

5. When a vote is completed, the President notifies the Commission, the author, and the journal in which publication is intended of the results, and communicates to the author the comments of the members, but the votes of individual members are not disclosed. The Commission may publish the results of votes, but unpublished names of disapproved minerals are not given.

6. Reconsideration of adverse votes can be requested by an author at any time if new data are obtained.

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SUGGESTED OUTLINE FOR NEW MINERAL DESCRIPTIONS

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All manuscripts that describe new minerals and new synthetic crystalline species have a good deal in common. Many of the leading mineralogical journals now require that proposals of new mineral names must be approved in advance by the Commission on New Minerals and Mineral Names, IMA. The present outline has been approved by the Commission. 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.

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, published by Kennard, Speakman, and Donnay (1967) and by the Russian Commission on New Minerals (1957 and 1958) [in Russian]. Authors proposing new mineral names should read carefully the statement by F. Permingeat (approved by the IMA 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, para-

¹ Publication authorized by the Director, U. S. Geological Survey, Washington, D. C.

genesis (including associated minerals, replacements observed, alterations, texture), abundance of mineral (tons or micrograms?), size of crystals.

Chemistry. Chemical analysis (state purity of samples); if electron probe 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 solubility and fusibility; synthesis and stability relations, if known; DTA and TGA, especially for minerals containing volatiles; spectrographic analysis.

Crystal geometry. 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; indexed X-ray powder data with intensities; relations to other known structures.

Crystal morphology. 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; hardness (micro-hardness); density; pyro- and piezo-electric properties; magnetic susceptibility; infrared absorption spectrum; fluorescence.

Optical properties. If transparent, indices of refraction, optical sign, $2V$, dispersion(s), optical orientation, elongation, pleochroism; calculated index of refraction. If opaque, color in air and oil; reflectivity and its dispersion (state standards used), anisotropism, bireflectance, polishing hardness and quality.

Type specimen. State where 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.

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NATIVE ZINC AND α -Cu,Zn FROM MINA DULCINEA
DE LLAMPOS, COPIAPÓ, CHILE

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ABSTRACT

Native zinc (Cu, 0.12 ± 0.05 percent by microprobe analysis; Pb, Sn, Cd n.d.) and α -Cu,Zn (Zn, $\leq 9.5 \pm 0.5$ percent) occur as oxidation products of sphalerite and djurleite in the Dulcinea copper deposit.

Although the existence of native zinc has been established in recent years (*e.g.* Goncharova, 1959; Boyle, 1961; Bartikyan, 1966), its mode of occurrence in nonplacer environments requires further documentation. Microscope and electron-microprobe studies of ores from the Dulcinea de Llampos copper mine (Lat. $27^{\circ}8.9'S$; Long. $69^{\circ}57.7'W$), near Copiapó, northern Chile, have revealed minor amounts of metallic zinc and a copper-rich, Cu-Zn alloy.

These phases occur in association with native copper, and represent products of the oxidation of sphalerite intergrown with supergene djurleite. Specimens were taken from the 180-fathom level of the mine; the native metals antedate mining and are definitely not artifacts. The djurleite at this depth formed by the replacement of chalcopyrite and pyrite during the later of the two major episodes of supergene sulfide enrichment which affected the Dulcinea vein during the Tertiary (Sillitoe, 1969; Sillitoe, Mortimer and Clark, 1968). Rims of native copper, intergrown with cuprite, developed locally through replacement *in situ*