

Book reviews

The Chemistry of Organic Compounds of Arsenic, Antimony and Bismuth

S. Patai (Ed.)

John Wiley & Sons, Chichester, 1994

962 pages: £485

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This book is devoted to a comprehensive presentation of the chemistry of organometallic compounds of arsenic, antimony and bismuth based on a literature search up to the end of 1991 or to the beginning of 1992.

The book consists of 21 chapters covering not only the preparation and properties of organometallic compounds of Group 15 elements, but also structural as well as biochemical and biological aspects. All the contributing authors are top specialists in this research field.

After a short first chapter (24 pages) devoted to general and theoretical aspects including those related to multiple-bonded compounds and hypervalent compounds, the second chapter (64 pages) presents a systematic overview of the structural chemistry of organic compounds of arsenic, antimony and bismuth, based mainly on solid-state X-ray diffractometry studies. The structures are classified by taking into account the central metal atom, its oxidation state and the type of metal-element bonds. Chapter 8 (52 pages) is also devoted to structural chemistry, but the presentation follows other criteria, i.e. the presence of hydrogen bonding or at least one dative covalently bound ligand.

Comprehensive accounts of the methods of preparation for organoarsenic compounds, and organoantimony and organobismuth derivatives, are excellently presented in Chapters 21 (69 pages) and 20 (52 pages), respectively. The preparation of optically active arsines, and their uses in asymmetric synthesis or as stereochemical probes, are overviewed in Chapter 3 (64 pages). Chapter 15 (77 pages) is devoted to the syntheses and uses of isotopically labelled compounds of arsenic, antimony and bismuth. Other shorter chapters deal with radical intermediates (di-, tri-, tetra-, penta- and hexa-coordinated species, as well as ligand-centred radicals and inorganic radicals) in the radiation chemistry of arsenic, antimony and bismuth (Chapter 12, 15 pages), organoarsenic and organoantimony homocycles (preparation, properties and reactions) (Chapter 14, 15 pages), and arsonium, stibonium and bismuthonium ylides and imines (synthesis, stability and reactions, structure) (Chapter 16, 37 pages). The substituent effects of arsenic, antimony and bismuth groups are described in Chapter 9 (73 pages).

Chapter 4 (16 pages) presents some thermochemical aspects, i.e. enthalpies of formation for alkyl and phenyl derivatives of Group 15 elements. Chapter 13 (36 pages) is devoted to the thermolysis of organopnictogens, with emphasis on the use of thermal decomposition for

preparative purposes, e.g. semiconductor or superconductor materials. The electrochemistry of organoarsenic, organoantimony and organobismuth compounds is reviewed in Chapter 11 (53 pages), which is organized in sections according to the type of the electrochemical process and the oxidation state of the metal atom.

An overview of the thermochromism of organometallic compounds of Group 15 elements which contain metal-metal bonds, i.e. colour changes on melting or dissolution in organic solvents, is presented in Chapter 10 (16 pages). The mass spectra and photoelectron spectra of organic derivatives of arsenic, antimony and bismuth are reviewed in Chapters 6 (27 pages) and 7 (49 pages).

Chapter 5 (67 pages) is devoted to a comprehensive presentation, covering the literature up to 1991, of the methods used in the detection, identification and determination of organometallic derivatives of arsenic, antimony and bismuth.

Finally, three chapters deal with biological aspects related to organoarsenic, organoantimony and organobismuth compounds, i.e. biochemistry (Chapter 17, 19 pages), pharmacology and toxicology (Chapter 18, 9 pages), and safety and environmental effects (Chapter 19, 35 pages).

All the chapters are well illustrated and contain a rich reference section.

The book is warmly recommended to chemists and biochemists who are interested in the synthesis and structure as well as the biological implications of organometallic compounds of arsenic, antimony and bismuth. No library of any institute or laboratory involved in organometallic chemistry should exist without this book!

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Hydrocarbon Chemistry

G. A. Olah and A. Molnar

Wiley, Chichester, 1995

632 pages. £55.00 (hardback)

ISBN 0471 11359 X

This book provides a wealth of information about the chemistry of hydrocarbons. There are 12 chapters which comprehensively cover the chemistry of alkanes, cycloalkanes, alkenes, dienes, alkynes and aromatics. Although there is heavy emphasis on laboratory and industrial processes, there is plenty of information for undergraduate, postgraduate and research chemists. They can all benefit from the wide coverage of reduction, oxidation, addition, carbonylation, hetero-substitution, oligomerization and polymerization reactions. Each chapter has been constructed around well-chosen examples and