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INSTRUCTIONS TO AUTHORS

Revised January, 1977

Introduction

The American Mineralogist, the journal of the Mineralogical Society of America, publishes the results of original scientific research in the general fields of mineralogy, crystallography, and petrology. Manuscripts are judged on the basis of significance, originality, appropriateness of subject matter, and clarity of presentation. The decision regarding acceptance or rejection of a manuscript is the responsibility of the Editor; it is based in large part on the reviews of associate editors and referees. Membership in the Mineralogical Society of America is *not* a prerequisite for publication in *The American Mineralogist.*

Authors are reminded that pressure on space in the journal is great, and publication costs heavy (approximately $120 a page in 1976). They are therefore urged to write as concisely as is consistent with clarity, and to avoid unnecessary detail. Over-long manuscripts may require special arrangements prior to consideration for publication. A prospective contributer should study these instructions and examine recent issues of *The American Mineralogist* to familiarize himself with the style and requirements of the journal, and should note the limitations set by the page size and lay-out.

A letter of transmittal, including a statement that the manuscript has not been previously published or about to be published, wholly or in part, must accompany each manuscript. Authors are strongly advised to have their manuscripts reviewed by colleagues before submission; include in the letter of transmittal the names of those colleagues. Referees are selected by associate editors, but authors may provide the names and addresses of persons in North America but outside their institution whom they think are qualified to act as referees for the manuscript.

Page charges

Part of the publication cost will be billed, at the rate of $35 per published page, to the institution sponsoring the research. A form will be sent with the galley proof for the author to indicate where page charges are to be billed. Payment of page charges is not a condition for acceptance or for publication.

Authors who pay page charges will be furnished 100 free reprints without covers, as will authors of Memorials and of speeches at Society functions. On the form accompanying the galley proof, the author indicates the total number of reprints desired, consolidating the orders from all coauthors and including the free reprints. This form is sent to the Business Office of the Mineralogical Society at the same time that proof is returned to the Editor. The MSA Business Office will bill later; any purchase order forms required by the author's institution may be sent later to the Business Office of the Mineralogical Society of America, Suite 1000, lower level, 1909 K Street N.W., Washington, D.C. 20006.

General requirements

1. Manuscripts including illustrations, must be submitted in duplicate to the Editor, Brian Mason, *The American Mineralogist,* Department of Mineral Sciences, Smithsonian Institution, Washington, D.C. 20560. They must be typewritten, *double-spaced throughout* (including abstract, references, figure captions, and all footnotes, except those to tables), with margins at least 1.5 in. on all sides of each page, on white paper about 8.5 × 11 in. in size; one side only of standard-weight paper must be used for the first copy. Xerox or other clear photocopy is satisfactory for the second copy. Footnotes may only be used if absolutely essential. They are typed at the bottom of the page and are numbered in sequence.

2. New mineral names and redefinitions of existing names, before publication, must be approved by the Commission on New Minerals and Mineral Names of the International Mineralogical Association (Fleischer, 1970). For this purpose a copy of the manuscript should be simultaneously (or previously) sent to Dr. Akira Kato, Chairman, Commission on New Minerals and Mineral Names, National Science Museum, 3-23-1 Hyakunin-cho, Shinjuku, Tokyo 160, Japan. In general, manuscripts proposing new names for imperfectly or incompletely described minerals or new names for mere compositional varieties cannot be accepted. Writers naming new minerals should

conform to the rules and principles set forth in Hey *et al.* (1961) and Donnay and Fleischer (1970).

3. Obsolete, discredited, or superfluous mineral names may not be used. A useful guide is *1975 Glossary of Mineral Names* (Fleischer, 1975); if a mineral name does not appear therein, some explanation is usually necessary. This glossary is taken as the standard for the spelling of mineral names.

4. For crystallographic data, the recommendations of the Commission on Crystallographic Data of the International Union of Crystallography (Kennard *et al.*, 1967), and of the NAS-NRC Committee on Chemical Crystallography are standard in this journal; copies are available from the Editor of *The American Mineralogist*. X-ray powder diffraction data (d or 2θ) may be tabulated if necessary to characterize the mineral. They may be illustrated only if essential features cannot be tabulated. If the data are similar to some already published or listed in the Powder Diffraction File, then a statement to that effect is usually sufficient without republishing either a table or a cut. Refinements to previously-available powder data can be contributed directly to the PDF without publication.[1] Powder patterns should be indexed, if at all possible, and cell parameters listed; if this is not possible, the reasons should be stated. If the space group is known or determined, a powder pattern whose extinctions are inconsistent with the space group should not be published without explanation of the inconsistent extinctions.

5. For thermal analysis data, the recommendations of a Committee on Standardization of the International Conference on Thermal Analysis (McAdie, 1967) are standard for this journal; copies are available from the Editor.

Title and abstract

6. The increased application of computer systems for information retrieval requires that both title and abstract be as brief and informative as possible, consistent with their respective lengths. Authors should avoid complex symbols and formulas in the title. To facilitate identification in indexing and abstracting, it is recommended that authors spell out one of their given names rather than precede their surnames with initials only.

7. The abstract should state concisely, in 250 words or less, what was done and what was concluded; if possible, it should include important numbers (*e.g.* temperature range, main X-ray lines, chemical composition, *etc.*). Literature citations should not appear in the abstract.

Style

8. Use a separate page for the title and authorship; number it 1 on the top right-hand corner. Begin each major section—abstract, text, references, figure captions—on a new sheet. Paginate figure captions and tables after the references. Avoid beginning a sentence with numbers or symbols. As far as possible, use decimals rather than fractions. Place a zero before the decimal point in writing numbers with no integer, *i.e.* 0.25, not .25. "Percent" should be spelled out in the text, and the symbol % used in tables, illustrations, and figures. Avoid dividing a word at the end of a line, since this can be confusing to the typesetter. Authors are responsible for indicating (by underlining) where italics are required in symbols and equations. Symbols which may be difficult to interpret should be explained in marginal pencil notes. Complex mathematical notations and equations are difficult and expensive to typeset, and should be used sparingly. Ionic charge is indicated by a superscript plus or minus sign following the symbol of the ion; for multiple charges an Arabic superscript numeral *precedes* the plus or minus sign, *e.g.* Na^+,Cl^-,Ca^{2+},S^{2-}.

For questions of style not covered here, the answers can usually be found by examining a paper in the same field in a recent issue of *The American Mineralogist*. Excellent discussions of the preparation of manuscripts are *Geowriting* (Cochran *et al.*, 1974), *Writing Scientific Papers in English* (O'Connor and Woodford, 1975), and *Suggestions to Authors* (U.S. Geological Survey, 1958). If authors would adhere to the recommendations in these books, the path to publication would be smoothed for all concerned.

9. The system of metric units known as SI (Systeme International) should be used, except that the angstrom is used instead of nanometer and bar and kilobar instead of the pascal. Where 0, O, l, 1, Greek letters, or other typography is possibly ambiguous in the text, instruct the printer by writing in the margin "zero," "oh," "el," "one," *etc.* Avoid the use of subscripts and superscripts as far as possible, since they require expensive typesetting; parenthetical designations can often be used, *e.g.*, *d* (calc), $P(O_2)$.

Precision of measurement may be indicated as

[1] Address Editor, Powder Diffraction File, Mary E. Mrose, U.S. Geological Survey, 959 National Center, Reston, Virginia 22092. Standard forms for reporting the data may be obtained from Mr. W. F. McClune, Joint Committee on Powder Diffraction Standards, 1601 Park Lane, Swarthmore, Pennsylvania 19081.

1.782 ± 0.002, if 0.002 represents a subjective estimate of the measurement error. Where sufficient data permit calculation of the estimated standard deviation (*esd*), indicate it as 7.3012 *esd* 0.0002. To save space in tables, the shortened form 7.3012(2) or 7.3012(11) respectively indicates *esd*'s of 0.0002 or 0.0011. A footnote to the table should then explain that "parenthesized figures represent the estimated standard deviation (*esd*) in terms of least units cited for the value to their immediate left, thus 7.3012(11) indicates an *esd* of 0.0011."

For acceptable symbols and abbreviations, see Table 1.

Use of headings

Heads. When set in type, an article is more attractive and easier to read if it is divided into major sections which are distinguished by first-order headings. These first-order heads should show the basic organization of the paper, and might be, for example: **Introduction; Previous work; Methods; Results; Discussion; Conclusions and implications; Acknowledgments; References.** For a mineral-centered article they might be: **Introduction; Occurrence and associations; X-ray crystallography; Chemical composition; Physical and optical properties; Thermal study; Discussion; Conclusions; Acknowledgments; References.**

Subheads, or second-order heads. A major section of a paper may itself be divided into subsections, each distinguished by a subhead. For example, if some of the previously-cited major sections in the paper on a mineral seem too brief, they may be grouped together as second-order heads under a single first-order head. Thus, under the first-order head **Results,** there might be grouped the subheads: *X-ray crystallography; Chemical composition; Physical and optical properties.* The previous heading, "*Using of headings,*" represents style of a second-order head.

Third-order heads. The three paragraphs of this subsection on heads begin with "third-order heads," which may be used when a further subdivision is needed. If, in the previous example, two or more

Table 1. Abbreviations and symbols commonly used in *The American Mineralogist**

Original typed version = 117 elite spaces = 9.5 in.

Physical Quantities

P ressure
bar
kbar = kilobars
atm = atmosphere

T emperature
cal = calories
kcal = kilocalories
K = Kelvin
°C = degrees Celsius

l ength
in. = inches
m = meter; cm = 10^{-2}m
mm = 10^{-3}m, μm = 10^{-6}m
nm = 10^{-9}m
A = Angstrom

V olume
ml = milliliters
A^3

t ime
sec. = seconds
m.y. = million years
f requency (or ν)

g = gram; kg = kilogram
μg = microgram
ρ = density

ppm = parts per million
pH
G = specific gravity

I ntensity
I/I_o = relative intensity

d = interplanar spacing

hkl = diffraction index
(hkl) = miller index
{hkl} = form
[uvw] = line or zone

$MoK\alpha_1$ = radiation type

unit cell
a, b, c, = edge=lengths
a, b, c, = vectors†
α, β, γ, = angles

refr. ind = refractive indices, or n, ε, ω, α, β, γ

principal vibrations: E, O, X, Y, Z,

optic axial angle: 2V, $2V_x$, or $2V_z$

r v = dispersion

extinction angle: Z∧c or Z:c

perpendicular to = ⊥

parallel to = ||

Other Abbreviations

p. = page or pages
ca. = circa
calc = calculated

et al. = et alii= and others
etc.= and other things

i.e. = that is
e.g. = for example

meas = measured
obs = observed
vs. = versus

** The table title should be typed and should be the only material above the table itself. Other explanatory information can be placed as a footnote at the conclusion of the table, as done here. Instead of using letters or Arabic numerals, indicate footnotes by symbols such as *, **, ***, †, ††.*

In this table the underlined portions of words indicate their standard abbreviations, and this underlining also instructs the printer to set the underlined material in italics. All the abbreviations underlined above should be underlined in your manuscript, as they are customarily set in italics in print.

† The wavy underlining calls for use of bold face type and is customarily used for vector quantities.

minerals are being studied, under the second-order heads, *e.g. Physical and optical properties,* the specific mineral names might be used as third-order heads.

Tables

10. Tables must be submitted as camera-ready copy, which can be photographed and included in your article without being set in type. To avoid undue delays or the necessity of retyping, use an electric typewriter with a carbon ribbon, and type each table on a separate sheet of white paper. We recommend an IBM Selectric typewriter equipped with a Prestige Elite 72 (IBM 012) or an Adjutant (IBM 030) ball. Footnotes to the table are single-spaced, and their first line should be indented. White correction fluid as well as light-blue guide lines, which will not photograph, are permissible. The camera-ready set of tables (in its own separate envelope) should be accompanied by two xerox (or other type) copies for use by reviewers. Tables must be typed to one of the following widths:

4.5– 5.5 in. for 1-column table
9.0–11.0 in. for 2-column table
12.0–14.5 in. for broadside table

This allows us to photoreduce a table to approximately 65 percent of its original size, keeping within the format of the journal. For 1- and 2-column tables, maximum length is 13.5 in. Broadside or side-turn tables must run approximately 8.5 in. for a 12-in. wide table and 10 in. for a 14.5-in. wide table.

Number the tables consecutively with Arabic numerals. About 3 mm above the column heads, use a smoothly-writing black ball-point pen to rule a double horizontal line,[2] the spacing between these two lines being about 2 mm. Immediately below the double line, type the individual column headings, capitalizing only the first letter of their first word. Draw a single horizontal line to separate the column heads from the data to follow below them. The material in the body of the table should be single-spaced, or, if the presence of subscripts or superscripts prevents this, it may be double spaced (or 1½ spaced if your typewriter has a ½ space ratchet). After every four or five lines of data within the single-spaced body of the table—or as the material demands to block together like with like—skip a line, to aid the eye to follow horizontally along a given line. Below the final data in the table draw a single horizontal line to signify termination of the table. If the table continues onto a following page or column, reserve this line so as to draw it only below the last line of data. Below this final line of the table, type (single-spaced) all footnotes and general references; do not include such material in the table's title.

All titles for tables are to be listed on a separate sheet, double-spaced (as are figure captions), to facilitate typesetting.

See the following pages of *The American Mineralogist,* Volume 61, for examples of tables to guide authors: (1) Magnitudes and orientation of principal axes of thermal ellipsoids in hopeite, Table 2, page 990; (2) Crystal and chemical data for strontianites, Table 1, page 1002; (3) Vuagnatite. Comparison of observed and predicted cation–oxygen bond lengths, Table 5, page 836. Note the judicious use of single and double spacing to block data and guide the eye in the tables on pages 848, 900, 958, and 974.

11. Data likely to interest only a few readers (*e.g.,* individual hydrothermal runs, observed and calculated structure amplitudes, multiple chemical analyses, or supporting raw data) will be printed at the discretion of the Editor. Usually he will ask that these be deposited in the permanent file in the Business Office, Mineralogical Society of America. An original typescript or the original computer printout is required in order to make a readable microfiche. Microfiche of the tables will be sent to any reader, upon request, for a nominal fee. Such tables should be referred to in the manuscript by a footnote such as:

To receive a copy of this material, order document AM-77-000 from the Business Office, Mineralogical Society of America, Suite 1000 lower level, 1909 K Street, N.W., Washington, D.C. 20006. Please remit $1.00 in advance for the microfiche.

Illustrations

12. The principal criterion for accepting illustrations is the amount of important information they convey. The following types of illustrations can often be replaced by a short sentence in the text: photograph of a massive mineral or a simply bedded outcrop, graph of a linear calibration, routine X-ray diffraction or differential thermal analysis results, previously-published illustrations. On the other hand, a single line drawing can often be substituted for an extensive table.

13. The originals and all copies of all illustrations

[2] To facilitate the drawing of inked lines parallel to the lines of typing, the typist should type an underscore OUTSIDE the table's left and right boundaries at the levels where these horizontal lines are to be drawn. A straight-edge joining these beyond-camera marks will then locate the lines correctly.

must not exceed 8.5 × 11 in.; high-contrast glossy black and white prints are preferred for ease of handling. The author must prepare all illustrations so that they will be legible when printed. Drawings and photographs will generally be reproduced at (A) 3.2 in. wide, (B) 6.3 in. wide, (C) 8.5 in. wide. For type (C), which are broadside or side-turn figures, the reproduced length should be between 5.5 in. and 6.5 in. Figures of types (A) and (B) may be up to 8.5 in. long, including their captions. The originals of these drawings and photographs may be retained by the author until he is notified by the Editor that his manuscript has been accepted. Two sets of xerox or other type copies of the illustrations and figures should be included with each manuscript submitted.

14. Lines less than 0.1 mm when reduced to published size, or lines that are not black enough, may be lost in reproduction. Shading reproduces badly; use stippling or cross hatching. Graph paper does not look well when reprinted: draft graphs with either no grid or a very open grid. Figures combining line cuts and half-tone reproductions of photographs are expensive to reproduce. On photomicrographs use a bar scale on the photograph (not outside of it), instead of a magnification factor in the legend.

15. Do not insert illustrations in the text. All illustrations are figures. Individual parts may be grouped as one figure having a single legend, providing they do not extend beyond one page. Letter parts of the figure, neatly for reproduction, in the corner of

Table 2. Standard abbreviations for common title words of periodicals*

Original typed width = 110 elite spaces = 9.25 in.

Abh andlung	Dokl ady	Lett ers	Rev iew
Acad emy (Akad., Accad.)†		Lond on	R oyal
Adv ances	Econ omic		
Am erican	Eng ineering	Mag azine	Sb ornik (Zb irnik)
Anal ytical		Mater ials	Schweiz erische
Anorg anische	Fac ulty	Mech anical	Sci ences
Appl ied	Fören inger	Meet ing	Sediment ary
Arch ives (Ark iv)	Förh andlingar	Mem oirs	Seismol ogical
Assoc iation	Forsch ungen	Mineral ogy	Ser ies
Astron omical	Fortschr itte	Mitt eilungen	Serv ice
Aust ralia	Fr ance, fr ancais	Monatsh efte	Soc iety
		Mus eum	Spec ial
Beitr age	Gen eral		Spectrochem istry
Ber ichte	Geochem istry	Nat ural	Stand ards
Bull etin (Bol., Boll.)	Geochim ica	Natl = National	Stud ies
Bur eau	Geogr aphy	Nauk ovi	Surv ey
	Geol ogy		
Can adian	Geophys ical	Pap er	Tech nical
Ceram ic		Petrogr aphy	Technol ogy
Chem istry (Chim.)	Ind ustry	Petrol ogy	Trans actions
Circ ular	Inf ormation	Philos ophical	
Comm ission	Inst itute	Phys ical	Univ ersity
C omptes R endus	Instrum ent	Proc eedings	
Conf erence	Int ernational	Prof essional	Volcanol ogical
Congr ess	Ital ian	Prog ress	
Contrib ution			Wash ington
Cosmochim ica	Jahrb uch	Q uarterly	
Crystallogr aphy	Jap anese		Zap iski
	J ournal	Rec ord	Z eitschrift
Dep artment		Rep ort	Zentralbl att
Dtsch = Deutsche	Kristallogr afia	Res earch	Zh urnal

Words not abbreviated

Any single-word title	Earth	Neue, Neues	X-ray
Acta	Interior	Program	Year Book
Annual	Kemi	Soil	
Clay or Clays	Mines	Space	

*In this table the underlined portions or words indicate their standard abbreviations. These abbreviations should end with periods. Periodical titles are set in italics and should be underlined on your manuscript.

For words not listed, spell out the entire word in the List of References to your paper.

†In general, words with the same root have the same abbreviation. Related words in other languages usually have similar abbreviations, e.g., Acad emy, Akad emie.

(rather than below) each part. All captions for figures should be typed double-spaced on a separate sheet, numbered consecutively with Arabic numerals, including a general legend for any group figures.

References

16. References are cited in the text by the name of the author(s) and the year of publication; if the citation has more than two authors, the first should be used followed by *et al.*, as, for example, Cochran *et al.* (1974). Only references mentioned in the text (or tables or figures) are listed. Accurate and complete references are an indicator of the reliability of an author. *The author must check all parts of a reference listing against the original.* If the original was not seen, add "not seen; extracted from . . . ," as in Hideo *et al.* (1976) in the Appendix.

17. References are arranged alphabetically by the last name of the senior author and placed at the end of the paper, as in the reference list below. For several publications of an author and coauthor(s), the following order should be used: publications of the single author, in sequence of publication dates, publications of the same author with one coauthor, publications of the author with more than one coauthor. Place the names of authors *after the senior author* in normal order (initials first). The list of references must be double-spaced. See Table 2 for abbreviations of title words of journals frequently cited in *The American Mineralogist*. All other words must be spelled out in full.

18. References to unpublished material (manuscripts, reports, computer programs, personal communications, and the like) are made in the text or acknowledgments section, not in the list of references. Specifiy the source person sufficiently so that he can be identified, for instance by his institution.

A report qualifies as published, and may be included in the list of references, if it is generally available. Reports from U.S. Government or Government-sponsored research are most generally available through the U.S. Department of Commerce National Technical Information Service, and such a report should be referred to by the NTIS document number ("AD," "PB," *etc.*), as in Busing *et al.* (1962) in the Appendix.

19. Manuscripts *accepted* for publication, but which have not yet appeared in print, may be included in the list of references. Those which have been submitted but not yet accepted, and those which are under review or in the process of revision, should *not* be listed, but may be cited in the text, as: Brown and Gibbs (in preparation).

20. Reference to a presentation at a meeting should be to the published abstract, and should be identified as such just after the title of the paper; see Louisnathan and Gibbs (1971) in the Appendix.

21. Translations, whether individual or from a cover-to-cover translation journal, should be listed by the original source, followed by the translated source in brackets; see Urusov (1967) in the Appendix.

Errata

22. Corrections to a paper that has already been published are to be sent in duplicate to the Editor; they will be published in an Errata section in the November–December issue.

References

Cochran, W., P. Fenner and M. Hill (Eds.) (1974) *Geowriting: A Guide to Writing, Editing, and Printing in Earth Science*, second ed. Am. Geol. Inst., Falls Church, Virginia.

Donnay, G. and M. Fleischer (1970) Suggested outline for new mineral descriptions. *Am Mineral., 55,* 1017–1019.

Fleischer, M. (1970) Procedure of the International Mineralogical Association Commission on New Minerals and Mineral Names. *Am. Mineral., 55,* 1016–1017.

——— (1975) *1975 Glossary of Mineral Species.* Mineralogical Record, Inc., P.O. Box 783, Bowie, Maryland 20715.

Hey, M. H., C. Guillemin, F. Permingeat and J. P. de Roever (1961) Sur la nomenclature mineralogique. *Bull. Soc. fr. Mineral. Crystallogr., 84,* 96–104.

Kennard, O., J. C. Speakman and J. D. H. Donnay (1967) Primary crystallographic data. *Acta Crystallogr., 22,* 445–449.

McAdie, H. G. (1967) Recommendations for reporting thermal analysis data. *Anal. Chem., 39,* 543.

O'Connor, M. and F. P. Woodford (1975) *Writing Scientific Papers in English.* Elsevier, New York.

U. S. Geological Survey (1958) *Suggestions to Authors,* fifth ed. U.S. Government Printing Office, Washington, D.C.

Appendix: sample entries for list of references

Journal articles:

Akella, J. and G. C. Kennedy (1971) Studies on anorthite + diopside$_{50}$–hedenbergite$_{50}$ at high pressures and temperatures. *Am. J. Sci., 270,* 155–165.

Hayes, J. F. (1967) Lime–alumina–silica. *Carnegie Inst. Wash. Year Book, 65,* 234–239.

Hideo, Y., O. Akihiko and S. Makato (1976) Nesquehonite found on the Yamato 74371 meteorite. *Sci. Pap. Inst. Phys. Chem. Res. (Japan), 70,* 22–29 (not seen; extracted from *Chem. Abstracts, 85,*#81304, 1976).

Tuttle, O. F. (1949) Two pressure vessels for silicate–water studies. *Bull. Geol. Soc. Am., 60,* 1737–1729.

Translated articles:

Urusov, V. S. (1967) Chemical bonding in silica and silicates. *Geokhimiya, 4,* 399–412. [transl. *Geochem. Int., 4,* 350–362 (1967)].

Abstracts:

Louisnathan, S. J. and G. V. Gibbs (1971) A comparison of Si–O distances in olivines with the bond overlap populations predicted by the extended Hückel molecular orbital (EHMO) theory (abstr.). *Geol. Soc. Am. Abstracts with Programs, 3,* 636.

Reports:

Busing, W. R., K. O. Martin and H. A. Levy (1962) ORFLS, a Fortran crystallographic least-squares refinement program. *U.S. Natl. Tech. Inf. Serv., ORNL-TM-305.*

Books:

Deer, W. A., R. A. Howie and J. Zussman (1962) *Rock-Forming Minerals.* Vol. 1, *Ortho- and Ring Silicates.* John Wiley and Sons Inc., New York.

Friedel, G. (1926) *Leçons de Crystallographie.* Berger-Levrault, Paris.

Articles in books:

Farmer, V. C. (1964) Infra-red spectroscopy of silicates and related compounds. In H. F.W. Taylor, Ed., *The Chemistry of Cements,* p. 602–606. Academic Press, London.

Goldsmith, J. R. and R. C. Newton (1974) An experimental determination of the alkali feldspar solvus. In W. S. MacKenzie and J. Zussman, Eds., *The Feldspars,* p. 337–359. Manchester University Press, Manchester, England.

Dissertations and theses:

Hall, H. T. (1965) *The Systems Ag–As–S, Ag–Sb–S: Phase Relations and Mineralogical Significance.* Ph. D. Thesis, Brown University, Providence, Rhode Island.

More than one entry for author:

Saxena, S. K. (1968) Chemical study of phase equilibria in charnockites, Varberg, Sweden. *Am. Mineral., 53,* 1674–1695.

——— (1973) *Thermodynamics of Rock-Forming Crystalline Solutions.* Springer-Verlag, Heidleberg.

——— and S. Ghose (1971) Mg^{2+}–Fe^{2+} order–disorder and the thermodynamics of the orthopyroxene crystalline solution. *Am Mineral, 56,* 532–545.

——— and C. E. Nehru (1975) Enstatite–diopside solvus and geothermometry, *Contrib. Mineral. Petrol., 49,* 259–267.

———, ——— and A. C. Turnock (1974) Cation distribution in low-calcium pyroxenes: dependence of temperature and Ca content and the thermal history of lunar and terrestrial pigeonites. *Earth Planet. Sci. Lett., 21,* 194–200.

Mineralogical Association of Canada

SHORT COURSE IN MICROBEAM TECHNIQUES

EDITED BY D. G. W. SMITH, 186 PAGES, 1976

THIS NEW BOOK PUBLISHED BY THE MINERALOGICAL ASSOCIATION OF CANADA CONTAINS THE NOTES FOR THE FIRST SHORT COURSE SPONSORED BY THE M. A. C. AT THEIR ANNUAL MEETING IN EDMONTON, ALBERTA, CANADA. THE BOOK IS DIVIDED INTO THE FOLLOWING SECTIONS —

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