

Book review

HOUBEN-WEYL METHODEN DER ORGANISCHEN CHEMIE, 4th Edition, Volume 13, Part 6, METALLORGANISCHE VERBINDUNGEN: Ge, Sn; H. Kropf, volume editor; G. Bähr, H.-O. Kalinowski and S. Pawlenko, volume authors; Georg-Thieme-Verlag, Stuttgart, 1978, xxxii + 599 pages; DM 420 (in German).

The organic derivatives of tin in the past decade have become increasingly useful as reagents in organic and organometallic synthesis. Therefore, this new volume of the Houben-Weyl organometallics series which brings a detailed account of organotin compounds will be welcomed by the organic and organometallic chemist alike.

The ease with which the tin-carbon bond is formed and the facility with which it is broken by diverse electrophilic and nucleophilic reagents, as well as the high reactivity of the tin-hydrogen bond in organotin hydrides provide the basis for applications of organotins in organic and organometallic chemistry. The organotins have, of course, been of commercial importance for some years, and it is their applications as poly(vinyl chloride) stabilizers and as broad spectrum biocides which are responsible for their commercial availability. These applications, however, involve only simple organic groups on tin - butyl, octyl, cyclohexyl and phenyl, and it is the more recent organotin research which has made available methods for the synthesis of diverse organofunctional organotins.

All that the reader will need to know about the synthesis of the simple organotins (tetraorganotin compounds, organotin hydrides, halides, oxides, carboxylates, etc.) is presented to the reader in an orderly, very systematic manner and is discussed in great detail. The large number of equations and tables will greatly help the reader who does not read German well. Equally detailed discussions of the reactions of these organotins - the reactions which cleave their tin-carbon bonds, those which involve the nonorganic functionality on tin, those which introduce organic functionality - follow the preparative section.

Particularly of value is the detailed account of the use of organotin hydrides as reducing agents. The review of organotin compounds as reagents in organic and organometallic synthesis suffers from the systematic manner in which the information is presented according to compound type, so that a good, overall view of the various types of applications of organotins in synthesis does not result. An organization according to reaction type would have been much better.

Abbreviated preparative recipes are found throughout these discussions - not as detailed as in "Organic Syntheses" and untested, but detailed enough to give the reader an appreciation of the reaction conditions involved. In contrast, the accounts of the nomenclature, bonding and general reactivity, toxicology and technical applications at the beginning of the tin section and of the structure, the spectroscopy and the analysis of organotin compounds at the end of the tin section are too short and superficial to be really useful. To obtain a good appreciation of these topics the reader will need to go to the references which are cited.

What the Houben-Weyl approach does not provide is a listing of individual compounds and their properties. A few melting and boiling points can be found here and there in the text and in a few short tables. However, for the properties of individual organotin compounds the reader will have to refer to the Gmelin Handbook of Inorganic Chemistry organotin volumes, which provide an exhaustive coverage of such information, or to the Dub handbook.

The same type of treatment is given the synthesis and reactions of organogermanium compounds in the first, somewhat shorter section of this book. Organogermanium compounds, however, have found no utility as reagents in organic or organometallic synthesis and the world-wide research efforts of the past twenty years have led to no commercial applications. As a result, in these days in which it is advisable to demonstrate relevance and utility in order to obtain support for one's research, organogermanium chemistry is not flourishing. Organogermanium research is nevertheless being carried on here and there, often only as an afterthought in larger organosilicon or organotin programs. But, as J. Satgé and his coworkers at Toulouse and several research groups in the Soviet Union have been showing us, there remains much interesting chemistry to be uncovered in the organogermanium area. Thus the detailed coverage of organogermanium

chemistry in this Houben-Weyl volume has some purpose and, perhaps, it will suggest to others that organogermanium research can be interesting and worth doing.

There are several features of this book which are worth pointing out: the many references which are cited throughout the book, an author index and a somewhat complex compound index, which, however, is adequately explained, and bibliographies of review articles and monographs which deal with organogermanium and organotin chemistry.

This excellent new Houben-Weyl volume will be an indispensable addition to the shelves of all chemistry libraries: its virtues far outweigh its few faults and it will be particularly useful to the organic chemist who seeks an introduction into the organic chemistry of germanium and tin.

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