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Book reviews

Free Radical Chain Reactions in Organic Synthesis, by W.B. Motherwell and D. Crich, Academic Press, London, 1992, xix + 268 pages. £50.00. ISBN 0-12-508760-8

This is an excellent addition to the very useful series on Best Synthetic Methods. It is reviewed here because of the very important role of organometallic reagents in the field covered.

The book begins with a first class 26 page general introduction on basic concepts of free radical chain reactions, a very informative and highly readable account that provides a solid base from which to consider specific procedures; even in this chapter the importance of R_3SnH reagents becomes apparent, and there is a helpful outline of the ways of removing the organotin residues after completion of the reactions. This chapter is followed by a useful list of relevant books and reviews in the field.

The subsequent chapters are as follows (i) substitution reactions (which includes accounts of use of organotin hydrides in dehalogenation and in reductive decarboxylation of organo-boron and -mercury compounds for the preparation of alcohols, and use of organo-mercury and -cobalt compounds in preparation of chalcogenides); (ii) olefin-forming β -elimination reactions (in which organotin hydrides again have a role); (iii) preparative free radical rearrangement reactions (in which many of the examples again involve R_3SnH species but the advantages of the more recently introduced $(Me_3Si)_3SiH$ are also indicated); (iv) intermolecular carbon-carbon bond forming free radical chain reactions (in which organomercury acetates or halides, organotin hydrides, and trialkylboranes appear largely; use of $RHgH$ species, formed in situ from $RHgX$ and $NaBH_4$, as a source of both alkyl radicals and hydrogen atoms is especially interesting); (v) intramolecular carbon-carbon bond forming free radical chain reactions (in which the great majority of examples involve organotin hydrides).

This book could be of much value to students preparing for examinations in advanced organic chemistry, but it is directed, of course, towards those contemplating laboratory use of the procedures described, and no-one in that position should be without it.

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Inorganic Reactions and Methods. Volume 4. Formations of Bonds to Halogens (Part 2), A.P. Hagen (Ed.), VCH, New York, 1991, xxx + 491 pages. ISBN 0-89573-267-X

This volume of a now familiar series deals with (i) methods of forming bonds between the halogens and the elements (a) B, Al, Ga, In, Tl; (b) Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra; (c) Cu, Ag, Au, Zn, Cd, Hg; (d) transition and inner

transition metals; (e) Kr, Xe, Rn; and (ii) methods of forming fluorides of Group IB and IIB metals and of transition and inner transition metals in high oxidation states. The (well-qualified) contributors are: N. Bartlett; T.B. Brill; T.M. Brown, J.A. Canich, J.H. Clark, D.A. Edwards, G.L. Gard; B.D. James, E.M. Page and D.A. Rice.

The treatment of the subject follows closely that now familiar from the earlier volumes in the series. The author, formulae, and subject index occupy 193 pages; in the copy supplied for review the subject index ends about halfway through the letter T, but the loss is not a severe one.

This volume will be much consulted by practising inorganic and organometallic chemists.

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Gmelin Handbook of Inorganic and Organometallic Chemistry. 8th Ed. Sn. Organotin Compounds. Part 19. Organotin-nitrogen Compounds (concluded), Organotin-Phosphorus, -Arsenic, -Antimony, and -Bismuth Compounds, Springer-Verlag, Berlin, 1991, xiv + 316 pages. DM. 1650. ISBN 3-540-93632-7 and 0-387-9362-7

These carefully compiled volumes in the Gmelin series on organotin compounds become increasingly useful as their number increases and with it the chance of finding the compound or type of compound in which one is interested. The appearance of this volume is especially notable because it completes the coverage of organotin-nitrogen compounds.

The survey of organotin-nitrogen compounds is concluded with accounts of (i) triorganotin nitrogen derivatives, containing R_3Sn groups with R either an alkyl group larger than butyl or an aryl group, and related $R_2R'Sn$ and $RR'R''Sn$ species; (ii) diorganotin-nitrogen compounds such as $R_2Sn(NR')_2$, $R_2Sn(NR'_2)(NR''_2)$, $RR''Sn(NR'_2)_2$, $R_2Sn(NR'R'')_2$, and $RR'Sn(NRR')_2$, and (the five-coordinate) $MeN \cdots N \cdots NMeSnMe_2I$; and (iii) the corresponding monoorganotin compounds. Attention is then switched to organotin derivatives containing Sn-P bonds, the survey taking up 69 pages, and finally to those containing Sn-As, Sn-Sb, and Sn-Bi bonds, which take up a total of only 19 pages.

The literature has been searched systematically up to the end of 1988 for the nitrogen compounds and the end of 1989 for the others, but there are some more recent references. Where biological effects have been examined care is taken to mention that fact. As usual in the series a list is given of relevant text books and reviews that have appeared in recent years, including those dealing with toxicological texts and biological and other uses of organotin compounds.

The authors of this valuable set of volumes, H. Schumann and I. Schumann, deserve the gratitude of all those active in organotin chemistry.

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