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Book reviews

Inorganic Reactions and Methods, Vol. 13, The Formation of Bonds to Group-I, -II, and -IIIB Elements, A.P. Hagen (Ed.), VCH, New York, 1991, xxviii + 571 pages. DM 308; £119. ISBN 0-89573-263-7

Most readers of this review will know by now that this series of volumes (initiated by the late Professor J.J. Zuckermann) aims to describe all inorganic reaction chemistry by showing how all the possible bonds between the elements of the Periodic Table are formed. This volume is concerned with (a) formation of bonds to B, Al, In and Tl (sub-divided into formation of Group-IIIB–IIIB element bonds; Group-IIIB–Group-IA or Group-IIA bonds, Group-IIIB–Group-IB or Group-IIB bonds, Group-IIIB–transition or –inner-transition metal bonds, Group III–Group-0 element bonds, and formation of borides); (b) formation of bonds to the Group-IA and Group-IIA metals (sub-divided into formation of Group-IA or Group-IIA to Group-IA or Group-IIA metal bonds, Group-IA or Group-IIA to Group-IB or Group-IIB element bonds, Group-IA or Group-II to Group-IB or Group-IIB element bonds, Group-IA or Group-IIA to transition and inner-transition metal bonds, Group-IA or Group-IIA to Group-0 elements); and (c) formation of the bonds to Group-IB or Group-II elements (sub-divided into formation of Group-IB or Group-IIB to Group-IB or Group-IIB metal bonds, Group-IB or Group-IIB to transition metal bonds, Group-IB or Group-IIB to Group-0 bonds). (In trying to define the content concisely I could not help thinking how much better it would have been if the IUPAC-favoured 1–18 numbering for the groups of the Periodic Table had been used for this series.) A substantial part (162 pages) of the volume is devoted to borides, and provides a very useful account of this important topic, including methods of growing crystals of such materials.

Contributors to this volume are: M.G. Barker, N. Bartlett, J.J. Bour, J.R. Chipperfield, J.R. Etourneau, P. Hubberstey, K.J. Klabunde, T. Lundström, H. Pastor, P. Peshev, R.J. Pulham, P. Rogl, G. Schmid, L.J. Steggarda, M.J. Taylor, J.W.A. van der Velden, and F.A. Vollenbroek. They provide an impressive body of organized information.

The author and formula indexes together take up 161 pages of the book, and there is also a brief (5 page) subject index.

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Colin Eaborn

Inorganic Reactions and Methods. Vol. 9. Formation of Bonds to C, Si, Ge, Sn, Pb (Part 1), A.P. Hagen (Ed.), VCH, New York, 1991, xxvi + 604 pages. DM 385.00; £136.00. ISBN 3-527-26267-9 and 0-89573-259-9

It will be possible to assess the overall value of this ambitious series (initiated by the late Professor J.J. Zuckermann) only when it is complete, but in the meantime some of the volumes are of considerable use even in isolation, and this is one such. It deals with methods of forming bonds between the elements of Group 14 (IVB)

(except C–C bonds). The number of pages devoted to formation of the various M–M and M–M' bonds are as follows: Si–Si, 32; Ge–Ge, 34; Sn–Sn, 23; C–Si, 108; C–Ge, 57; C–Sn, 102; C–Pb, 34; M–M', 7. The division of space between these topics is in some respects rather surprising. In particular, the account of the formation of Si–Si bonds, which is especially important in view of the considerable current interest in polysilanes, is slightly shorter than that of the formation of Ge–Ge bonds, which has been much less studied. Likewise, the literature on formation of C–Si bonds is very much more extensive than that on formation of C–Sn bonds, and yet the topics have been judged to merit almost exactly the same number of pages. Very puzzlingly, the formation of C–Si bonds by addition of silicon hydrides to C=C and C≡C bonds (although described, somewhat debatably, by the author as the most important route to C–Si bond formation) is dealt with in only three pages, though within this limitation the outline provided is clear and informative. On the other hand the small amount of space devoted to formation of M–M' bonds correctly reflects the low level of activity in this area, which can confidently be expected to develop substantially in the next decade or so.

The quality of this book arises from the very sound choice of authors, *viz.*: F.F. Cartledge, M. Dräger, P.P. Gaspar, F. Glockling, P.G. Harrison, E. Hengge, F. Huber, B. Kanner, N. Kleiner, M.F. Lappert, B. Mathiasch, B.R. Mauzé, R.V. Piccione, R.C. Poller, M.A. Ring, P. Riviere and J. Satgé. As usual in this series much space (181 pages) is taken up very inefficiently by author and compound indexes. I was interested to see my own work credited variously to C. Eaborn, E. Eaborn, and C. Eborn, but I am not the only author to be treated in this way in this volume!

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Gmelin Handbook of Inorganic and Organometallic Chemistry. 8th Edition. Supplement Volume B5c. Silicon Nitride in Electronics, Springer-Verlag, Berlin, 1991, xv + 400 pages. DM 2075. ISBN 3-540-93630-0

This is the first of three Gmelin volumes devoted to silicon nitride (of empirical formula Si_3N_4), and is concerned with the application of silicon nitride in micro-electronic devices. After a short general introduction it is made up of three parts, Chapters 2–8 dealing with general aspects of microelectronic applications of the nitride, Chapters 9–31 with its applications in specific devices, and Chapter 32 to its applications in solar cells. The chemistry of preparation of silicon nitride and its various forms (powders, films, *etc.*), its physical properties and chemical reactions, and its uses in engineering ceramics will be described in later volumes (Silicon Supplement Volumes B5a and B5b).

This valuable reference work is exceptionally timely in view of the growing interest in uses of silicon nitride and is impressively up-to-date; detailed coverage of the literature is complete up to January 1990 but there are some more recent references. It is expensive (*ca.* US\$1250, £710 on the date of this review), but good value for those active in the field surveyed.

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