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Book Reviews

Preparative polar organometallic chemistry Volume 1

L Brandsma and H D Verkruijsse
Springer Verlag, Berlin. 1987. (240 pages) Soft cover. DM 78. ISBN 3-540-16916-4

This book is a practical manual containing descriptions of the preparation and synthetic uses of main-group organometallic compounds in which the metal is attached to an sp^2 carbon atom. The organic compounds covered are alkenes, allenes, cumulenes, arenes and heteroaromatic compounds. The book is the first volume of a series, although no information is given about future volumes.

The great strength of the book is the attention to detail in the practical descriptions. For example, on page 50 we are told that in the preparation of cyclohexenyllithium from 1-chlorocyclohexane and lithium in diethyl ether a deposit of lithium chloride on the metal can stop the reaction. The deposit can be removed by adding sharp pieces of broken glass. The authors even describe how to arrange the stirring to ensure that the lithium, which floats in ether, is scratched by the glass, which sinks.

In addition to the preparation of organometallic compounds themselves the book contains descriptions of preparative applications. Thus in the case mentioned above, conversion to cyclohexenecarboxaldehyde by reaction with dimethylformamide is described.

It is regrettable that the authors have not given some attention to transition-metal compounds. On page 42 we learn that syntheses via copper compounds are beyond the scope of the book, a point which should be emphasized since it is not clear from the title. Even within the main-group elements there is a tendency to concentrate on lithium compounds. A strange feature of the book is that there is no index in the conventional sense, although there is a comprehensive contents list and an appendix which consists of three tabular indices with many structural diagrams.

The book can be recommended to organic chemists looking for practical instructions on how to make and use organometallic derivatives of the main-group metals. There is a wealth of practical experience here, although in the cyclohexenyllithium experiment, I was left wondering whether a blast of ulta-sound might solve the problem more effectively.

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The chemistry of the metal carbon bond Volume 4 The use of organometallic compounds in organic synthesis

Frank R Hartley (ed.)
John Wiley & Sons, Chichester, New York, Brisbane, Toronto and Singapore (an Interscience publication). 1987. (1349 pages) £199. ISBN 0-471-90888-6

This work is the latest in the well-known Chemistry of Functional Groups series (Series Editor, Saul Patai) and the present volume (Vol. 4) of the organometallic section comes under the sole editorship of Frank R Hartley. It is an extension and companion to Volume 3 which covered the use of organometallic compounds to synthesize carbon–carbon bonds. The emphasis in Volume 4 is the synthesis of carbon–hydrogen and carbon–element bonds, although there is inevitably a considerable coverage of carbon–carbon bond formation dispersed throughout the work, particularly involving examples of more recent studies. The main division of the book is into Main Group and Transition Metal sections; in addition to organic synthesis, hydrogenation, C–H bond activation and supported metal catalysts are covered. The stated aim of the work is not to be encyclopaedic but to concentrate on more recent developments; however, most of the chapters do provide a full coverage of their topic and it is not usually necessary to read elsewhere in order to benefit from this.

The book is wide-ranging as evidenced by the chapter titles: Chapters 1 to 6 cover the preparation and use of Main Group organometallics in organic synthesis, i.e. organolithium and Group IA (J L Wardell), Grignard and Group II (C L Raston and G Salem), organoboranes (D S Matteson), organoaluminium (P A Chaloner), organothallium (S Uemura) and organosilicon compounds (E W Colvin). Similarly, there are chapters on organoiron (D Astruc), organorhodium (F H Jardine), organonickel (K Tamao and M. Kumada) and transition metal stabilized carbocations in organic synthesis (A J Pearson). For those with a special interest in catalytic aspects there are chapters on hydrogenation (D Parker), on the mechanism of homogeneous hydrogenation (F H Jardine), on saturated carbon–hydrogen bond activation (J R Chipperfield and D E Webster) and on the use of supported metal complex catalysts (F R Hartley).

Together with the companion Vol. 3, the present work provides a near-complete resource for workers in the area, for academics conscientiously searching for