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Book reviews

Inorganic syntheses, Vol. 27, editor-in chief Alvin P. Ginsberg, John Wiley and Sons, New York, $47.50. ISBN 0-471-50976-0.

The editor in his preface mentions that more than 3000 "mostly foolproof" synthetic procedures have appeared in the Inorganic Syntheses series to date. There are 200 in the current volume spread over nine chapters. With the exception of Chapter 8, which contains a collection of miscellaneous procedures, each of the chapters is devoted to a particular family of compounds with material drawn from currently active areas of research. Chapter 1 deals with transition metal polyhydride complexes with examples drawn from metals in groups 6, 7, and 8. Molecular dihydrogen complexes and polyhydrides of Re^{VII}, Ir^{V}, and a number of bimetallic and heterobimetallic hydrides, mainly with group 8 metals present, are included. Chapter 2 deals with polysulphide and selenide complexes including the various anions $[Mo_2(S_2)_{6-n}S_n]^{2-}$, $(n = 0–6)$. Organometal polysulphides and selenides of titanium and vanadium are also included. The third chapter is concerned with early transition metal polyoxoanions including heteropolyanions especially the polytungstosilicates and polytungstophosphates. The emphasis here is on systematic approaches to related families of compounds. Routes to phosphonate and some organometallic derivatives are also described. In Chapter 4 we find compounds of the lanthanides and actinides, including a useful procedure for anhydrous but solvated metal halides from the metals and mercuric chloride. The synthesis of diorganolanthanides by the interesting redox transmetallation reaction using organomercurials is illustrated in the case of $(PhC{\equiv}C)_2Yb$. Some divalent pentamethylcyclopentadienyl compounds and a range of trivalent lanthanide compounds most notably with cyclooctatetraene, dicyclopentadienyl, and alkoxide ligands, are also included here. Chapter 5 covers tetrairon carbido carbonyl clusters and chiral trinuclear clusters featuring NiCoMo and MoRuCo triangulo units with μ^3-$C_2(CH_3)_2$ incorporated. Some routes to μ^3-methylidyne triruthenium and triosmium species are also given. The isolobal relationship between hydride and gold(I) phosphine "ligands" is illustrated by reactions of the dihydride $Os_3(\mu\text{-}H)_2(CO)_{10}$. The synthetic procedures for the full-shell cluster, $Au_{55}[P(C_6H_5)_3]_{12}C_{16}$, as well as other heterometallic molecular clusters containing gold are detailed. Chapter 6 deals with syntheses of phosphorus complexes and compounds, including the polyphosphide solvates $Li_3P_7 \cdot 3$monoglyme, $Li_2P_{16} \cdot 8THF$, $Na_3P_{21} \cdot 15THF$. A number of phosphorus compounds with sterically demanding groups present, and some compounds with unsupported P=P and P=C bonds are detailed. In Chapter 7 we have compounds of biological interest. These include reversible Co^{II} and Fe^{II} dioxygen carriers, with lacunar cyclidene ligands where the cyclidene refers to the parent macrocycle encircling the metal ion. The collection of procedures in Chapter 8 represent either improved routes to frequently encountered classes of compounds (for example salts of the group 6

pentacarbonyl acetates) or routes to compounds with metals in unusual oxidation states (for example, $K_2[MnF_3(SO_4)]$). The final chapter on ligands and some main group compounds gives a general route to the *N*-(trimethylsilyl)alkanamines, important reagents for organoimido complexes and some representatives of the important class of functionalised tertiary aryl phosphines. In addition routes to a series of iodine and bromine polysulphur hexafluoroarsenate and antimonate(V) species are detailed and a clever high yield synthesis of BMe_3 completes the section. As with other volumes of Inorganic Synthesis each procedure or set of procedures is prefaced by a short informative introduction incorporating some key references to the topic.

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Advances in silicon chemistry. Vol. 1, G.L. Larson (Ed.), JAI Press, Greenwich (CT), 1991, xii + 387 pages, £54.00. ISBN 1-55938-176-0.

There has been a substantial number of monographs devoted to aspects of organosilicon chemistry in recent years but this one is of outstanding quality. It is the first in what is intended to be a continuing series on advances in silicon chemistry, and wisely the editor chose to focus it on aspects of the rapid development of organosilicon compounds in organic synthesis.

The first review (64 pages, 265 references), by G.A. Olah, G.K. Prakash and R. Krishnamurti deals with iodotrimethylsilane. It is a well-balanced account, dealing briefly with the preparation or *in situ* generation of the iodide and then outlining its synthetically useful reactions with various types of organic compounds. (I am puzzled, however, by the unusual chronology implied by the first two sentences on the preparation of the iodide, *viz*: "The first preparation of iodotrimethylsilane was reported by Voronkov and Khudobin in 1956 by the reaction of hexamethyldisiloxane with aluminium iodide. Pray et al. obtained iodotrimethylsilane in 1948 by the iodolysis of phenyltrimethylsilane.")

The second chapter, entitled 'The Chemistry of Cyanotrimethylsilane (123 pages, 727 references), by J.K. Rasmussen, S.M. Heilmann, and L.R. Krepki, is a model of its kind, and could hardly be bettered. A very good concise introduction (10 pages) on the preparation and properties of organocyanosilanes in general is followed by a well-organized account of reactions of Me_3SiCN with organic compounds.

The third chapter, on trialkylsilyl perfluoroalkanesulfonates (58 pages, 226 references), by G. Simchen, is in two parts, one dealing with their use as silylating agents and the other with their application as Lewis and catalysts in organic synthesis. Again the account is reasonably comprehensive and well-presented, but some of the print and formulae are so small that older readers will need their best spectacles!

The next chapter, on trimethylsilyldiazomethane (60 pages, 143 references), by R. Anderson and S.B. Anderson, is less comprehensive than the preceding ones, but presents a useful outline of the main applications of this very valuable