

Organometallic Compounds Of Low Coordinate Si Ge Sn And Pb From Phantom Species To Stable Compounds

Organometallic Compounds of Low-Coordinate Si, Ge, Sn and Pb From Phantom Species to Stable Compounds John Wiley & Sons ***Organosilicon Compounds*** provides readers with the state-of-the-art status of organosilicon chemistry, including its theoretical, synthetic, physico-chemical and applied aspects. By including high quality content in a key strategic signing area, this work is a strong addition to chemistry offerings in organic, main group and organometallic research. ***Organosilicon chemistry deals with compounds containing carbon-silicon bonds, an essential part of organic and organometallic chemistry. This book presents the many milestone in the field that have been discovered during the last few years, also detailing its usage in commercial products, such as sealants, adhesives and coatings. Features valuable contributions from prominent experts who cover both fundamental (theoretical, synthetic, physico-chemical) and applied (material science, applications) aspects Covers important breakthroughs in the field, along with historically significant achievements Includes applied information for a wide range of specialists, from junior and senior researchers (from both academia and industry) working in organometallic, organosilicon, main group element, transition metal, industrial silicon chemistry, and more***

In Organometallics and Catalysis, author Manfred Bochmann distills the extensive knowledge of the field that has been amassed in recent years into a succinct review of the essential concepts. It is enriched throughout by examples that demonstrate how our understanding of organometallic chemistry has led to new applications in research and industry--not least in relation to catalysis--and an extensive art program clarifies the concepts being explained. Striking just the right balance between breadth and depth, Organometallics and Catalysis is the perfect introduction for students who need a thorough grounding in the subject.

Theory and Experiment (Synthesis)

Inorganic Syntheses

Supercritical Fluids and Organometallic Compounds

Einkernige Verbindungen (ohne Ferrocene) / Mononuclear Compounds (Excluding Ferrocenes) 6

This book is both a review of current research and an undergraduate textbook for inorganic chemistry at university level. In university undergraduate lectures, basic concepts are mainly explained and added examples of frontier research are optional. However, in many cases, frontier research is more interesting for students than basic

studies. This book is aimed at undergraduates in inorganic chemistry. Each author introduces or reviews "frontier research topics" of inorganic coordination chemistry. Additionally, "basic concepts," as found in textbooks on this subject, indicate application examples of "frontier research topics."

A series of critical reviews and perspectives focussing on specific aspects of organometallic chemistry interfacing with other fields of study are provided. For this volume, the critical reviews cover topics such as the activation of "inert" carbon-hydrogen bonds, ligand design and organometallic radical species. For example, Charlie O'Hara discusses how mixed-metal compounds may perform the highly selective activation of C-H bonds and, in particular, how synergic relationships between various metals are crucial to this approach. The chemistry of a remarkable series of air-stable chiral primary phosphine ligands is discussed in some depth by Rachel Hiney, Arne Ficks, Helge Müller-Bunz, Declan Gilheany and Lee Higham. This article focuses on the preparation of these ligands and also how they may be applied in various catalytic applications. Bas De Bruin reports on how ligand radical reactivity can be employed in synthetic organometallic chemistry and catalysis to achieve selectivity in radical-type transformations. As well as highlighting ligand-centered radical transformations in open-shell transition metals, an overview of the catalytic mechanism of Co(II)-catalysed olefin cyclopropanation is given, showing that enzyme-like cooperative metal-ligand-radical reactivity is no longer limited to real enzymes. Valuable and informative comprehensive reviews in the field of organometallic chemistry are also covered in this volume. For example, organolithium and organocuprate chemistry are reviewed by Joanna Haywood and Andrew Wheatley; aspects in Group 2 (Be-Ba) and Group 12 (Zn-Hg) compounds by Robert Less, Rebecca Melen and Dominic Wright; metal clusters by Mark Humphrey and Marie Cifuentes; and recent developments in the chemistry of the elements of Group 14 - focusing on low-coordination number compounds by Richard Layfield. This volume therefore covers many synthetic and applied aspects of modern organometallic chemistry which ought to be of interest to inorganic, organic and applied catalysis fields."

Until recently the low-coordinate compounds of the heavier elements of group 14 were known only as transient, unstable species which were difficult to isolate. However recent developments have led to the stabilisation of these compounds and today heavier group 14 element cations, radicals, anions, carbene analogues, alkene and alkyne analogues and aromatics have all been prepared as highly reactive, stable, fully characterizable and readily available organometallic reagents. Organometallic Compounds of Low-Coordinate Si, Ge, Sn and Pb describes the chemistry of this exciting

new class of organometallics, with an emphasis on their major similarities and differences with the analogous species in organic chemistry. Topics covered include the synthesis, structure, reactions and synthetic applications of : Si-, Ge-, Sn and Pb-centered cations, radicals and anions heavy analogues of carbenes: silylenes, germylenes, stannylenes and plumblyenes heavy analogues of alkenes: disilenes, digermenes, distannenes, diplumbenes heavy analogues of alkynes: disilynes, digermynes, distannynes, diplumbynes, and their valence isomers heteronuclear derivatives: silenes, germenes, stannenes, silagermenes, silastannenes, germastannenes heavy analogues of alkenes of the type: $>E_{14}=E_{13}-$, $>E_{14}=E_{15}-$, $>E_{14}=E_{16}$ [where E_{13} , E_{14} , E_{15} and E_{16} are elements of the groups 13, 14, 15 and 16] cyclic compounds (three-, four-, five-, and six-membered rings) heavy analogues of 1,3-dienes, allenes and other cumulenes heavy analogues of aromatic compounds; including a comparison between organometallic and organic aromaticity

Organometallic Compounds of Low-Coordinate Si, Ge, Sn and Pb is an essential guide to this emerging class of organometallic reagents for researchers and students in main group, organometallic, synthetic and silicon chemistry

Ge. Organogermanium Compounds

From Phantom Species to Stable Compounds

Organosilicon Compounds

Activation of Small Molecules

The newest volume in the authoritative Inorganic Syntheses book series provides users of inorganic substances with detailed and foolproof procedures for the preparation of important and timely inorganic and organometallic compounds that can be used in reactions to develop new materials, drug targets, and bio-inspired chemical entities.

This widely-acclaimed serial contains authoritative reviews that address all aspects of organometallic chemistry, a field which has expanded enormously since the publication of Volume 1 in 1964. Almost all branches of chemistry and material science now interface with organometallic chemistry--the study of compounds containing carbon-metal bonds. Organometallic compounds range from species which are so reactive that they only have a transient existence at ambient temperatures to species which are thermally very stable.

Organometallics are used extensively in the synthesis of useful compounds on both large and small scales. Industrial processes involving plastics, polymers, electronic materials, and pharmaceuticals all depend on advancements in organometallic chemistry.

Organometallic compounds are utilized as reagents in the preparation and processing of advanced nanostructured materials, as catalysts in the production of a wide variety of specialty chemicals and polymers, and as drugs.

Supercritical fluid science and technology has a wide variety of applications ranging from extraction of pharmaceutically active compounds to the synthesis of advanced materials. The combination of organometallic chemistry and

supercritical fluids has significant potential. This book covers the fundamental aspects and related applications in this rapidly growing area. Covers the preparation of nanostructured composite materials using supercritical fluids Focuses on the intersection of organometallic chemistry and supercritical fluids Addresses the behavior of organometallic compounds in supercritical fluid environments

Surface Organometallic Chemistry: Molecular Approaches to Surface Catalysis Spectroscopic Properties of Inorganic and Organometallic Compounds Organometallics and Catalysis

Functional Molecular Silicon Compounds I

*Inorganic Chemistry This series reflects the breadth of modern research in inorganic chemistry and fulfils the need for advanced texts. The series covers the whole range of inorganic and physical chemistry, solid state chemistry, coordination chemistry, main group chemistry and bioinorganic chemistry. Synthesis of Organometallic Compounds A Practical Guide Edited by Sanshiro Komiya Tokyo University of Agriculture and Technology, Japan. This book describes the concepts of organometallic chemistry and provides an overview of the chemistry of each metal including the synthesis and handling of its important organometallic compounds. Synthesis of Organometallic Compounds: A Practical Guide provides: * an excellent introduction to organometallic synthesis * detailed synthetic protocols for the most important organometallic syntheses * an overview of the reactivity, applications and versatility of organometallic compounds * a survey of metals and their organometallic derivatives The purpose of this book is to serve as a practical guide to understanding the general concepts of organometallics for graduate students and scientists who are not necessarily specialists in organometallic chemistry.*

A series of critical reviews and perspectives focussing on specific aspects of organometallic chemistry interfacing with other fields of study are provided. For this volume, the critical reviews cover topics such as the activation of "inert" carbon-hydrogen bonds, ligand design and organometallic radical species. For example, Charlie O'Hara discusses how mixed-metal compounds may perform the highly selective activation of C-H bonds and, in particular, how synergic relationships between various metals are crucial to this approach. The chemistry of a remarkable series of air-stable chiral primary phosphine ligands is discussed in some depth by Rachel Hiney, Arne Ficks, Helge Müller-Bunz, Declan Gilheany and Lee Higham. This article focuses on the preparation of these ligands and also how they may be applied in various catalytic applications. Bas De Bruin reports on how ligand radical reactivity can be employed in synthetic organometallic chemistry and catalysis to achieve selectivity in radical-type transformations. As well as highlighting ligand-centered radical transformations in open-shell transition metals, an overview of the catalytic mechanism of Co(II)-catalysed olefin cyclopropanation is given, showing that enzyme-like cooperative metal-ligand-radical reactivity is no longer limited to real enzymes. Valuable and informative comprehensive reviews in the field of organometallic chemistry are also covered in this volume. For example, organolithium and organocuprate chemistry are reviewed by Joanna Haywood and Andrew Wheatley; aspects in Group 2 (Be-Ba) and Group 12 (Zn-Hg) compounds by

Robert Less, Rebecca Melen and Dominic Wright; metal clusters by Mark Humphrey and Marie Cifuentes; and recent developments in the chemistry of the elements of Group 14 - focusing on low-coordination number compounds by Richard Layfield. This volume therefore covers many synthetic and applied aspects of modern organometallic chemistry which ought to be of interest to inorganic, organic and applied catalysis fields.

Organosilicon Compounds: Experiment (Physico-Chemical Studies) and Applications, volume 2, also contains two parts. In its first part, Experiment (Physico-Chemical Studies), the application of modern instrumental tools (such as X-ray crystallography, ^{29}Si NMR spectroscopy, UV-Photoelectron Spectroscopy, and other methods) for assessing the structures of organosilicon compounds is described. The second part, Applications, reviews the current research in the field of material science, specifically the use of organosilicon compounds in synthetic chemistry directed towards the creation of new materials. Organosilicon Compounds: From Theory to Synthesis to Applications provides a comprehensive overview of this important area of organic and organometallic chemistry, dealing with compounds containing carbon-silicon bonds. This field, which includes compounds that are widely encountered in commercial products such as in the fabrication of sealants, adhesives, and coatings, has seen many milestone discoveries reported during the last two decades. Beginning with the theoretical aspects of organosilicon compounds' structure and bonding, the book then explores their synthetic aspects, including main group element organosilicon compounds, transition metal complexes, silicon cages and clusters, low-coordinate organosilicon derivatives (cations, radicals, anions, multiple bonds to silicon, sila-aromatics), and more. Next, readers will find valuable sections that explore physical and chemical properties of organosilicon compounds by means of X-ray crystallography, ^{29}Si NMR spectroscopy, photoelectron spectroscopy, and other methods. Finally, the work delves into applications for industrial uses and in many related fields, such as polymers, material science, nanotechnology, bioorganics, and medicinal silicon chemistry. Features valuable contributions from prominent experts cover both fundamental (theoretical, synthetic, physico-chemical) and applied (material science, applications) aspects of modern organosilicon chemistry. Covers important breakthroughs in the field as well as with the historically significant achievements of the past. Includes applied information for a wide range of specialists from junior and senior researchers (from both academia and industry), working in organometallic, organosilicon, main group element, transition metal, and industrial silicon chemistry, as well as those from interdisciplinary fields such as polymer, material science, nanotechnology

A Practical Guide

Organosilicon Compounds, Two volume set

Tetraorganogermanium Compounds from $\text{Ge}(\text{C}_3\text{H}_7)_3\text{R}'$ to $\text{GeRR}'\text{R}''\text{R}'''$, Germacyclic Compounds, and Organogermanium Compounds with Low-Coordinate Germanium Atoms

Reaction Mechanisms of Inorganic and Organometallic Systems

Organometallic chemistry is an interdisciplinary science which continues to grow at a rapid pace. Although there is continued interest in synthetic and structural studies the last

decade has seen a growing interest in the potential of organometallic chemistry to provide answers to problems in catalysis, synthetic organic chemistry and also in the development of new materials. This Specialist Periodical Report aims to reflect these current interests reviewing progress in theoretical organometallic chemistry, main group chemistry, the lanthanides and all aspects of transition metal chemistry. Volume 29 covers literature published during 1999.

Surface organometallic chemistry is a new field bringing together researchers from organometallic, inorganic, and surface chemistry and catalysis. Topics ranging from reaction mechanisms to catalyst preparation are considered from a molecular basis, according to which the "active site" on a catalyst surface has a supra-molecular character. This, the first book on the subject, is the outcome of a NATO Workshop held in Le Rouret, France, in May, 1986. It is our hope that the following chapters and the concluding summary of recommendations for research may help to provide a definition of surface organometallic chemistry. Besides catalysis, the central theme of the Workshop, four main topics are considered: 1) Reactions of organometallics with surfaces of metal oxides, metals, and zeolites; 2) Molecular models of surfaces, metal oxides, and metals; 3) Molecular approaches to the mechanisms of surface reactions; 4) Synthesis and modification of zeolites and related microporous solids. Most surface organometallic chemistry has been carried out on amorphous high-surface-area metal oxides such as silica, alumina, magnesia, and titania. The first chapter, contributed by KNOZINGER, gives a short summary of the structure and reactivity of metal oxide surfaces. Most of our understanding of these surfaces is based on acid base and redox chemistry; this chemistry has developed from X-ray and spectroscopic data, and much has been inferred from the structures and reactivities of adsorbed organic probe molecules. There are major opportunities for extending this understanding by use of well-defined (single crystal) oxide surfaces and organometallic probe molecules.

Organometallic Chemistry of Five-Membered Heterocycles explores the synthesis, coordination modes, reactivity of coordinated five-membered monoheterocycles, and organometallic complexes of their numerous derivatives, including chelating ligands, oligomers, and macrocycles. Beginning with the introduction of organometallic compounds, this book dives deep into the reactivity of coordinated five-membered monoheterocycles and the derivatives of fundamental ligands. This book is an ideal reference for researchers working in organometallic, heterocyclic, materials, or organic chemistry, and catalysis. The readers will gain a comprehensive understanding of modern synthetic methods, reactivity trends of heteroaromatic ligands, and the methods of modern materials construction. Includes synthesis, structural features, and coordination modes of five-membered heterocycles Features a comparative analysis of reactivity of uncoordinated and coordinated ligands Offers coverage of derivatives of fundamental ligands and examines trends in materials applications

Functional Molecular Silicon Compounds II

Organic Chemistry

Organometallic Chemistry of Five-Membered Heterocycles

An Introduction

This Specialist Periodical Report aims to reflect the growing interest in the potential of organometallic chemistry.

The series Structure and Bonding publishes critical reviews on

topics of research concerned with chemical structure and bonding. The scope of the series spans the entire Periodic Table and addresses structure and bonding issues associated with all of the elements. It also focuses attention on new and developing areas of modern structural and theoretical chemistry such as nanostructures, molecular electronics, designed molecular solids, surfaces, metal clusters and supramolecular structures. Physical and spectroscopic techniques used to determine, examine and model structures fall within the purview of Structure and Bonding to the extent that the focus is on the scientific results obtained and not on specialist information concerning the techniques themselves. Issues associated with the development of bonding models and generalizations that illuminate the reactivity pathways and rates of chemical processes are also relevant. The individual volumes in the series are thematic. The goal of each volume is to give the reader, whether at a university or in industry, a comprehensive overview of an area where new insights are emerging that are of interest to a larger scientific audience. Thus each review within the volume critically surveys one aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years should be presented using selected examples to illustrate the principles discussed. A description of the physical basis of the experimental techniques that have been used to provide the primary data may also be appropriate, if it has not been covered in detail elsewhere. The coverage need not be exhaustive in data, but should rather be conceptual, concentrating on the new principles being developed that will allow the reader, who is not a specialist in the area covered, to understand the data presented. Discussion of possible future research directions in the area is welcomed. Review articles for the individual volumes are invited by the volume editors. Readership: research scientists at universities or in industry, graduate students

Special offer for all customers who have a standing order to the print version of Structure and Bonding, we offer free access to the electronic volumes of the Series published in the current year via SpringerLink.

The chemistry of silicon has always been a field of major concern due to its proximity to carbon on the periodic table. From the molecular chemist's viewpoint, one of the most interesting differences between carbon and silicon is their divergent coordination behavior. In fact, silicon is prone to form hyper-coordinate organosilicon complexes, and, as conveyed by reports in the literature, highly sophisticated ligand systems are required to furnish low-coordinate organosilicon

complexes. Tremendous progress in experimental, as well as computational, techniques has granted synthetic access to a broad range of coordination numbers for silicon, and the scientific endeavor, which was ongoing for decades, was rewarded with landmark discoveries in the field of organosilicon chemistry. Molecular congeners of silicon(0), as well as silicon oxides, were unveiled, and the prominent group 14 metalloid proved its applicability in homogenous catalysis as a supportive ligand or even as a center of catalytic activity. This book focuses on the most recent advances in the coordination chemistry of silicon with transition metals as well as main group elements, including the stabilization of low-valent silicon species through the coordination of electron donor ligands. Therefore, this book is associated with the development of novel synthetic methodologies, structural elucidations, bonding analysis, and also possible applications in catalysis or chemical transformations using related organosilicon compounds.

***Advances in Organometallic Chemistry
From Theory to Synthesis to Applications
Low Oxidation States
Volume 41***

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The significance of organometallic chemistry has constantly increased during the second half

of this century. The Gmelin Institute recognizes this fact in publishing an entire series on organometallic compounds, listed in the Complete Catalog. Within this series the description of the organogermanium compounds has started, of which already two volumes have been published. The present third volume in the organogermanium series describes the remainder of $\text{GeR}_3\text{R}'$ compounds, all other types of tetraorganogermanium compounds, from $\text{GeR}_2\text{R}'_2$ to $\text{GeRR}'\text{R}''\text{R}'''$, germacyclic compounds of various ring sizes, including spiro compounds, and compounds with low-coordinate germanium atoms such as GeR_3 radicals, germylenes, and germanocenes. The volume concludes with an empirical formula index. Spectroscopic Properties of Inorganic and Organometallic Compounds provides a unique source of information on an important area of chemistry. Divided into sections mainly according to the particular spectroscopic technique used, coverage in each volume includes: NMR (with reference to stereochemistry, dynamic systems, paramagnetic complexes, solid state NMR and Groups 13-18); nuclear quadrupole resonance spectroscopy; vibrational spectroscopy of main group and transition element compounds and coordinated ligands; and electron diffraction. Reflecting the growing volume of published work in this field, researchers will find this Specialist Periodical Report an invaluable source of information on current methods and applications. Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research. Compiled by teams of leading experts in their specialist fields, this series is designed to help the chemistry community keep current with the latest developments in their field. Each volume in the series is published either annually or biennially and is a superb reference point for researchers. www.rsc.org/spr

Descriptive Inorganic Chemistry

Synthesis of Organometallic Compounds

The Organometallic Chemistry of the Transition Metals

Organosilicon Compounds: Theory and Experiment (Synthesis), volume 1, comprises two parts. The first part, Theory, covers state-of-the-art computational treatments of unusual nonstandard organosilicon compounds that classical bonding theory fails to describe adequately. The second part, Experiment (Synthesis), describes recent synthetic advances in the preparation of a variety of organosilicon compounds with different coordination numbers of the central silicon: from tetracoordinate to low-coordinate to hypercoordinate derivatives. Organosilicon Compounds: From Theory to Synthesis to Applications provides a comprehensive overview of this important area of organic and organometallic chemistry, dealing with compounds containing carbon-silicon bonds. This field, which includes compounds that are widely encountered in commercial products such as in the fabrication of sealants, adhesives, and coatings, has seen many milestone discoveries reported during the last two decades. Beginning with the theoretical aspects of organosilicon compounds' structure and bonding, the book then explores their synthetic aspects, including main group element organosilicon compounds, transition metal complexes, silicon cages and clusters, low-coordinate organosilicon derivatives (cations, radicals, anions, multiple bonds to silicon, sila-aromatics), and more. Next, readers will find valuable sections that explore physical and chemical properties of organosilicon compounds by means of X-ray crystallography, ^{29}Si NMR spectroscopy, photoelectron spectroscopy, and other methods. Finally, the work delves into applications for industrial uses and in many related fields, such as polymers, material science, nanotechnology, bioorganics, and medicinal silicon chemistry. Features valuable contributions from prominent experts that cover both fundamental (theoretical, synthetic, physico-chemical) and applied (material science, applications) aspects of modern organosilicon chemistry. Covers important breakthroughs in the field, along with the historically significant achievements of the past. Includes applied information for a wide range of specialists, from junior and senior researchers (from both academia and industry). Ideal reference for those working in organometallic, organosilicon, main group element, transition metal, and industrial silicon chemistry, as well as those from interdisciplinary fields, such as polymer, material science, and nanotechnology.

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Reaction Mechanisms of Inorganic and Organometallic Systems helps students develop both an appreciation of and skepticism about mechanistic studies.

The know-how about reactivity, reaction mechanisms, thermodynamics and other basics in physical organic chemistry is the key for successful organic reactions. This textbook presents comprehensively this knowledge to the student and to the researcher, too. Includes Q&As.

Coordination Chemistry of Silicon

Organometallic Compounds of Low-Coordinate Si, Ge, Sn and Pb

From Recovery of Trace Metals to Synthesis of Nanostructured Materials

Experiment (Physico-Chemical Studies) and Applications

Advances in Organometallic Chemistry, Volume 74, the latest release in this longstanding series known for its comprehensive coverage of topics in organometallic synthesis, reactions, mechanisms, homogeneous catalysis, and more. It is ideal for a wide range of researchers involved in organometallic chemistry, with this updated release including chapters on Metal dendrimers used in biomedical applications, Sigma-bond activation reactions induced by unsaturated osmium (IV) complexes, bulky phosphines, Base metal pincer complexes, and more. Contains contributions from leading authorities in the field of organometallic chemistry Covers topics in organometallic synthesis, mechanisms, homogeneous catalysis, and more Informs and updates readers on the latest developments in the field Carefully edited to provide easy-to-read material

The first to combine both the bioinorganic and the organometallic view, this handbook provides necessary knowledge in one convenient volume. Alongside a look at CO₂ and N₂ reduction, the book also discusses O₂, NO and N₂O binding and reduction, activation of H₂ and the oxidation catalysis of alcohols. Edited by the highly renowned William Tolman, who has won several awards for his research in this field.

With the increase in volume, velocity and variety of information, researchers can find it difficult to keep up to date with the literature in their field. This interdisciplinary field has the potential to provide answers to problems and challenges faced in catalysis, synthetic organic chemistry and the development of therapeutic agents and new materials. Providing an invaluable volume, Organometallic Chemistry, Volume 41 contains analysed, evaluated and distilled information on the latest in organometallic chemistry research including developments and applications of Lewis acidic boron reagents, main group low-coordinate main group species in synthesis and the diiron centre.

The Organometallic Chemistry of Conjugated, Low-coordinate Phosphacarbon Compounds
Regular Oxidation States

Organometallic and Bioinorganic Perspectives

Basic Concepts Viewed from Frontier in Inorganic Coordination Chemistry

Fully updated and expanded to reflect recent advances, this Fourth Edition of the classic text provides students and professional chemists with an excellent introduction to the principles and general properties of organometallic compounds, as well as including practical information on reaction mechanisms and detailed descriptions of contemporary applications.

This book covers the synthesis, reactions, and properties of elements and inorganic compounds for courses in descriptive inorganic chemistry. It is suitable for the one-semester (ACS-recommended) course or as a supplement in general chemistry courses. Ideal for major and non-majors, the book incorporates rich graphs and diagrams to enhance the content and maximize learning. Includes expanded coverage of chemical bonding and enhanced treatment of Buckminster Fullerene. Incorporates new industrial applications matched to key topics in the text

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Organometallic Chemistry
Theory, Reactivity and Mechanisms in Modern Synthesis
Volume 31