

PROCEDURES INVOLVING THE IMA COMMISSION ON NEW MINERALS AND MINERAL NAMES, AND GUIDELINES ON MINERAL NOMENCLATURE

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INTRODUCTION

The Commission on New Minerals and Mineral Names (hereafter abbreviated as CNMMN) of the International Mineralogical Association was established in 1959 for the purpose of controlling mineral nomenclature. All proposals for introducing new minerals, changing mineralogical nomenclature, and discrediting or redefining existing minerals and mineral names should be submitted to the CNMMN for approval before publication. If approval is withheld, the proposal should not be published.

This report incorporates material from previous reports on mineral nomenclature and procedures of the CNMMN (Fleischer 1970, Donnay & Fleischer 1970, Embrey & Hey 1970, Hey & Gottardi 1980, Mandarino *et al.* 1984), and represents an attempt to consolidate this information and to present a comprehensive summary of the subject. Where there are differences between this report and the earlier ones, this version is to be regarded as the correct one.

SUBMISSION OF PROPOSALS

a) If the proposal deals with a new mineral, it should be sent directly to the chairman of the CNMMN. In countries that require a prior review by their national committee, the proposals should first be submitted to the national committee, and subsequently to the CNMMN.

b) All proposals to redefine or discredit existing minerals or mineral names, or to revalidate obsolete names, must be submitted to the vice-chairman of the CNMMN, with a copy to the chairman.

c) If the proposal deals with mineral groups, it should be sent to the secretary of the CNMMN, with a copy to the chairman (the current Secretary is Dr. C.E.S. Arps, National Museum of Geology and Mineralogy, Hooglandse Kerkgracht 17, 2312 HS Leiden, The Netherlands.)

NATURE OF THE PROPOSAL

A proposal should include as many data as possible so that the CNMMN can adequately judge the validity of the proposal. Ideally, a new-mineral proposal should contain the following information:
Proposed name and reason for its selection

Description of the occurrence (geographic and geological occurrence, paragenesis, and a list of associated minerals, particularly those in apparent equilibrium with the new mineral)

Chemical composition and method of analysis

Chemical formula: empirical and simplified

Crystallography: crystal system, crystal class, space group, unit-cell parameters, unit-cell volume, number of formula units per unit cell, X-ray powder data, morphology and crystal structure

General appearance and physical properties: grain or crystal size, type of aggregate, color, streak, lustre, transparency, hardness, tenacity, cleavage, parting, fracture, density (calculated and measured)

Optical properties

a) Nonmetallic minerals: optical character (isotropic or anisotropic; uniaxial or biaxial), optical sign, indices of refraction, 2V, dispersion, orientation, pleochroism and absorption

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b) Metallic minerals: color in reflected light, internal reflections, anisotropy, birefractance, pleochroism and reflectivity

Type material (museum where it is deposited)

Relationship to other species

Any other data that will clarify difficult parts of the description.

It is recognized that it may not always be possible to obtain all the above data; in such cases the author should give reasons for the omissions. To assist potential authors of new-mineral proposals, a check-list should be submitted as part of the proposal. Copies of an official check-list can be obtained from the chairman of the CNMMN or from one of the national representatives. Guideline on some aspects of mineral proposals are given below.

CRITERIA FOR A NEW MINERAL NAME

General considerations

A mineral is generally accepted as being a crystalline substance with defined compositional limits, and which has been formed as the result of geological processes. The essential components in the definition of a mineral are its chemical composition and its crystallographic properties. If a mineral is found whose composition or crystallographic properties (or both) are substantially different from those of any existing mineral, a new name, if needed, must be proposed to the CNMMN. It is probably not desirable to formulate rigid rules to define whether or not a compositional or crystallographic difference is sufficiently large to require a new mineral name, and each new-mineral proposal must be considered on its own merits. However, a general guideline for compositional criteria is that at least one major structural site should be occupied by a different chemical component than that which occurs in the equivalent site in an existing mineral. But if the presence of an element occurring in a relatively minor amount stabilizes the structure, or if its presence in an occupied site effects a structural change due to charge or size difference, then consideration may be given to a proposal to create a new name for such a mineral. Generally speaking, a crystallographic difference sufficiently large to justify the creation of a new mineral name is one in which the structure of the mineral is topologically different from that of an existing one.

Example: Hydroxyl-apatite and fluorapatite both crystallize in the hexagonal system, with the same space group, and have similar unit-cell parameters. They are considered as separate minerals because the relevant structural site is predominantly occupied by OH in hydroxyl-apatite, and by F in fluorapatite.

Example: Sphalerite (ZnS) and "marmatite" ([Zn,Fe]S) are both cubic, with the same space group and similar unit-cell parameters, but they are not regarded as separate minerals because the structural site of the metal is predominantly occupied by Zn in both cases. Marmatite is regarded as a ferroan variety of sphalerite.

Example: Graphite and diamond both have the same composition, but their structures are topologically different, and therefore minerals such as these deserve separate names.

Polymorphs

Polymorphic minerals are those that have essentially the same chemical compositions, but different crystal structures. Polymorphs are regarded as distinct species and warrant separate mineral names. If the structures of the polymorphs are topologically similar, it is preferable to give the new polymorph a name that is related to that of the existing polymorph (see "Selection of a Mineral Name", below) rather than giving it a trivial name.

Polytypes

Polytypes have been defined as substances that occur in several different structural modifications, each of which may be regarded as built up by the stacking of layers of (nearly) identical structure and composition, and with the modifications differing only in their stacking sequence (Guinier *et al.* 1984). Polytypes do not merit new names, but can be distinguished by appropriate suffixes. The modified Gard notation recommended by the International Union of Crystallography (Guinier *et al.* 1984) is probably more detailed than is necessary for mineral nomenclature since it is generally necessary only to distinguish between polytypes, not to specify them accurately. Consequently, a simplified nomenclature that consists of an italicized suffix comprising an alphabetical character to indicate crystal system, and a numerical symbol to indicate multiplicity of the structural unit, first proposed by Ramsdell (1947), is commonly used. The alpha-

betical characters recommended by the International Union of Crystallography (Guinier *et al.* 1984), and now by the CNMMN, are as follows:

cubic	=	<i>C</i>
hexagonal	=	<i>H</i>
rhombohedral	=	<i>R</i>
trigonal	=	<i>T</i>
tetragonal	=	<i>Q</i> (quadratic)
orthorhombic	=	<i>O</i>
monoclinic	=	<i>M</i>
triclinic	=	<i>A</i> (anorthic)

Example: Wurtzite-4*H* is a hexagonal polytype with a periodicity of 4 times the *c* dimension of the wurtzite parent; wurtzite-15*R* is a rhombohedral polytype with a 15-times periodicity.

Although polytypes are not regarded as mineral species, authors are advised to consult with officers of the CNMMN before introducing new polytype names for minerals into the literature.

Regular interstratifications

New names can be given to regular interstratifications where the kinds of layers, their relative proportions, chemical compositions, and regularity of interstratification have been well documented. For detailed criteria that determine whether the interstratification is sufficiently regular to warrant a species name, the reader is referred to Bailey (1981). However, any proposed new name must be submitted to the CNMMN. *Example:* The name *alietite* has been given to a 1:1 regular interstratification of talc and trioctahedral smectite.

TYPE SPECIMENS

When a new mineral is described, or an existing one redefined, the author should exercise care in defining its type designation, and should ensure that a type specimen is held as permanent reference-material by at least one major museum or a nationally recognized mineral collection.

TREATMENT OF A NEW-MINERAL PROPOSAL

When the chairman of the CNMMN receives a new-mineral proposal, he is authorized to write to the author asking for more data if he considers this desirable, or he may point out possible objections either to the mineral or to the name. If the author so desires, the chairman is required to submit a proposal to the CNMMN whether or not he approves of it. In such cases, the chairman will inform the author that he will give his reasons as to the unsuitability of the proposal under "Chairman's Remarks". The chairman's abstract of a proposal is sent by air mail to each member of the CNMMN, and approximately 60 days are allowed for receipt of voting papers.

Member of the CNMMN are urged, not only to vote, but also to comment in detail. The chairman is authorized to suspend voting on a proposal to enable more information to be obtained, or he may call for a second vote on a proposal if, in his opinion, important comments made by a member should be seen by all the members. Second votes have the same voting periods (about 60 days) and require the same majorities as those for original proposals (see below). Any member of the CNMMN who objects to a proposal may ask the chairman to suspend voting or to call for a new vote, but the final decision to do so rests with the chairman.

Abstracts of proposals dealing with "ore" minerals may be sent to some members of the IMA's Commission on Ore Mineralogy, at the discretion of the Chairman. Similarly, the chairman may submit abstracts of any proposals to other specialists for advisory opinions. Such advisors do not vote, but their comments are considered by the chairman. Serious objections raised by any advisors are to be treated by the chairman as specified above.

Proposals dealing with minerals belonging to mineral groups for which subcommittees have been organized by the CNMMN may be sent to the appropriate subcommittee chairman for circulation among the subcommittee members if the CNMMN chairman thinks that such action is advisable. Subcommittee members are invited to submit opinions, and serious objections raised by them are to be treated as specified above.

If two or more proposals for the same new mineral are received by the chairman, the proposal that arrived first in the chairman's office will have priority.

A proposed new mineral will be considered approved if more than half ($\frac{1}{2}$) of the members of the CNMMN vote on the proposal, and if more than two-thirds ($\frac{2}{3}$) of these members have voted 'yes'. A proposed name will be considered approved if more than one-half ($\frac{1}{2}$) of the members who vote on the proposal vote 'yes'. In assessing the voting results, an abstention is treated as a negative vote. After the voting on a proposal is completed, the chairman sends the results to the CNMMN members and to the author of the proposal. He includes the comments of the voting members, but the votes of individual members are not disclosed. Reconsideration of adverse votes can be requested by an author at any time if *significant new data or new interpretations* are obtained. If a mineral is approved, but not the name, a new name should be requested by the chairman when he notifies the author of the voting results. In cases of repeat voting, approvals of the mineral and the name require the same majorities as in the original voting.

Authors who have described new minerals without names do not have any priority rights on the subsequent naming of such minerals. Any names proposed subsequently have to be approved by the CNMMN, as do the minerals for which the names are proposed.

The publication of non-approved names or the names of non-approved minerals is not condoned. Non-approved minerals for which descriptions have been published should be treated as *unnamed minerals* and fall under the provisions of the preceding paragraph.

REDEFINITION, DISCREDITATION OR REVALIDATION OF MINERALS

Wherever possible, the redefinition or discreditation of a mineral should be based on a study of type material. If a type specimen exists and if the original description, though faulty, represents a reasonable approximation to material on the specimen, the mineral is to be defined by reference to the type material rather than to the original description. This means that errors in the original description cannot be held to discredit a mineral unless the original description was so grossly inaccurate that, in the words of J.D. Dana (1868) "a recognition of the mineral by means of it is impossible". If type material cannot be obtained for study, the investigator may propose a neotype to the CNMMN, clearly stating the efforts made to seek the original type-specimen. Both the acceptance of the neotype and approval of the proposal are within the authority of the CNMMN.

If a mineral is shown to be a mixture and one of the components is otherwise new, the name should usually be transferred to the new phase; a proposal to do this must also be approved by the CNMMN before publication.

If the original authors of the mineral to be discredited or redefined are alive, the author of the discreditation or redefinition proposal should write to the original authors asking them to comment on the proposal; these comments should accompany the submission to the CNMMN. The vice-chairman may also choose to contact the original authors independently.

Minor modifications to the definition of a particular mineral do not need to be referred to the CNMMN, but substantial ones do. In general, a redefinition that requires approval by the CNMMN is a) one that adds or deletes one or more chemical components essential to the definition of the mineral, b) proposes a new compositional limit to a member of a solid-solution series, or c) proposes important changes in the structure of the mineral. In case of doubt, the redefinition proposal should be sent to the vice-chairman of the CNMMN for a ruling.

A mineral name may be discredited if it can be shown that the mineral is identical to another one that has priority, or if the name is misleading. All such cases must be submitted to the vice-chairman of the CNMMN for approval.

Example: A case similar to that of johachidolite (*Amer. Mineral.* 62, 327), in which the elements H, Na and F were found not to be essential to the mineral, requires approval.

Example: A case similar to that of sarcosite (*Mineral. Mag* 48, 107), in which it was shown that F is essential to the mineral, requires approval.

Example: A case similar to that of hauchecornite (*Mineral. Mag.* 43, 873) in which it was shown that ordering of Bi, As, Sb and Te on two structural sites warranted redefinition of the original name and the introduction of three new mineral names for end members, requires approval.

Example: A case similar to that of minerals in the amphibole group, in which compositional limits to members of solid-solution series were proposed (*Amer. Mineral.* 63, 1023), requires approval.

Example: A case similar to that of pierrotite (*Z. Krist.* 165, 209), in which one S atom was subtracted from the formula, does not require approval because no essential elements are added or deleted, only their proportion has changed. However, if this change had also been accompanied by a change in symmetry of the mineral, then approval would have been required.

Example: A case similar to that of onoratoite, originally described as triclinic, but later found to be monoclinic (*Acta Cryst.* C40, 1506), requires approval.

Example: A case similar to that of mohsite, which was discredited (*Can. Mineral.* 17, 635) because re-examination of a type specimen showed that it is essentially similar to crichtonite, which has priority over mohsite, requires approval.

Example: A case similar to that of ferroschallerite, which was discredited because re-examination of type material showed that it was not the Fe analogue of schallerite and that it did not have the schallerite structure (*Mineral. Mag.* 48, 271) requires approval.

A discredited name (a list is provided in Appendix 1) should not be used in the literature except to report its discreditation. However, if there is evidence that a previously discredited mineral is valid, a proposal to revalidate the name should be submitted to the CNMMN for consideration.

The treatment of proposals for redefinition, discreditation or revalidation is analogous to that for the introduction of a new mineral name, and more than a two-thirds majority is required to approve such proposals.

SELECTION OF A MINERAL NAME

Adjectival modifiers

In mineralogical nomenclature, it is important to distinguish the name proper from adjectival modifiers that may precede the name and are not connected to it. An adjectival modifier is not considered to be part of the mineral name, and is normally used to indicate a compositional variant, *e.g.*, *ferroan* manganotantalite, where *ferroan* is the adjectival modifier that indicates the presence of some ferrous iron, and manganotantalite is the name proper. The adjectival modifiers recommended by Schaller (1930) have generally been used in papers published in the English language, but with the greatly increased information about valence states that has become available since that time, it seems appropriate to draw up a new list.

A complete consensus could not be reached by members of the CNMMN on several adjectival modifiers. Although the CNMMN generally recommends that Latin-derived prefixes should be used wherever possible (Hey & Gottardi 1980), a substantial number of members feel more comfortable with prefixes derived from common English names of chemical elements, *e.g.*, sodium *versus* natrium and potassium *versus* kalium. In such cases, either version is regarded as acceptable. Following is a list of adjectival modifiers approved by the CNMMN:

Ag	argentian		
Al	aluminian		
As ³⁺	arsenoan	As ⁵⁺ arsenian (AsO ₄) ³⁻ arsenatian	(AsO ₃) ³⁻ arsenitian
Au	aurian		
B	borian	(BO ₃) ³⁻ boratoan	(BO ₄) ⁵⁻ boratian
Ba	barian		
Be	beryllinan		
Bi ³⁺	bismuthoan	Bi ⁵⁺ bismuthian (BrO ₃) ⁻ bromatian	(BiO ₄) ⁵⁻ bismuthatian
Br	bromian	(CO ₃) ²⁻ carbonatian	
C	carbonian		
Ca	calcian		
Cd	cadmian		
Ce ³⁺	ceroan	Ce ⁴⁺ cerian	
Cl	chlorian	(ClO ₂) ⁻ chloratian	
Co ²⁺	cobaltoan	Co ³⁺ cobaltian	
Cr	chromian	(CrO ₄) ²⁻ chromatian	
Cs	caesian or cesian		
Cu ⁺	cuproan	Cu ²⁺ cuprian	
Dy	dysprosian		
Er	erbian		
Eu ²⁺	europoan	Eu ³⁺ europian	
F	fluorian		
Fe ²⁺	ferroan	Fe ³⁺ ferrian	
Fr	francian		
Ga	gallian		
Gd	gadolinian		
Ge	germanian	(GeO ₄) ⁴⁻ germanatian	

H	hydrogenian	(OH) ⁻ hydroxylian (H ₃ O) ⁺ hydronian or oxonian H ₂ O hydrated or hydrous	
Hf	hafnian		
Hg ⁺	mercuroan	Hg ²⁺ mercurian	
Ho	holmian		
I	iodian	(IO ₃) ⁻ iodatian	
In	indian		
Ir	iridian		
K	kalian or potassian		
La	lanthanian		
Li	lithian		
Lu	lutecian		
Mg	magnesian		
Mn ²⁺	manganoan	Mn ³⁺ or Mn ⁴⁺ manganian	
Mo	molybdian	(MoO ₄) ²⁻ molybdatian	
N	nitrian	(NO ₃) ⁻ nitratian	
NH ₄	ammonian		
Na	natrion or sodian		
Nb	niobian	(NbO ₄) ³⁻ niobatian	
Nd	neodymian		
Ni ²⁺	nickeloan	Ni ³⁺ nickelian	
O	oxygenian		
Os	osmian		
P	phosphorian	(PO ₄) ³⁻ phosphatian	
Pb ²⁺	plumboan	Pb ⁴⁺ plumbian	
Pd ²⁺	palladoan	Pd ⁴⁺ palladian	
Pr	praseodymian		
Pt ²⁺	platinoan	Pt ⁴⁺ platinian	
Ra	radian		
Rb	rubidian		
Re	rhenian		
Rh	rhodian		
Ru	ruthenian		
S	sulphurian or sulfurian;	(SO ₄) ²⁻ sulphatian or sulfatian;	(SO ₃) ²⁻ sulphitian or sulfitian
Sb ³⁺	antimonoan or stiboan	Sb ⁵⁺ antimonian or stibian	(SbO ₄) ³⁻ antimonatian or stibatian
Sc	scandian		
Se	selenian	(SeO ₄) ²⁻ selenatian	(SeO ₃) ²⁻ selinitian
Si	silician	(SiO ₄) ⁴⁻ silicatian	
Sm	samarian		
Sn ²⁺	stannoan	Sn ⁴⁺ stannian	
Sr	strontian		
Ta	tantalian		
Tb	terbian		
Te	tellurian	(TeO ₄) ²⁻ telluratian	(TeO ₃) ²⁻ telluritian
Th	thorian		
Ti ³⁺	titanoan	Ti ⁴⁺ titanian	
Tl ⁺	thalloan	Tl ³⁺ thallian	
Tm	thulian		
U ⁴⁺	uranoan	U ⁶⁺ uranian	(UO ₂) ²⁺ uranylian
V ²⁺	vanadoan	V ⁵⁺ vanadian (VO) ²⁺ vanadylian (WO ₄) ²⁻ wolframatian or tungstatian	(VO ₄) ³⁻ vanadatian
W	wolframian or tungstenian		
Y	yttrian		
Yb	ytterbian		
Zn	zincian		
Zr	zirconian		

In constructing an adjectival modifier that is not in the above list, the ending *oan* is to be used for the ion with the lower valency, and *ian* for the higher. If the valency of an element in a particular mineral is not known, the adjectival modifier derived from the more likely, or more common, valence state of the element should be used.

An adjectival modifier is an adjective that gives some information on the chemistry of the mineral, and is not considered to be a part of the mineral name. Adjectival modifiers should therefore be ignored in the preparation of alphabetical indexes. In some papers, an adjectival modifier is given in the form of a hyphenated chemical prefix, *e.g.*, Li-tosudite, rather than lithian tosudite or lithium-bearing tosudite. Such usage is *incorrect and should be avoided*.

Group and varietal names

A mineral name may be used for a group of minerals, *e.g.*, mica, or for a mineral species, *e.g.*, muscovite. Sometimes the species name is also used as a group name, *e.g.*, the pyrite species is a member of the pyrite group. In the past, varieties of minerals have been given special names (*e.g.*, kunzite, a variety of spodumene), but this practice is not approved.

Selection of a name

Naming a new mineral is the prerogative and responsibility of the senior author of the proposal submitted to the CNMMN for approval, but the choice of a new name is governed by the following guidelines:

The name must be sufficiently different from existing ones to prevent confusion, both in the author's language and in others. Existing mineral nomenclature already displays a number of examples of unfortunate names that are easily confused; names such as celadonite and caledonite, or mallardite and mallardite can easily be mis-spelled; names such as rhodosite, rhodizite and rhodusite are euphonically very similar. Introduction of new names that can create similar problems must be avoided.

If the new mineral is related to an existing one, it is desirable that this relationship be indicated by the new name, *e.g.*, clinoenstatite for the monoclinic dimorph of enstatite, or magnesiocopiapite for the Mg analogue of copiapite. Such a name should consist of one word only (*e.g.*, magnesiocopiapite, *not* magnesium copiapite).

Efforts should be made to choose a simple name rather than an excessively complicated one that may be difficult to read or pronounce.

The use of excessively long names should be avoided, as these may cause difficulties in pronunciation, tabulations, and computer data-bases.

The name of a mineral with essential rare-earth elements (or the chemically related elements Y or Sc) must have a suffix indicating the dominant rare-earth element, *e.g.*, bastnäsité-(Ce), and if a new mineral with the same structure and analogous composition, but with a different dominant rare-earth element, is discovered, it should be given a name that is analogous to that of the existing mineral, *e.g.*, bastnäsité-(Y). A suffix of this type is known as a 'Levinson modifier' after the author who introduced this procedure (Levinson 1966). The CNMMN recently decided that the names of all minerals containing essential rare-earth elements, including those introduced into the literature before the publication of Levinson's paper should be changed into the approved format. A list of these mineral names is given as Appendix 2.

In a few cases, a similar procedure has been used for minerals that do not contain rare-earth elements, and which can contain different substituting elements in one or more structural sites, *e.g.*, jahnsité-(CaMnMg). In general, this type of nomenclature is acceptable in cases where only one substituting element is suffixed, but suffixes consisting of multiple elements are conditionally acceptable in cases where the structure is complex, and use of such suffixes simplifies the nomenclature.

Suffixes can also be used to indicate crystallographic relationships. This usage has already been noted in the case of polytypes, but it has also recently been extended to minerals that are not polytypes according to the rigorous definition, *e.g.*, hilgardite-3Tc (Ghose 1985).

Relationships to other minerals can also be indicated by the use of prefixes, *e.g.*, clinoenstatite, the monoclinic dimorph of enstatite, or magnesiocromite, the Mg analogue of chromite. The use of a hyphen to distinguish the prefix from the root name is to be discouraged, but where an unhyphenated name is awkward, and a hyphen assists in deciphering the name, it may be used, *e.g.*, hydroxyl-bastnäsité-(Ce).

Where a chemical prefix is used, Latin-derived prefixes should be used wherever possible, *e.g.*, "ferro" instead of "iron", plumbo" instead of "blei", *etc.* (Hey & Gottardi 1980).

The prefix is an integral part of the mineral name, and should generally be treated as such in the

preparation of alphabetical indexes; however, an exception can be made in the case of prefixed symbols such as Greek letters of their spelled-out Latin equivalents. A recent decision by the CNMMN permits their positioning after the main name; *e.g.*, β -roselite may be written as roselite- β or roselite-beta.

If the mineral is named after a person with a space or a capital letter in the name, the name should be modified to eliminate them (*e.g.*, mcnearite, *not* mcNearite; joesmithite, *not* joe smithite). Otherwise, the original spelling of the person's name should be retained. If the mineral is to be named after a living person, that person's permission must be obtained by the author, and this should be done prior to the submission of the proposal to the CNMMN. When deciding to name a mineral after a person, it is well to recall J.D. Dana's (1854) precept: "It should be remembered that the use of names of persons eminent in other sciences, or of such as are ignorant of all science, is wholly at variance with good usage and propriety; moreover, an attempted flattery of the politically distinguished is degrading to science, and cannot be too strongly discountenanced".

Although the CNMMN does not have a fixed policy on the use of compounded personal names, some members feel strongly that they should be discouraged, particularly where they become cumbersome or cacophonous, or where they unnecessarily distort the true names of the individual who is supposedly being honored.

If the mineral is to be named after a geographical occurrence, care must be taken to ensure that the spelling conforms to that in use at the locality; it should not be taken from translations.

Mineral names proposed in languages that use other than the Latin alphabet shall be transliterated into the Latin alphabet according to the prevalent system operative in the country of origin. In the case of Cyrillic names, transliteration shall follow the British Standard System, which has been adopted by the CNMMN.

Diacritical marks must be retained wherever possible, but it is recognized that not all printing establishments have the necessary facilities for printing all types of diacritical marks; in such cases diacritical marks may be omitted.

Re-use of a discredited or obsolete name for a new or redefined mineral is to be discouraged, except when the new mineral is a component of a mixture originally described as a single mineral; in such a case, the original name may be transferred to the new phase. Re-use of a discredited name may also be permitted if there is a good reason why the discredited name is particularly appropriate for the mineral in question, and the discredited or obsolete name has not appeared in the active literature (except for the report of its discreditation) for *fifty years*. A proposal to re-use an obsolete name must be accompanied or preceded by a proposal to discredit the obsolete name. If the CNMMN does not approve a proposal to re-use a discredited name, the author of the proposal has no priority for the use of the discredited name, although he is free to propose the name again at a future time.

The re-use of an obsolete or discredited name will not be permitted if the name has been used outside the field of mineralogy (*e.g.*, in petrography, metallurgy, paleontology, *etc.*), or to indicate two or more minerals.

If an artificial substance has been given a name, and a mineral corresponding to that substance is subsequently discovered, the name given to the artificial substance does not necessarily have to be applied to the mineral.

PUBLICATION OF THE DESCRIPTIONS OF APPROVED MINERALS

Authors of approved proposals should publish descriptions of the minerals covered by these proposals within *two* years of being notified of the approval by the chairman or vice-chairman. If new-mineral descriptions, discreditations, redefinitions or revalidations are not published within that time, the proposals are no longer considered as approved. Any extensions of this deadline must be approved by the chairman or vice-chairman, as appropriate.

ADVICE TO EDITORS

Editors of mineralogical and geological journals will do a service to the earth sciences if they cooperate fully with the CNMMN. All aspects of the nomenclature in submitted manuscripts should be evaluated according to the guidelines given here, and assurances should be sought from authors that they have submitted all matters dealing with mineral nomenclature to the CNMMN, and that their proposals have been approved. Unless they have definite proof of approval, editors should consult with their national representatives, or with members of the CNMMN executive. Editors should be particularly cautious about the final acceptance of a paper bearing phrases like "has been submitted" or "will be submitted" to the

CNMMN. Acceptance of such papers should be delayed until evidence is produced that the nomenclature *has been approved* by the CNMMN.

In the case of new minerals, editors should insist on evidence that a type specimen of the new mineral has been lodged in at least one major museum or a nationally recognized mineral collection.

It would be appreciated if all journals that publish mineralogical papers included the following statement in their instructions to authors: "This journal follows the rules of the Commission on New Minerals and Mineral Names of the IMA in all matters concerning mineral names and nomenclature."

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APPENDIX 1. DISCREDITED MINERAL NAMES

Following is a list of mineral names discredited by the CNMMN. The names in the 'Discredited Name' column should not appear in publications; where there is a name in the "Approved Name" column, that should be used instead.