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A Review of: "B. Peter Block, Warren H. Powell, and W. Conard Fernelius, *Inorganic Chemical Nomenclature. Principles and Practice*, ACS Professional Reference Book, Washington, D.C., 1990, 210 pp. ISBN 0-8412-1698-3 (paper) US$ 39.95, and 0-8412-1697-5 (cloth) US$ 59.95."

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BOOK REVIEW

B. Peter Block, Warren H. Powell, and W. Conard Fernelius, *Inorganic Chemical Nomenclature. Principles and Practice*, ACS Professional Reference Book, Washington, D.C., 1990, 210 pp. ISBN 0-8412-1698-3 (paper) US$ 39.95, and 0-8412-1697-5 (cloth) US$ 59.95.

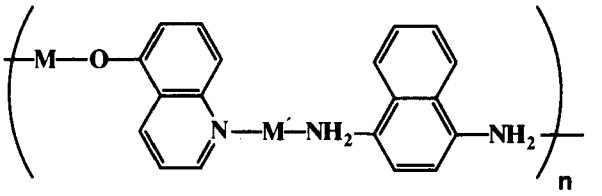
Precise naming of chemical compounds is nearly as difficult as preparing the compounds. Most of us will not be able to master the scientific discipline of chemical nomenclature even after reading this book. However, we may be able to comprehend the names given by even the most sophisticated writers in the inorganic chemical literature.

The authors give a very thorough exposition of the latest version of IUPAC's rules for inorganic nomenclature. As members of nomenclature committees all three authors have influenced these rules, and not only do they know how to name compounds, they also know why. Thus, the first two chapters explain the general principles of chemical nomenclature in a very clear and lucid way. Most readers will be familiar with some of the material concerning systematic, semisystematic and trivial names, but the elaboration on locants will probably be found pertinent by most readers who have difficulties in remembering the precise meaning of symbols such as centered point, colon, comma, dash, hyphen, semicolon, slash, space, brackets, and a number of Greek letters.

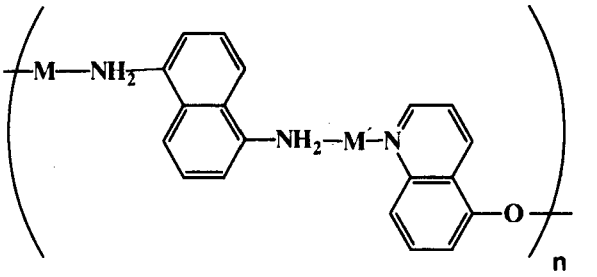
In the examples given in the first two chapters one already gets the impression that the authors wish us to abandon the Stock nomenclature in favor of the so-called Ewans-Basset nomenclature which indicates the charge of an entity rather than the oxidation number of a central ion. Chapter 3 deals with homoatomic species and here O_2^+ is given the name dioxygen(1+) cation and O_2^- is called dioxide(1−). These names seem natural whereas some names in the next chapter on heteroatomic species seem "old-fashioned" to me, like *e.g.* vanadate(3-) instead of tetraoxovanadate(V). Oxo derivatives may be given "-yl" names like sulfinyl for SO in $SOCl_2$ and sulfonyl for the SO_2 unit. These names are in common use for main group elements, but I would definitely prefer oxovanadium(IV) to vanadyl, and in my opinion a name like antimonyl creates confusion. On the other hand, SF_4^+ can safely be called tetraflurosulfur radical ion(*1*+).

Chapter 5 on additive nomenclature gives examples of the use of the kappa convention. This way we can indicate that sulfur in a thiocyanato κS complex is coordinating (κS) while this is not the case in the ligand *N*-[*N*-(2-amino-κ*N*-ethyl)-*N*′,*S*-diphenylsulfono-diimidoyl-κ*N*]benzamidine-κN′. Similarly the hapto convention η^n indicates that a ligand binds to n atoms. Thus Zeise's salt is a η^2-ethene compound. This use of a Greek letter is perhaps less known than the use of μ- for a bridging ligand as in bis-(μ-dimethyl sulfide-$\kappa^2 S$)-bis[dibromoplatinum(II)]. With more complicated polynuclear coordination entities the κ convention is extended and it is my guess that most writers and readers will have to consult this book to ensure correct communication.

In the chapter on polymers a constitutional repeating unit (CRU) is defined, allowing us to write *catena*-poly[sulfur]. When seniority rules are also introduced, it becomes obvious that writing the formula for the polymer **I** is preferable to writing it as in **II**, and for the same reason -MS(R)M′NH_2NH_2- is superior to -MNH_2NH_2M′S(R)-. It is



I



II

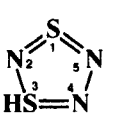
important to know all the Greek letters since nearly the whole alphabet is in use as demonstrated by Cl-$(S)_n$H which is called α-chloro-ω-hydrido-*catena*-poly[sulfur].

It is interesting to notice that IUPAC gives freedom to choose between names based on a prefix method, *e.g.* chlorobis(methylimido)sulfuric acid and dimethyl(chlorodiimidosulfuric) acid, and names based on an infix method like dimethylsulfurochloridodiimidic acid. It also surprises me that all three names for SO_2Cl_2: sulfuric dichloride, sulfuryl dichloride, and sulfonyl dichloride are acceptable. Hopefully, within a few years the chemicals community will find itself using one name only for each compound.

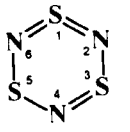
Substitutive nomenclature for covalent inorganic compounds is treated in chapter 9. Here the lambda convention is introduced for non-standard bonding numbers in parent hydrides. A prefix λ^n is added, as *e.g.* in λ^6-sulfane for the parent molecule SH_6 in tetrafluorooxo-λ^6-sulfane, SOF_4. Here we also meet HS^- written as SH^- and called sulfanide ion as well as hydrosulfide ion. Why not hydrogen sulfide ion?

The chapter on chains and rings is important and the use of Greek letters is again to be emphasized. We learn to treat ring atoms with non-standard bonding number by means of the lambda convention as in 2,2,3,3,4,4,5,5-octafluoro-1,1-dioxo-1λ^6-thiatetrasilolane. Cumulative double bonds are present when more than one skeletal double bond is associated with a single ring atom and it is designated with δ^n. Examples are 1$\lambda^4\delta^2$,3λ^4,2,4,5-dithiatriazole, **III**, and 1$\lambda^4\delta^2$,3λ^4,5,2,4,6-trithiatriazin-3-ide, **IV**.

The general replacement nomenclature for naming rings and chains of substituted



III



IV

hydrocarbons is very popular with students and everyone understands a name like 2,5,8-trithia-3,6-nonadiene.

The section on boron compounds is very complicated, but also organometallic chemistry represents difficult nomenclature. Substitutive, additive, and ionic nomenclatures are used rather indiscriminately. Simple additive compounds like $[Cu(OH_2)_4]SO_4 \cdot H_2O$ should be written with a dash as a separator. In this case *Chemical Abstracts* uses a much more typewriter friendly colon.

The contents of the section on isotopically modified species may not be new but it is very nice to have rules at hand when naming compounds like $[^{36}Cl]SOCl_2$, [^{36}Cl] sulfinyl chloride, and $HOSO_2[^{35}S]H$, [^{35}SH] thiosulfuric acid.

The last chapter on stereochemical relationships focuses on locants. One may use letter locants like ac-diammine-bd-dichloroplatinum for trans-diamminedichloroplatinum(II). One may also use L (for linear) and A (for angular) in names like (L-2)-chloro(pyridine)gold and (A-2)-sulfur dichloride. More complicated locants and rules for symbols for absolute configurations are also found.

In addition to all this you will find eleven appendices among which No. 8 gives systematic names of hydrides, thus oxidane for H_2O.

Altogether this book is very good value and is recommended to every chemist in interaction with the original literature.

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