Journal of Organometallic Chemistry, 120 (1976) C18—C24

Book reviews

Gmelin Handbook of Inorganic Chemistry, 8th Edition, *Main Series, System No. 61, Silver, Part B, Section 7, Complex Compounds with Neutral Ligands and Ligands Forming Inner Complexes; Silver(I) Complexes with Ligands Containing S, Se, Te, P, As, Sb, Bi, B, Si or Ge. Silver(II) and Silver(III) Complexes*, R. Keim, Section editor-in-chief, Gmelin Institut für Anorganische Chemie und Grenzgebiete der Max-Planck-Gesellschaft zur Förderung der Wissenschaften, Springer-Verlag, Berlin/Heidelberg/New York, 1976, viii + 430 pages, DM 786, $ 322.30 (in German).

This book concludes the current Gmelin 12 volume coverage of silver and its alloys and compounds. The longest sections of the book deal with silver(I) complexes with sulfur-containing ligands (sulfoxides, mercapto compounds, thio ethers, thioketones, S-heterocycles, thiocarboxylic, xanthogenic and thiocarbamic acids and their derivatives, thiourea and related compounds, a total of 190 pages) and phosphorus-containing ligands (phosphines, phosphine oxides, phosphites, phosphoric and thiophosphoric acid esters, 56 pages total). Also covered are silver(I) complexes with ligands containing the heavier Group V and VI elements, as well as the rare silver(II) complexes and the still rarer silver(III) complexes. The stabilization of the higher oxidation states of silver in its complexes is achieved mainly with aromatic nitrogen donor ligands (pyridines, bipyridines, phenanthrolines, pyrazines) and porphyrins and phthalocyanines.

Some of the complexes discussed (e.g., $AgX \cdot PR_3$ and $AgX \cdot SR_2$) are of interest as starting materials in the synthesis of organosilver compounds and as catalysts in organometallic processes such as the coupling of active metal reagents. However, the known complexes of organosilver(I) compounds with tertiary phosphines and other ligands are treated in Part B5 of the silver compound series, not in the present volume.

As usual, exhaustive coverage of the literature provides all that is known about a given silver complex's preparation, physical and spectroscopic properties, structure, stability constants in solution and chemical transformations. The literature is covered through mid-1974. This volume contains the indexes for all parts of the silver compound series (Parts B1—7), including Part B5 which deals with organosilver compounds*. Provided are a formula register of ligands an alphabetical index of all silver compound classes covered in these volumes. In the ligand formula register σ-alkyl and σ-aryl ligands show up as the alkane and the arene, respectively, i.e., not as R but as RH. This can be confusing since silver forms both σ-aryl and π-arene derivatives.

English translations of the preface, the table of contents, chapter and section headings as well as of the explanatory remarks for the indexes are provided.

*For a review of this volume, see J. Organometal. Chem., 90 (1975) C7.

At this point in time, the Gmelin Institut has brought us up to date on silver and its alloys and compounds. This will greatly aid all those who must search the literature in this area. Of course, reserach marches on and new work continually adds new results to the literature, but it is very welcome to have such a thorough 1970—1976 literature baseline available.

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Progress in Inorganic Chemistry, Vol. 19, edited by S.J. Lippard, Interscience—John Wiley & Sons, New York, 1975, 367 pages, $22.50.

Volume 19 continues the aims and format of earlier volumes in this valuable series by presenting detailed compilations on topics of current interest to inorganic chemists. Articles in this volume are biased toward structural aspects of five different areas of coordination chemistry.

Chapter 1 on "Oxidation—reduction and related reactions of metal—metal bonds" by T.J. Meyer is 50 pages long and presents a detailed survey of the properties, preparations, and reactions of compounds containing metal—metal bonds. The types of compounds discussed include binary metal carbonyls (e.g., $(OC)_5Re—Re(CO)_5$), ligand-bridged systems (e.g., $[(\pi\text{-}C_5H_5)Fe(CO)SCH_3]_2^+$), and clusters, (e.g., $M_6X_8]^{4+}$. The two sections on electrochemical studies and chemical oxidation—reduction reactions provide some interesting comparisons and contrasts between the two methods for synthesizing complexes with metal metal bonds.

Chapter 2 (53 pages) on "Transition metal complexes containing tridentate amino acids" by S.T. Chow and C.A. McAuliffe illustrates the complicated nature and equilibria in which a wide variety of potentially tridentate ligands can function. The chapter is focused toward bio-inorganic chemistry and organizes a large amount of data around the different physical characterization techniques. Unfortunately, the accuracy and usefulness of this chapter is negated somewhat by a large number of proof-reading and/or publishing errors.

The chapter by G.A. Ozin and A. VanderVoet on "Cryogenic inorganic chemistry: A review of metal—gas reactions as studied by matrix-isolation infrared and Raman spectroscopic techniques" presents an up-to-date summary of the equipment,techniques,and the results obtained from reactions involving co-condensation of metal atoms and gases and "matrix isolation" techniques. Much of the discussion centers around the preparation, identification, and thermodynamic stability of the binary products obtained by co-condensation of a wide variety of metal atoms and gases such as CO, O_2, and N_2.

The chapter (65 pages) on "The structural and magnetic properties of first row transition metal dimers containing hydroxo, substituted hydroxo, and halogen bridges" by D.J. Hodgson is a detailed correlation between the structures of magnetically condensed dimers and their magnetic properties. Most of the examples are copper(II) complexes, with a much smaller number of iron(III) and chromium(III) complexes being discussed.