American Mineralogist, Volume 67, pages 190–191, 1982

Suggested outline for new mineral descriptions

COMMISSION ON NEW MINERALS AND MINERAL NAMES
OF THE INTERNATIONAL MINERALOGICAL ASSOCIATION

This "suggested outline" is largely based on a previous paper with the same title by Donnay and Fleischer (1970).

All manuscripts that describe new minerals and new synthetic crystalline phases have a good deal in common. Nearly all the leading mineralogical journals now require that proposals of new mineral names be approved in advance by the I.M.A. Commission on New Minerals and Mineral Names. To save the authors and the referees time and trouble, we are listing below the subtitles followed by brief descriptions that the authors should attempt to deal with whenever possible. It is evident that not all the data suggested can be obtained, especially on small samples, but enough data must be provided to characterize the mineral unambiguously; as a rule this will require, as a minimum, a quantitative chemical analysis or some other proof of its chemical individuality, X-ray powder data, and basic optical data. The details under *Occurrence*, *Storage of type specimen* and *Name*, below are always required.

In general, polytypes should not receive individual mineral names, but should be designated in accordance with the "Report of the I.M.A.–I.U.Cr. Joint Committee on Nomenclature" (Bailey, 1977, 1978). Exceptions to this rule may be considered if supported by evidence of striking differences in the properties of the polytypes involved. New members of the pyrochlore or amphibole groups should be named in accordance with the schemes proposed by the subcommittees of the Commission (pyrochlores Hogarth, 1977; amphiboles Leake, 1978). The same holds for new members of mineral groups, the classification and nomenclature of which may be reconsidered in the future (pyroxenes, micas, zeolites, *etc.*).

Other guidelines, highly recommended and in no way conflicting with the present suggestions, are formulated by the Commission on Crystallographic Data of the International Union of Crystallography (Kennard *et al.*, 1967) and by the Commission on New Minerals and Mineral Names of the All-Union Mineralogical Society of the Academy of Sciences of U.S.S.R. (1975, 1977). The criteria of the Soviet Commission are recommended in particular as far as polymorphs (especially for Order–Disorder polymorphs), solid solutions, mixed layer minerals, and metamict minerals are concerned.

The requirements for amorphous minerals are currently under consideration.

Authors proposing new mineral names should read carefully the statement of F. Permingeat (approved by the I.M.A. Commission) in Hey *et al.* (1961).

Introduction

Statement of name, mineralogical classification (oxide, sulfate, *etc.*) and relationships, generalized characterization.

Occurrence

Locality (in identifiable form), type of host rock, paragenesis (including associated minerals, replacements, alterations, texture), abundance of mineral (tons or micrograms ?), size of crystals.

Chemistry

Chemical analysis (state purity of samples); if electron-probe (or other instrumental) analyses were used, give the standards used, the number of determinations, and the range of values, as well as the averages; actual and idealized formulae; determinative chemical reactions, especially fusibility and solubility; synthesis and stability relations, if known; DTA and TGA, especially for minerals containing volatiles.

Crystallography

Cell dimensions and volume, all with standard deviation (state numerical value of X-ray wavelength used); Laue class, diffraction aspect or space group (state extinctions observed); number of formula units (for actual formula) per cell (see Hey, 1939 and 1954); observed and calculated densities (discrepancy calls for comment); indexed X-ray powder data with relative intensities; relations to known phases; crystal structure, if determined (if

not, state whether the structure has been determined or whether suitable material will be made available to another laboratory for structure determination).

Goniometric axial ratio(s) and angles; crystal forms and form combinations; habit, malformation; cleavage(s) (Miller indices, quality, facility); twinning (twin law and composition surface); gliding; parting.

Physical properties

Color, luster, streak, grain size; Mohs-hardness or, at least for opaque minerals, micro-indentation hardness (Vickers) according to the rules of the I.M.A. Commission on Ore Microscopy (Criddle, 1980); pyro- and piezo-electric properties; magnetic susceptibility; fluorescence; for transparent minerals containing H_2O or OH, infrared absorption spectrum.

Optical properties

For transparent minerals, indices of refraction, optical sign, 2V, dispersion(s), optical orientation, elongation, pleochroism. Any optical property which may be observed on cleavage fragments or on prominent planes (Buttgenbach, 1953; Taylor, 1948).

It is recommended that the relationship between chemical composition, density and refractive indices be checked by the Gladstone–Dale rule (Mandarino, 1976, 1978, 1979). If there are difficulties, if the data are incomplete or approximate, an explanation is desirable.

For opaque minerals, color in air and oil; pleochroism, anisotropism (intensity and colors), polishing hardness and quality; reflectances in air and oil at least at the four standard wavelengths 470, 546, 589, 650 nm, or better at every 20 nm from 400 to 700, stating the band width of the monochromator, the aperture used in the measurements, the standards of reflectance, the manufacturer of the oil; all these data for opaque minerals must be given according the rules of the I.M.A. Commission for Ore Microscopy (Criddle, 1980).

Storage of type specimen

State where (preferably a national museum) and how much type material is deposited, giving identification number(s) if possible.

Name

Derivation, pronunciation (preferably with international phonetic symbols). If a mineral is named for a living person, his or her consent must be obtained. If it is proposed to change an existing name, or to redefine an already named mineral, the person who gave the previous name must, if living, be given an opportunity to comment on the proposal.

References

Bailey, S. W. (1977) Report of the I.M.A.–I.U.Cr. Joint Committee on Nomenclature. American Mineralogist, 62, 411–415.

Bailey, S. W. (1978) Report of the I.M.A.–I.U.Cr. Joint Committee on Nomenclature, Canadian Mineralogist, 16, 113–117.

Buttgenbach, H. (1953) Les mineraux et les roches (8th ed. with J. Melon). Paris, Dunod; Liege, Vaillant-Carmanne. See Table VIII, 735–739.

Commission on New Minerals and Mineral Names of All-Union Mineralogical Society of the Academy of Sciences of U.S.S.R. (1975) On the procedure for confirmation and the requirements to characterize new Minerals (in Russian). Zapiski Vserossiiskogo Mineralogicheskogo Obshchestva, 104, 521–525.

Commission on New Minerals and Mineral Names of All-Union Mineralogical Society of the Academy of Sciences of U.S.S.R. (1977) On the criteria used in the consideration of new minerals (in Russian). Zapiski Vserossiiskogo Mineralogicheskogo Obshchestva, 106, 686–687.

Criddle, A. J. (1980) Editorial policy for the second issue of the IMA/COM quantitative data file. Canadian Mineralogist, 18, 553–558.

Donnay, Gabrielle and Fleischer, Michael (1970) Suggested outline for new mineral descriptions. American Mineralogist, 55, 1017–1019.

Hey, M. H. (1939) On the presentation of chemical analyses of minerals. Mineralogical Magazine, 25, 402–412.

Hey, M. H. (1954) A further note on the presentation of chemical analyses of minerals. Mineralogical Magazine, 30, 481–497.

Hey, M. H., Guillemin, C., Permingeat, F. and De Roever, J. P. (1961) Décisions de la Commission des noveauz minéraux et des noms des minéraux de l''Association Internationale de Minéralogie. Bulletin de la Société Francaise de Minéralogie et de Cristallographia, 84, 96–104.

Hogarth, D. D. (1977) Classification and nomenclature of the pyrochlore group. American Mineralogist, 62, 403–410.

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

Leake, B. E. (1978) Nomenclature of amphiboles. American Mineralogist, 63, 1023–1052. Bulletin Mineralogica, 101, 453–467. Mineralogical Magazine, 42, 533–563. Mineralogica Petrographica Acta, 22, 195–224. Canadian Mineralogist, 16, 501–520.

Mandarino, J. A. (1976, 1978, 1979) The Gladstone-Dale relationship. Part I: Derivation of new constants. Canadian Mineralogist, 14, 498–502. Part II: Trends among constants. Canadian Mineralogist, 16, 169–174. Part III: Some general applications. Canadian Mineralogist, 17, 71–76.

Taylor, E. D. (1948) Optical properties in cleavage flakes of rock-forming minerals. Quebec, Université Laval, Géologie et Minéralogie.