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# MINERALOGIC TERMINOLOGY AND DESCRIPTIONS

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**A**UTHORS WHO PLAN TO REPORT on the optical, physical, crystallographic, or chemical properties of either existing minerals or proposed new minerals should review the guidelines below.

## MINERAL NAMES

A complete compilation of mineral names, periodically updated and corrected, is given by Fleischer (1983), including errata. Fleischer's glossary provides correct spelling and chemical formulas for more than 2,900 mineral species in a convenient alphabetical format.

Authors should avoid colloquial names (sunstone), outdated names (plumbago instead of graphite), nonspecific mineral terms (sericite, psilomelane, asbestos), and varietal names without reference to the parent mineral species (kunzite without reference to spodumene).

## MINERALOGIC TERMINOLOGY

Correct standard terminology for morphological, physical, and optical properties of minerals may be verified in standard references such as Klein and Hurlbut (1985). Widely accepted abbreviations for physical quantities are given on the inside back cover of each issue of the journal "American Mineralogist." Some of these abbreviations are not included in the STA listing of abbreviations in table 4, page 109; some also differ slightly from those listed.

## REPORTING X-RAY DATA

Acceptable abbreviations for reporting X-ray diffraction data are also given by the "American Mineralogist." The use of nanometers (nm) rather than angstroms (Å) is now preferable (see "The Metric System," p. 122, for USGS policy).

Guidelines for the publication of X-ray powder data are given by Bayliss (1976). The use of single-crystal, powder diffraction, or Guinier film techniques is recommended over Debye-Scherrer or Gandolfi methods in the interest of unique indexing, more reliable intensity data, or better resolution, respectively. Correction of lines to an internal standard is desirable, and refinement of cell parameters by a suitable least-

squares algorithm is standard practice. Questions regarding choice of crystallographic axes, standard settings, and other recognized conventions of crystallography are addressed by the "International Tables for X-Ray Crystallography" (International Union of Crystallography, 1952, 1959, 1962, 1974, 1983).

Conditions under which X-ray diffractometer data are collected should be described. For manual systems this description should include the data-collection speed in degrees 2θ per minute, 2θ range, slit configuration, time constant, and generator power settings. For automated systems or manual systems utilizing stepping motors, the slew speed is replaced by values for step size and step time. The use of a theta compensating slit should always be reported if no intensity corrections are made for its presence. Any algorithms used to locate or fit diffraction peaks should also be reported.

## CHEMICAL NOMENCLATURE AS IT RELATES TO MINERALOGY

General aspects of chemical nomenclature are described in the preceding section entitled "Chemical Terminology." Some special consideration is needed, however, when reporting minerals whose substitutional chemistry leads an author to propose a prefix, suffix, or adjectival modifier to indicate the nature of the substitution. Authors should be aware that the use of any prefix or suffix with an existing mineral name is considered to be a new name by the International Mineralogical Association (IMA) and that only adjectival modifiers can be used without creating a new mineral name. The distinctions between these three types of modifiers, and when their use is appropriate, are outlined in Hey and Gottardi (1980). The salient points of these usages are summarized below.

### USE OF MINERAL NAMES

- To indicate a family name ("mica")
- To indicate a dominant end-member species ("siderite")
- To indicate a variety of a mineral species ("kunzite")

## USE OF PREFIXES

To indicate crystallographic information  
("clinoenstatite")

No unique implication ("parachrysotile")

To indicate chemistry ("ferroglaucophane")

Prefixes may be joined with the mineral name or separated by a hyphen. Chemical prefixes should be used only when the element named is dominant in an isomorphous series and the author wishes to introduce a new name. (This usage constitutes a new mineral name and is subject to approval by the IMA.)

## USE OF SUFFIXES

A mineral name also may be suffixed. A suffix, as used here, is a symbol, a chemical or crystallographic one, that follows a mineral name and is attached to it with a hyphen. The suffix gives some particular additional information; for example "monazite-(La)," which means a monazite in which La is dominant among the rare earth elements; another example is "graphite-2H," which names a special polytype of graphite (Hey and Gottardi, 1980).

The use of a suffix also creates a new mineral name and is subject to approval by the IMA. Use of a chemical suffix for rare earth minerals is now standard, and in the format just shown (Levinson, 1966).

## USE OF ADJECTIVAL MODIFIERS

Adjectival modifiers are used to denote nondominant chemical substitution in an isomorphous series. Their use does not create a new mineral name and therefore does not require IMA approval. Proper usage combines the adjectival form of an element name (separate word) immediately followed by a mineral name—for example, "ferroan glaucophane."

Under this rule a clear distinction is made between terms like "ferroglaucophane," which indicates  $Fe > Mg$  and is a mineral name proper, and "ferroan glaucophane," which indicates  $Fe < Mg$  and is merely a mineral name with an adjectival modifier.

Avoid the use of nouns as adjectival modifiers because of possible misunderstanding of intent. For example, the modifier "manganese" in "manganese tremolite" may imply either a manganese-rich tremolite or the manganese equivalent of tremolite. Element names should therefore be converted to the adjectival form when they are used as modifiers.

For minerals that can accommodate many substitutions (for example, the amphiboles and pyroxenes), the use of adjectival modifiers, prefixes, and suffixes can be more confusing than enlightening. Attempts to systematize the nomenclature are given in several short-course volumes of the Mineralogical Society of America (Prewitt, 1980; Veblen, 1981; Bailey, 1984). A similar systematization for phyllosilicates is given by Bailey (1980). If no previous nomenclature exists and prefixes, suffixes, or modifiers would only cause confusion, the author should simply use explicit chemical formulas whenever possible.

## NEW MINERAL DESCRIPTIONS

Before reporting a new mineral species, the author should thoroughly investigate the possibility of a previously published description. The outline of Donnay and Fleischer (1970) is recommended to authors describing new minerals. All proposed new mineral names must be approved by the Commission on New Minerals and Mineral Names of the International Mineralogical Association. Approval is needed before the manuscript is published and should be noted on the first page of the manuscript as a footnote immediately after the new mineral name in the title. When naming new minerals, authors should consider possible similarities to already existing mineral names and should consider possible confusion resulting from non-English pronunciation. In naming new rare-earth minerals, the applicable rules should be followed (Levinson, 1966).