

Supplemental Materials in an Online World

Hot Topics in Big Data: What You Need to Know

**CENDI-NFAIS Sponsored Workshop
December 11, 2012**

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Outline

1. The Supplemental Material Landscape
2. The NISO/NFAIS Working Group
3. Current Status of the Recommendation
4. A Brief Look at the Recommendation
5. Some thoughts about Data

The Supplemental Material Landscape



Deluge!



Chart courtesy of Ken Beauchamp, American Society for Clinical Investigation

The Supplemental Material Landscape



- Due to growth in supplemental material, *Cell* took steps to exert some control over what could be submitted as supplemental material.
- *Journal of Neuroscience* decided to stop accepting supplemental materials for publication with their journal articles starting in 2011.
- The *Journal of Experimental Medicine* made the decision to accept only “essential supporting information”

The Supplemental Material Landscape



- In 2001, the International Union of Crystallography began to publish *Acta Crystallographica Section E: Structure Reports Online*. This is a journal that publishes articles consisting of crystallography data, an abstract, and perhaps a comment section
- Recent launches of *GigaScience* and the *Geoscience Data Journal* are examples of data journals that are embracing data publication

The Supplemental Material Landscape



- The *Biophysical Journal* began to ask that references cited from within the supplemental materials should also be included within the article.
 - Reason: cited references in the supporting material were considered to be of equal importance to those in the main text, and should be included in impact factor and h-index calculations.
 - Including the supporting references in the main text would ensure that they would be picked up by the citation services.

The Supplemental Material Landscape



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- In chemistry, a longer history: A search of the ACS Publications website found a reference to supplemental materials as early as 1935, in the *Journal of Chemical Education*

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JOURNAL OF CHEMICAL EDUCATION

COOPERATION WITH SCIENCE SERVICE

AUTHORS of manuscripts submitted to THIS JOURNAL who wish to publish related supplementary material or longer versions than those accepted by the editor may submit manuscripts embodying such material for approval. After this approval these manuscripts will be forwarded to *Science Service* for publication as *Science Service Documents* available in the form of microfilms or photoprints. Such manuscripts should be typewritten in an acceptable standard form (black fresh ribbon on 8 $\frac{1}{2}$ × 11 $\frac{1}{2}$ bond paper, single spaced, preferably pica type) and should have any photographs or figures separately mounted on sheets of the same size.

In these cases a footnote will be appended to the article as published stating that the more extended version or, as the case may be, the supplementary material is obtainable through *Science Service*. The

cost, payable in advance by check or money order to *Science Service*, 2101 Constitution Ave., Washington, D. C., will be stated in the footnote. *Science Service Documents* in microfilm form (images 1 inch high on standard 35-mm. motion picture film) will cost approximately 1 cent a page; in photoprint form (6 X 8 inches in size, readable with the unaided eye) approximately 5 cents a page.

Science Service also operates as a service to scientific research workers the *Bibliofilm Service* which copies to order literature in the library of the U. S. Department of Agriculture. Full information and order blanks for *Bibliofilm Service* and information about mechanisms for reading microfilms will be furnished free on request to *Science Service*. See also J. CHEM. EDUC., 12, 415-8 (1935).

OTTO REINMUTH, Editor

The Supplemental Material Landscape

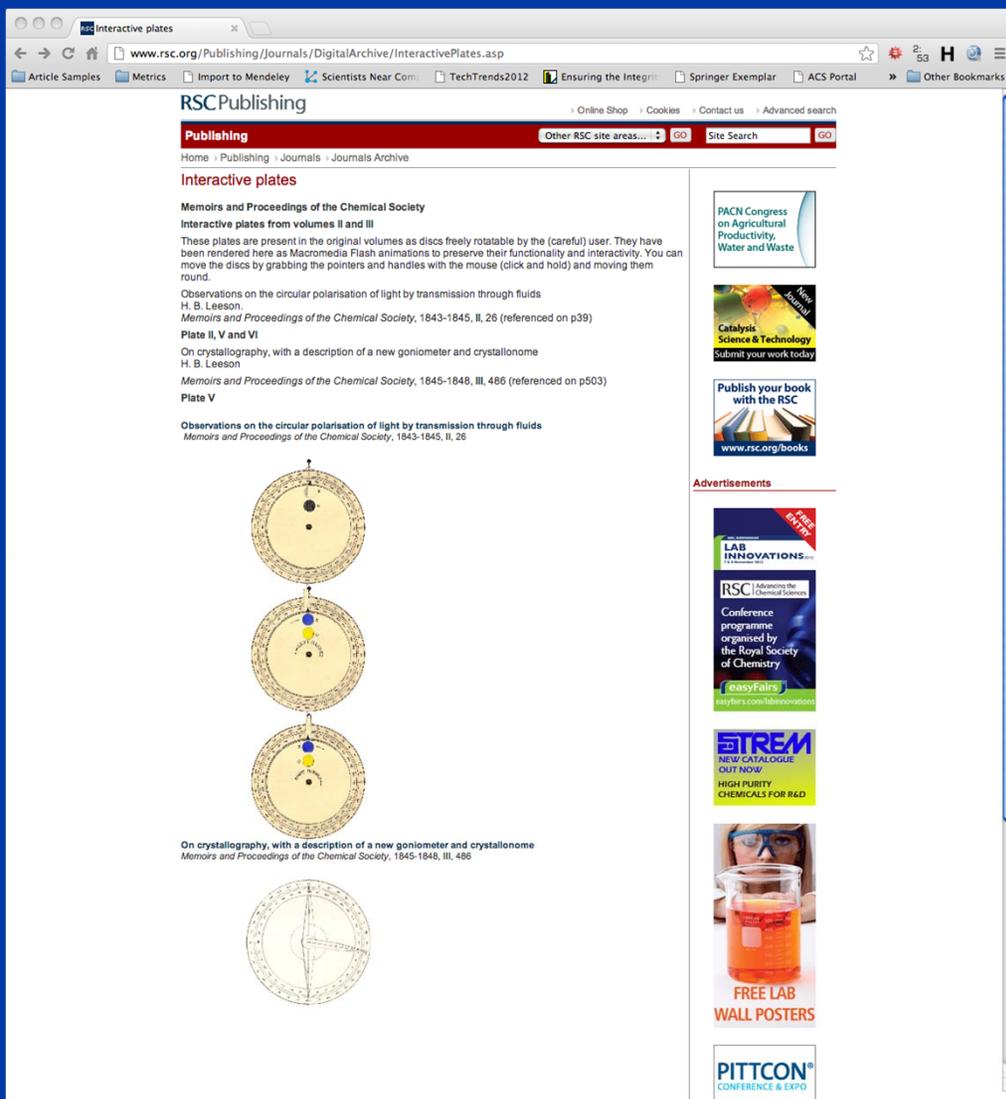
@RSC



- The Royal Society of Chemistry has an even earlier example of supplemental material
- A template for a physical device was included as supplemental material 1843.
- Plates 1-6 of that article were not paginated; the reader would cut out the template on each page, and connect them to create a working light polarization device.

The Supplemental Material Landscape

@RSC

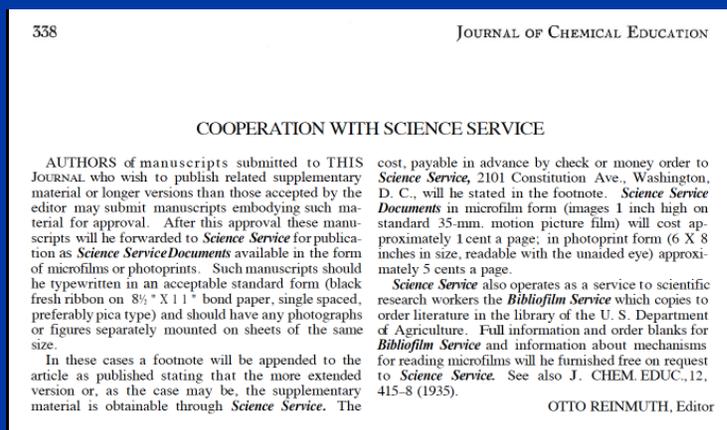


- Leesen, H.B., XCI. Observations on the circular polarization of light by transmission through fluids, *Mem. Proc. Chem. Soc.*, **1843**, 2, 26-45, <http://dx.doi.org/10.1039/MP8430200026>

- See <http://www.rsc.org/Publishing/Journals/DigitalArchive/InteractivePlates.asp>

The Supplemental Material Landscape

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- 1932: Cooperation with the Science Service at the National Academy of Sciences

The Supplemental Material Landscape



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given, because the other two gave much the same result.
The two low molecular weight samples (for disks 677 and 678) were obtained by fractional precipitation of an acetone extract of L38. Four 100-g. batches were extracted with 2 liters of acetone probably reliable to better than 0.5%.

In order to determine whether the thermal (12) Measurements were made at other temperatures, but in order to save space are omitted here. For a copy of these data, order Document 1561 from the American Documentation Institute, Office of Science Services, 2101 Constitution Ave., Washington, D. C., remitting 25c for microfilm or 50c for photocopies readable without optical aid.

- 1941:
 - Supplemental materials needed because the data takes up too much space
 - Availability: American Documentation Institute, Office of Science Services, at the National Academy of Sciences

The Supplemental Material Landscape



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782 INDUSTRIAL AND ENGINEERING CHEMISTRY Vol. 45, No. 4

LITERATURE CITED

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(2) *Ibid.*, D 823-45T, procedure B, 1945.
(3) Bacon, R. C., Smith, J. J., and Rugg, F. M., *IND. ENG. CHEM.*, **40**, 161 (1948).
(4) Barr, N. F., and Schneider, K. W., U. S. Patent 2,426,917 (September 1947).
(5) *Chem. Eng. News*, **29**, 1208 (1951).
(6) McClure, H. B., *Ibid.*, **29**, 749 (1951).
(7) McCuen, C. L., *Ibid.*, **29**, 746 (1951).
(8) Mattiello, J. J., "Protective and Decorative Coatings," Vol. IV, chapter by H. F. Payne, New York, John Wiley & Sons, 1944.
(9) Munger, H. P., *Chem. Eng. News*, **29**, 648 (1951).
(10) Powell, S. T., and Lossberg, L. G. von, *Chem. Eng. Progr.*, **45**, 300 (1949).
(11) Uhlig, H. H., *Chem. Eng.*, **59**, No. 6, 314 (1952).
(12) Vander Valk, C. J., *Official Digest Federation Paint & Varnish Production Clubs*, **292** (May 1949).

RECEIVED for review January 10, 1952. ACCEPTED September 10, 1952. For material supplementary to this article order Document 8843 from American Documentation Institute, % Library of Congress, Washington 25, D. C., remitting \$2.75 for microfilm (images 1 inch high on standard 35-mm. motion picture film) or \$7.50 for photocopies (6 x 8 inches) readable without optical aid.

- 1953:
 - Availability: American Documentation Institute at the Library of Congress

The Supplemental Material Landscape



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tions were different for the two naphthenes. Thus, from our results and those of other workers (Ciapetta *et al.*, 1958; Goetschel and Pines, 1964; Pines and Benoy, 1960; Pines and Chen, 1960; Pines and Greenlee, 1961), it is apparent that more work is needed before the effects of substituted alkyl groups on the rates and activation energies of naphthene aromatization can be completely understood.

Acknowledgment

Permission of the Air Force and the Shell Development Co. to publish is gratefully acknowledged. The authors are pleased to record thanks to R. D. Hawthorn for assistance with chemical calculations and to D.P. Anderson for his laboratory skills.

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Ciapetta, F. G., Dobres, R. M., Baker, R. W., "Catalysis," P. H. Emmett, ed., Vol. VI, pp. 495-962, Reinhold, New York, 1958.
Cremer, E., *Advan. Catalysis* 7, 75-91 (1955).
Goetschel, C. T., Pines, H., *J. Org. Chem.* 30, 3544 (1964).

Hawthorn, R. D., APL TDR 64-100, Pt. II, p. 51, August 1965.
Pines, H., Benoy, G., *J. Am. Chem. Soc.* 82, 2483 (1960).
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Ritchie, A. W., Hawthorn, R. D., Nixon, A. C., *IND. ENG. CHEM. PROD. RES. DEVELOP.* 4, 129 (1965).
Ritchie, A. W., Nixon, A. C., *IND. ENG. CHEM. PROD. RES. DEVELOP.* 5, 59 (1966).

RECEIVED for review January 22, 1968
ACCEPTED April 22, 1968

Division of Petroleum Chemistry, 152nd Meeting, ACS, New York, N. Y., September 1966. For supplementary material (complete Tables II to VI), order NAPS Document No. NAPS-00071 from ASIS National Auxiliary Publications Service, c/o CCM Information Sciences, Inc., 22 West 34th Street, New York, New York 10001; remitting \$1.00 for microfiche or \$3.00 for photocopies. Work done under the sponsorship of the Fuels, Lubricants, and Hazards Branch, Air Force Aero-Propulsion Laboratory, Wright-Patterson Air Force Base, C. Johnson and H. Lander, project engineers.

- 1968:
 - Availability: ASIS National Auxiliary Publication Service

The Supplemental Material Landscape



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(4) Listings of supplemental notes and material appearing in the microfilm edition of this volume of the journal are designated throughout the article with "s" notation, together with a brief comment on the nature of the supplemental material in brackets. Single copies may be obtained from the Business Operations Office, Books and Journals Division, American Chemical Society, 1155 Sixteenth St. N.W., Washington, D. C. 20036, by referring to the code number JPC-72-3603. Remit check or money order for \$4.00 for photocopy or \$2.00 for microfiche.

(5) R. D. Evans, "The Atomic Nucleus," McGraw-Hill, New York, N. Y., 1962, Chapters 26-28. The text includes references to a number of the prior studies which "verified" the generality of the Poisson.

The Journal of Physical Chemistry, Vol. 76, No. 24, 1972

- 1972:
 - Availability: American Chemical Society

The Supplemental Material Landscape

@ACS



- In process – ACS Publications is digitizing supporting information for the legacy archive
- In order to complete the scientific record
- Source material: microfiche from 1970 - 1995

Status of the NISO/NFAIS Recommendation

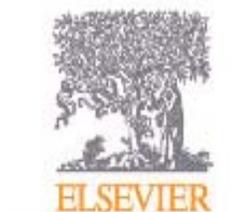


- Part A: the Business Working Group: Done
- Part B: the Technical Working Group:
 - Public Comment period ended September 15
 - October-November: Response to comments
 - Approved by TWG, December 3
- Next steps: approval by NISO Content and Collection Management Topic Committee and NFAIS member organizations

The NISO/NFAIS Working Group

- Fall, 2009, Sasha Schwarzman, then at AGU, sent a survey to the CrossRef and eXtyle listserve asking about publisher practices for supplemental materials
- A meeting of interested parties at the American Psychological Association in January 2010
- Over 50 people representing 30 different organizations attended either in person or by phone.
- A report on the meeting can be found on the NISO website at
http://www.niso.org/apps/group_public/download.php/3708/NFAIS_NISO_Supp_Materials_Meeting_Summary_Report_rev.pdf

The NISO/NFAIS Working Group



Business Working Group

Co-chairs: Linda Beebe (APA), Marie McVeigh (Thomson-Reuters ISI)



- *Recommended Practices*: scope and general principles
- *Definitions*: supplemental material, article, data, metadata
- *Roles and responsibilities* of publishers, authors, editors, peer reviewers, libraries, A&I services, repositories
- *Curation and life cycle*: selection, peer review, editing, presentation, providing context, referencing, citing, managing/hosting, discovery, preservation
- *Discoverability & Linking*
- *Intellectual property* rights management

Technical Working Group

Co-chairs: Dave Martinsen (ACS), Sasha Schwarzman (OSA)



- Metadata
- Persistent identifiers
- Preservation
- Packaging and exchange
- Supporting documentation
 - *non-normative* DTD
 - Tag Library
 - tagged samples

Considerations

- ◆ What is supplemental material?
 - Multimedia: video, audio, virtual reality
 - Chemical, crystallographic, and protein structures, gene sequences, 3-D images
 - Computer programs (algorithms, code, libraries, and executables)
 - Tables, Figures, Text (*Experimental procedures, Extended methodology, Survey results, Derivations, Extended bibliographies, ...*)
 - Data sets (data sets are not the focus of this group)

Recommendations: Importance

- Integral
 - Critical to understanding the article
 - Separate due to technical or business reasons
- Additional
 - Relevant and useful, but optional
- Who decides?

Recommendations: Location

- Publisher Site
 - Recommended practices
- Institutional Repository or Data Center
 - No recommendation
- Individual
 - Not suitable for supplemental material

Recommendations: Discoverability

- Consistent placement, naming, and navigation:
 - Across all articles in a journal
 - On ToC – indicate presence of supplemental material
 - In the article – locate links near the top of screen view
 - In the supplemental material – navigation should match article's
 - Aid A&I services by including metadata that indicate the purpose and format of the supplemental material

Recommendations: Links

- There should be bidirectional links between the supplemental materials and the article
- DOIs should be assigned to the supplemental material
- When supplemental material is hosted by an external repository, supplemental material must be assigned a DOI (or other appropriate persistent identifier); publisher is responsible for ensuring that the link works when its target moves

Recommendations: Minimal Metadata



- Supplemental material DOI(s): for each individual object or for their set(s)
- Article DOI
- Relationship of supplemental material to the article: Integral, Additional, or both
- Descriptive metadata for supplemental material, e.g., title or summary
- File formats of supplemental material files

What about data?

- There is an emerging focus on primary research data
- Some have said that the data are really more important than the description of the data.
- Is the data publication an appropriate model for the future?
- Do the data speak for themselves?

Journal Article, 1958: Computer center for basic physical science data proposed



- Ralph H. Müller, *Analytical Chemistry*, 30(8), 55A, 1958. <http://dx.doi.org/10.1021/ac60140a754>



Journal Article, 1958: Computer center for basic physical science data proposed



- It is manifestly impossible to embark upon a program to print prodigious detailed tables of all the data known to physical science. It would exceed our supply of paper, few could afford it, and storage would be a major problem. It would seem eminently feasible, however, to punch program cards for tens of thousands of cards for as many empirical or fundamental equations and the data to which they apply. In a suitable computer center or agency these could be interrogated when necessary and the detailed data sent to a subscriber by teletype or more leisurely by mail.

– R. H. Müller, <http://dx.doi.org/10.1021/ac60140a754>

Journal Article, 1958: Computer center for basic physical science data proposed



- Individual dialing of long-distance 'phone calls will be with us all very soon. It is not too great an extrapolation to imagine the time when one will be able to dial a call to a computer agency and, upon requesting a certain code designation, have an answer returned in a matter of minutes. There are no existing technical impediments to this scheme. The problem is one requiring vision, organization, and dedicated policy
 - R. H. Müller, <http://dx.doi.org/10.1021/ac60140a754>

Journal Article, 1958: Computer center for basic physical science data proposed



- We were surprised recently at the home of a physician friend, when he stretched out in a chaise-longue, reached wearily for a cocktail, and with a polite "by your leave" flipped the switch on a tape-recorder. We expected to hear soft, pleasant, and soothing music. Instead, a cultured, well-modulated voice proceeded to deliver a crisp, authoritative resume of the month's latest developments in the physician's own specialty. "It's a subscription service," explained our host. "I used to try to keep up with the journals, but after a hard day, I'd usually fall asleep over them." "It's not perfect," he went on, "I can nod or doze with this too, if I really feel beaten, but it's less likely because it is more like a talk from a respected authority or colleague." - R. H. Müller, <http://dx.doi.org/10.1021/ac60140a754>

Journal Article, 1958: Computer center for basic physical science data proposed



- One thing seems certain. We can harness the wonders of electronics in communication to much better advantage than we have. It would be a sad commentary on such fantastic accomplishments in communication as microwave telephone relays, transistorized circuitry, solar batteries, and multichannel lines if their major function were to continue the dissemination of tripe about Victorian vaudeville, snake-oil medicine, and interminably filtered cigarette smoke. There is an unmistakable decline in the art of communication, even while the science of communication flourishes as never before.

Acknowledgments

- *Thanks to the NISO/NFAIS Working Groups, especially the co-chairs, for many interesting and challenging discussions:*
- *Sasha Schwarzman, OSA*
- *Marie McVeigh, Thomson Reuters*
- *Linda Beebe, American Psychological Association*

QUESTIONS?

Thanks for your attention

Contact information:
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Supporting Information from doi:
10.1021/jp076064e, showing SEM
images of the Christmas treelike
ZnO–CNT hybrid film

Supporting Information

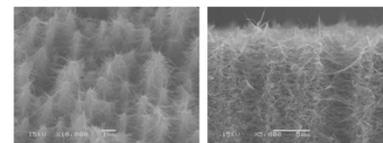


Figure S1. SEM images of ZnO nanorods grown on the pristine ACNT film under 1.5scem O₂ flux (gradient-view and cross-section view).

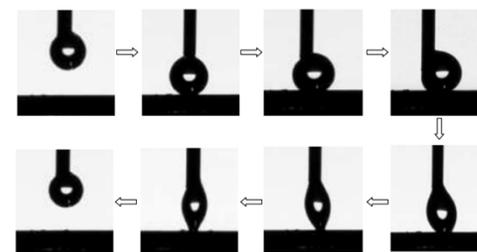


Figure S2. Photographs showing the process of a water droplet on the tip of needle touching the surface of the ZnO-CNT hybrid film.

Related Links

- The NISO/NFAIS Draft Recommendation for Supplemental Journal Article Materials, http://www.niso.org/apps/group_public/document.php?document_id=7964&wg_abbrev=suppbusiness
- The National Academy of Sciences Report on “Ensuring the Integrity, Accessibility, and Stewardship of Research Data in the Digital Age”, <http://sites.nationalacademies.org/PGA/COSEPUP/data/index.htm>
- Board on Research Data and Information, <http://sites.nationalacademies.org/PGA/brdi/index.htm>

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- *Cell*: Marcus, E., *Cell*, **2009**, 139(1), 11, <http://10.1016/j.cell.2009.09.021>.
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- *Journal of Experimental Medicine*: Borowski, C., Enough is Enough, *J. Exp. Med.*, **2011**, 208(7), 1337, 6 June 2011, doi: <http://dx.doi.org/10.1084/jem.20111061>
- *Acta Cryst E*: Clegg, W and Watson, D.G, Structure Reports Online: the birth of a new journal, *Acta Cryst. E*, **2001**, 57(1), e1-e2, <http://dx.doi.org/10.1107/S1600536800020432>.

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- Geoscience Data
Journal: [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)2049-6060](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2049-6060)
- *Biophysical Journal*: Author Guidelines: Supporting Material, June 21, 2011,
http://download.cell.com/images/edimages/Biophys/Supporting_Material.pdf

References

- *RSC 1843 Supplemental Material*: Leesen, H.B., XCI. Observations on the circular polarization of light by transmission through fluids, *Mem. Proc. Chem. Soc.*, **1843**, 2, 26-45, <http://dx.doi.org/10.1039/MP8430200026>. See <http://www.rsc.org/Publishing/Journals/DigitalArchive/InteractivePlates.asp>

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