation, University of Minnesota

Always use the standard abbreviation of a journal's name according to the ISSN List of Title Word Abbreviations, see [www.issn.org/2-22661-LTWA-online.php](http://www.issn.org/2-22661-LTWA-online.php)

For authors using EndNote, Springer provides an output style that supports the formatting of in-text citations and reference list. [EndNote style \(zip, 2 kB\)](#)

For authors using Docear, Mendeley, Zotero or other citation-management software, a citation style language (CSL) version of this Journal's reference style can be downloaded from <https://www.zotero.org/styles/journal-of-materials-science>.

Authors preparing their manuscript in LaTeX can use the BibTeX file `sbasic.bst`, which is included in Springer's LaTeX macro package, or generate their file using pandoc with the argument `--csl=journal-of-materials-science.csl`.

## Tables

- All tables are to be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
- Each table must be accompanied by a table caption (title) explaining the components of the table.
- The original source of any previously published material is to be identified using a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

## Artwork and illustration guidelines

### Electronic figure submission

- Supply all figures electronically. Authors are encouraged to embed their figures in the document near the paragraph in which they are first referenced.
- For vector graphics, the preferred format is EPS; for halftones, use TIFF format. Vector graphics file formats (e.g., EPS) must have fonts embedded in the file. MS Office files are also acceptable.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

### Line art

- Definition: Black and white graphic with no shading.
- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.

### Data plots

- Definition: Graphical representation of data to reveal relationships between variables.
- Plots should follow guidelines for line art in line width, font sizes and file resolution. All plots should use a white background.
- Simple geometric symbols (e.g., open and filled triangles, squares, circles, etc.) should be used for data points, with capped error bars to denote the precision of measurements.
- Axes should be labeled with the appropriate units included in parentheses.
- The use of Microsoft Excel to generate plots is strongly discouraged.

### Halftone art

- Halftone art includes micrographs, photographs, drawings, or paintings with fine shading, etc.
- If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves. Microscope-generated scale bars, particularly "tick-mark" style ones, typically reproduce poorly and should be replaced by larger, more legible scale bars. Magnifications should not be given (e.g., 1000×).
- The contrast in micrographs should be adjusted to fill the grey levels so long as it does not lead to misinterpretation of the visual information being presented.

- Screenshots of data from energy dispersive spectroscopy (EDS), mass spectrometry, nuclear magnetic resonance (NMR) spectroscopy, atomic force microscopy (AFM), etc. are not acceptable. Data must be plotted in a graphing program.
- Halftones should have a minimum resolution of 300 dpi.
- The aspect ratio of any images should not be altered.

#### **Combination art**

- Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
- Combination artwork should have a minimum resolution of 600 dpi.

#### **Color art**

- Color art is free of charge for online publication.
- If black and white will be shown in the print version, make sure that the main information will still be visible. Many colors are not distinguishable from one another when converted to black and white. A simple way to check this is to make a xerographic copy to see if the necessary distinctions between the different colors are still apparent.
- If the figures will be printed in black and white, do not refer to color in the captions.
- Color illustrations should be submitted as RGB (8 bits per channel).

#### **Figure lettering**

- To add lettering, it is best to use Helvetica, Calibri or Arial (sans serif fonts).
- Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).
- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
- Avoid effects such as shading, outline letters, etc.
- Do not include titles or captions within your illustrations.

#### **Figure numbering**

- All figures are to be numbered using Arabic numerals.
- Figures should always be cited in text in consecutive numerical order.
- Figure parts should be denoted by lowercase letters (a, b, c, etc.).
- If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures, "A1, A2, A3, etc." Figures in online appendices (Electronic Supplementary Material) should, however, be numbered separately.

#### **Figure captions**

- Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.
- Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.
- No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.
- Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.
- Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

#### **Figure placement and size**

- When preparing your figures, size figures to fit in the column width.
- For the *Journal of Materials Science*, the figures should be 84 mm wide for single-column figures or 174 mm wide for double-column figures, and not taller than 234 mm.

## Cover art

- The Journal of Materials Science features large cover images.
- Suggestions for artwork can be uploaded at the time of submission.
- Artwork should be about 4990 px × 3500 px (8.3 in. × 5.8 in. or 21.1 cm × 14.8 cm at a resolution of 600 dpi).
- The Journal of Materials Science does not charge authors a fee to feature their cover artwork.

## Accessibility

- In order to give people of all abilities and disabilities access to the content of your figures, please make sure that:
  - all figures have descriptive captions (blind users could then use a text-to-speech software or a text-to-Braille hardware);
  - patterns are used instead of or in addition to colors for conveying information (color-blind users would then be able to distinguish the visual elements); and
  - any figure lettering has a contrast ratio of at least 4.5:1.

## Permissions

If you include figures that have already been published elsewhere, you must obtain permission from the copyright owner(s) for both the print and online format. Please be aware that some publishers do not grant electronic rights for free and that Springer will not be able to refund any costs that may have occurred to receive these permissions. In such cases, material from other sources should be used.

## Electronic supplementary material

Springer accepts electronic multimedia files (animations, movies, audio, etc.) and other supplementary files to be published online along with an article or a book chapter. This feature can add dimension to the author's article, as certain information cannot be printed or is more convenient in electronic form.

## Submission

- Supply all supplementary material in standard file formats.
- Include in each file the following information: article title; journal name; author names; and affiliation and e-mail address of the corresponding author.
- To accommodate user downloads, keep in mind that larger files may require very long download times and that some users may experience other problems during downloading.

## Audio, video, and animations

- Always use MPEG-1 (.mpg) format.

## Text and presentations

- Submit your material in PDF format; .doc or .ppt files are not suitable for long-term viability.
- A collection of figures may also be combined in a PDF file.

## Spreadsheets

- Spreadsheets should be converted to PDF if no interaction with the data is intended.
- If the readers should be encouraged to make their own calculations, spreadsheets should be submitted as .xls files (MS Excel).

## Specialized formats

- Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

## Collecting multiple files

- It is possible to collect multiple files in a .zip or .gz file.

## Numbering

- If supplying any supplementary material, the text must make specific mention of the material as a citation, similar to that of figures and tables.
- Refer to the supplementary files as “Online Resource”, e.g., “... as shown in the animation (Online Resource 3)”, “... additional data are given in Online Resource 4”.
- Name the files consecutively, e.g. “ESM\_3.mpg”, “ESM\_4.pdf”.

## Captions

- For each supplementary material, please supply a concise caption describing the content of the file.

## Processing of supplementary files

- Electronic supplementary material will be published as received from the author without any conversion, editing, or reformatting.

## Accessibility

- In order to give people of all abilities and disabilities access to the content of your supplementary files, please make sure that
- The manuscript contains a descriptive caption for each supplementary material
- Video files do not contain anything that flashes more than three times per second (so that users prone to seizures caused by such effects are not put at risk)

## Publishing ethics

Springer is a member of the Committee on Publication Ethics (COPE) and subscribes to its principles. COPE’s code of conduct, guidelines, and flowcharts are freely available from <http://publicationethics.org/>. The methods this Journal uses to detect plagiarism are discussed in a [2016 editorial](#).

## Text recycling (self-plagiarism)

The Journal of Materials Science bases its policy on text recycling, also known as self-plagiarism, on the COPE’s guidelines available at <http://publicationethics.org/text-recycling-guidelines>.

Self-plagiarism occurs when sections of the same text appear (usually un-attributed) in more than one of an author’s own publications. The term ‘text recycling’ has been chosen to differentiate from ‘true’ plagiarism (i.e., when another author’s words or ideas have been used, usually without attribution).

The editors recognize that a certain degree of text recycling is unavoidable in scientific writing, especially in descriptions of techniques or experimental methods. In assessing cases of suspected self-plagiarism, the editors will consider how much of the text is repeated verbatim and in what context. Text recycling in the results section of an original research paper is always unacceptable if it duplicates published data. Text recycling in the discussion and conclusions sections is unlikely to be acceptable.

In the case of minor overlap, an editor may require the authors to re-write the sections of overlapping text and provide appropriate attribution. More significant overlap will result in the rejection of a submission. The assessment of the degree of overlap is at the discretion of the handling editor and editor-in-chief.

## Article spinning

Article spinning is the use of software in attempt to bypass plagiarism-detection software. Submissions that include significant portions of text that have been processed in this way will be rejected.

## Submissions that include experiments on samples of biological origin

*Experiments involving in vivo testing on animal subjects*

The Journal of Materials Science does not accept manuscripts where *in vivo* testing on animals is reported. Authors should consider submitting to Journal of Materials Science : Materials in Medicine.

### *Experiments involving human subjects and human tissue*

The Journal of Materials Science does not accept manuscripts where testing on human subjects is reported.

For work which reports on the use of human tissue (including blood, saliva and urine), the authors must confirm at the point of submission that they obtained approval from an institutional review board or equivalent ethics committee and consent from the donor. A statement reflecting this approval must be given in the experimental section.

### *Experiments involving cell lines*

At submission, authors must declare what cell lines were used and their origin.

## **Conflicts of interest**

Conflicts of interest are situations in which personal, financial or other considerations from authors or reviewers has the potential to compromise or bias objectivity or professional judgment. Authors must explicitly declare conflicts of interest upon submission of an article for publication. Peer-reviewers must recuse themselves from refereeing manuscripts where they perceive a conflict of interest.

Conflicts of interest include consulting fees, honoraria, payments for expert testimony; support for travel to meetings for the study, manuscript preparation or other purposes; multiple affiliations; fees for participation in review activities; payment for writing or reviewing of a manuscript; provision of writing assistance; stock, stock options, equity ownership or other investment interest (including holdings of a spouse, children or other blood relative); intellectual property rights, patents and patent applications (including planned applications); and royalty payments. Beyond financial aspects, conflicts may arise from personal relationships or competing interests directly or indirectly tied to the research for publication, or professional interests or personal beliefs that may influence that research.

Research funding must be listed in the acknowledgements section and must include the funder and grant number.

Referees who suspect an undisclosed conflict of interest should contact the handling editor in the first instance.

The Journal of Materials Science does not allow publication of the content of peer reviews submitted to the journal because of the opportunities for abuse and inherent conflicts of interest. The editors may verify that a reviewer contributed to the Journal's peer-review process provided that no identifying information such as title, manuscript code or DOI are available to link the review to a specific publication.

## **English language support**

All submissions must conform to accepted standards of written technical English. A clear and concise language will help editors and reviewers concentrate on the scientific content of your paper and thus smooth the peer review process. Either US or UK English is acceptable as long as the usage is consistent throughout.

The Journal's editors are not responsible for correcting errors in grammar or spelling. Articles that require extensive English revision may be rejected without review or referred to a professional copy editing service before acceptance.

Manuscripts that are accepted for publication will be checked by our copyeditors for spelling and formal style. This may not be sufficient if English is not your native language and substantial editing would be required. Authors who need help with writing in English you should consider:

- Asking a colleague who is a native English speaker to review the manuscript for clarity.
- Visiting Springer's [English language tutorial](#) which covers the common mistakes when writing in English.

- Using a professional language editing service where editors will improve the English to ensure that your meaning is clear and identify problems that require your review. Two such services are provided by our affiliates [Nature Research Editing Service](#) and [American Journal Experts](#).

The use of a language editing service is not a requirement for publication in this journal and does not imply or guarantee that the article will be selected for peer review or accepted.

Please contact the editing service directly to make arrangements for editing and payment.

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Upon acceptance of your article you will receive a link to the special Author Query Application at Springer's web page where you can sign the Copyright Transfer Statement online and indicate whether you wish to order OpenChoice, offprints, or printing of figures in color.

Once the Author Query Application has been completed, your article will be processed and you will receive the proofs.

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## **Offprints**

Offprints can be ordered by the corresponding author.

## **Color illustrations**

Online publication of color illustrations is free of charge. For color in the print version, authors will be expected to make a contribution towards the extra costs.

## **Proof reading**

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

## **Online First**

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After release of the printed version, the paper can also be cited by issue and page numbers.

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