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Book review

Gmelin Handbook of Inorganic Chemistry, 8th edition, Mo—Molybdenum, Supplement Volume B3b: Oxomolybdenum Species in Aqueous Solutions (continued). Oxomolybdenum Species in Nonaqueous Solvents. Oxomolybdenum Species in Melts. Peroxomolybdenum Species, Springer-Verlag, Berlin, 1989, xvi + 283 pages, DM 1300. ISBN 3-540-93564-9.

This is only the tenth volume which the Gmelin Institute has published concerning the chemistry of molybdenum (System No. 53), and the fifth describing molybdenum oxides and molybdate salts. Remarkably, there are still no volumes describing the coordination compounds or organometallic compounds of molybdenum, and this is indeed a sad omission which I hope will be rectified in the near future. For how long can these centrally important areas be ignored?

The present volume continues the coverage of oxomolybdenum species in aqueous solutions which was initiated in Supplement Volume B3a (1987), and deals (for the first time) with their chemical reactions in aqueous solution, the species present in non-aqueous solutions and in ionic liquids, and the important area of peroxomolybdenum species. It also includes, on p. 208, an important Errata section for Supplement Volume B3a.

This volume is then split into four logical sections. The first, and by far the longest section (207 pages; K.-H. Tytko), begins with a brief overview of the reactivity of oxomolybdenum(VI) species in aqueous solution, and then deals with those reactions in detail according to reaction type (e.g. reduction, precipitation with other cations, formation of mixed-metal isopolyanions, formation of heteropolymolybdates, reactions with hydrogen peroxide, reactions with chelating ligands, reactions with acids, etc.).

The second, and next longest, section (58 pages; K.-H. Tytko) describes the oxomolybdenum(VI) species present in nonaqueous solution, explicitly $[MoO_4]^{2-}$ and $[H_{p-2r}Mo_qO_{4q-r}]^{(2q-p)-}$ {e.g. $p = r = 0$, $q = 1$, $[MoO_4]^{2-}$; $p = 2r = 12$, $q = 8$, $[Mo_8O_{26}]^{4-}$; $p = 7$, $q = 5$}. The solvents discussed include ethanenitrile, 1,2-dichloroethane, propanone, *N*,*N*-dimethylmethanamide, dimethyl sulfoxide and ethanoic acid, and the principal ions found include $[MoO_4]^{2-}$, $[Mo_2O_7]^{2-}$, $[HMo_5O_{17}]^{3-}$, two isomers of $[Mo_8O_{26}]^{4-}$, and $[Mo_6O_{19}]^{2-}$.

To me (and personal bias must be admitted here), the most interesting (but sadly the shortest) section was that describing oxomolybdenum species in ionic liquids (6 pages; no author given). Is it not remarkable that $[MoO_4]^{2-}$, added as $K_2[MoO_4]$, is soluble without limitation in molten LiCl–NaCl at 450 °C, and apparently undergoes the following dissociation:

$$[MoO_4]^{2-} \rightleftharpoons MoO_3 + O^{2-}$$

The ionic liquids discussed include carbonate, chloride, nitrite, nitrate, sulfate thiocyanate and dichromate(VI) melts. The chemistry is fascinating, largely Russian

in origin, mostly from the early '70s, and overdue for reinvestigation using modern techniques.

The final section (9 pages; again anonymous) presents a brief discussion of the effects induced when hydrogen peroxide is added to aqueous solutions of oxomolybdate(IV), and of the structure and spectra of $[MoO_8]^{2-}$ and $[Mo_2O_{11}]^{2-}$.

One cannot help but be filled with admiration for this work. The volume is the usual professional product which one anticipates for this series, and it is without peer, both as a source of factual data and as a definitive text upon an extremely complex area of chemistry. This book must be purchased by all academic and industrial research libraries: it is expensive, but is also invaluable.

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Erratum

Re: Silaheterocyclen. IX. Darstellung und Charakterisierung von 2,4-Dineopentyl-1,3-disilacyclobutanen; by N. Auner and R. Gleixner (*J. Organomet. Chem.*, 393 (1990) 33–56)

Page 38, equation 4 should read as follows:

$$\begin{array}{ccc} [Cl_2Si{=}CHCH_2{}^tBu & \longleftrightarrow & Cl_2\overset{\oplus}{Si}-\underline{\overset{\ominus}{C}}HCH_2{}^tBu] \\ (\alpha) & & (\beta) \\ & \downarrow NR_3 & \\ & R_3N^{\oplus} & \\ & \vdots & \\ [R_3N\cdot Cl_2Si{=}CHCH_2{}^tBu & \longleftrightarrow & Cl_2\dot{S}i-\underline{\overset{\ominus}{C}}HCH_2{}^tBu] \\ (\gamma) & & \end{array} \qquad (4)$$