

BOOK REVIEW

GLOSSARY OF MINERAL SPECIES, seventh edition. By M. Fleischer and J. A. Mandarino. Mineralogical Record, Tucson, Arizona, 1995. 280 pages. \$18.00.

Once again the authors are to be congratulated for providing mineralogists with another edition of the inexpensive, useful book that includes a complete listing of accepted mineral species as of August 31, 1994. Michael Fleischer continues to provide a remarkable service for geologists in preparing the seven editions of this book as well as the Ford-Fleischer lists of references on minerals. He has coauthored the last two editions of this manual with Joseph Mandarino, who has excellent credentials as recent chairperson of the International Mineralogical Association Commission on New Minerals and Mineral Names (CNMMN). The mineralogical community should thank both authors for their continued, selfless efforts toward the progress of mineralogy.

The ring-bound booklet lists about 3600 minerals. This edition includes about 200 new minerals not listed in the sixth edition in 1991. In addition to accepted mineral names, several varietal names are provided with the accepted equivalent species name. The minerals are listed alphabetically, each followed by a chemical formula, the crystal system, a notation of polymorphs, the mineral group to which it belongs and isostructural or related compounds (if any), and color (occasionally). A reference (most often to an article in *American Mineralogist*) is provided for about three-quarters of the minerals. Polymorphic status is not indicated for some minerals that have extensive but overlapping solid solutions (e.g., majorite and enstatite, berthierine and chamosite, bustamite and johannsenite, and suessite and gupeite). The *Glossary* is very useful for the currently accepted validity of each mineral, the best chemical formula (at least according to the CNMMN), and the reference to descriptive information. Many of the formulae have commas confusingly inserted between two cations or two anionic groups with different valences, which cannot be correct, such as provided for cryptomelane $[K(Mn^{2+}, Mn^{4+})_8O_{16}]$, uvite $[(Ca, Na)(Mg, Fe^{2+})_3Al_5Mg(BO_3)_3Si_6O_{18}(OH, F)_4]$, and carbonate-fluorapatite $[Ca_5(PO_4, CO_3)_3F]$. A few formulae are simply erroneous. Wüstite is given as $Fe^{2+}O$ rather than $Fe_{1-x}O$, $x = 0.04-0.17$; some of the iron in wüstite is Fe^{3+} , which is charge balanced with cation vacan-

cies. Srilankite is listed as $(Ti, Zr)O_2$ rather than $ZrTi_2O_6$; it does not have extensive TiO_2 - ZrO_2 solid solution. Allanite-(Ce) is given as $(Ce, Ca, Y)_2(Al, Fe^{2+}, Fe^{3+})_3(SiO_4)_3(OH)$ rather than $CeCaFe^{2+}Al_2Si_3O_{12}(OH)$. The latter formula is better because Ce vs. Ca and Fe^{2+} vs. Al are located on different cation sites, and better yet is the formula $CeCaFe^{2+}Al_2(SiO_4)(Si_2O_7)O(OH)$ because epidote group minerals have Si_2O_7 , as well as SiO_4 groups. It is usually best to indicate idealized formulae of ordered structures rather than illustrate complex multivalent exchanges with commas. A very small number of minerals have no formulae listed in the *Glossary*, e.g., omphacite, which ideally is $CaNaMgAlSi_4O_{12}$, with Ca vs. Na and Mg vs. Al ordered on four octahedral sites and with a different space group than that of most pyroxenes. The book would prove yet more effective if space group and unit-cell data were included. Certainly the insertion of space group symbols would require little additional space.

The authors have placed about one-third of the minerals into a separate listing of one hundred mineral groups that is found near the back of the book. In this edition, each mineral listed under a group name is followed by its individual formula, which is a great help. A brief appendix contains a listing of common minerals and the word expressions for their constituent elements and anion grouping (e.g., almandine = iron aluminum silicate), although it is redundant given the chemical formulae. This book would have greater value to researchers if a chemical index based primarily on cations were provided in an appendix. A new chemical index of minerals is desperately needed because those in the 1970 *Mineralogische Tabellen* of H. Strunz are outdated. It should contain not only the mineral name but also its formula. Such an index may require 40-50 additional pages, but it would be invaluable to the many researchers who obtain chemical data on unknown phases with a SEM or electron microprobe. The seventh edition of the *Glossary* is strongly recommended for purchase by all geology libraries, serious mineral collectors, and interested mineralogists.

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