

Hisashi Mikamiya Editor

# Vanadium

Biochemical and Molecular  
Biological Approaches



Springer

# Vanadium Biochemical And Molecular Biological Approaches

**Wolfgang Maret, Anthony Wedd**



## **Vanadium Biochemical And Molecular Biological Approaches:**

*Vanadium* Hitoshi Michibata, 2011-09-15 The publication of Vanadium Biochemical and Molecular Biological Approaches is particularly timely as it exactly coincides with the centennial anniversary of the discovery of vanadium by Professor Henze in the blood cells of an ascidian tunicate collected in Gulf of Naples in 1911 Vanadium atomic number 23 covers a wide range of oxidation states from 2 to 5 and has unpaired electrons Depending on these properties a wide variety of enzymes and compounds containing vanadium have been found and the biochemical behaviour of vanadium has been investigated extensively This monograph provides not only the basic properties and recent advances of vanadium chemistry but also presents recent topics on hyper accumulators of vanadium enzymatic roles of vanadium biochemical functions of vanadium and medicinal functions of vanadium which have been discovered by Biochemical and Molecular Biological Approaches Vanadium Biochemical and Molecular Biological Approaches is aimed at pure and applied chemists biochemists

pharmaceutical and medical scientists **Vanadium Catalysis** Manas Sutradhar, Armando J L Pombeiro, José Armando L da Silva, 2020-11-05 Vanadium is one of the more abundant elements in the Earth's crust and exhibits a wide range of oxidation states in its compounds making it potentially a more sustainable and more economical choice as a catalyst than the noble metals A wide variety of reactions have been found to be catalysed by homogeneous supported and heterogeneous vanadium complexes and the number of applications is growing fast Bringing together the research on the catalytic uses of this element into one essential resource including theoretical perspectives on proposed mechanisms for vanadium catalysis and an overview of its relevance in biological processes this book is a useful reference for industrial and academic chemists alike

**Marine enzymes and specialized metabolism - Part B**, 2018-06-22 Marine enzymes and specialized metabolism Part B Volume 605 in the Methods in Enzymology series highlights experimental methods on diverse marine enzymes involved in the construction of bioactive natural product molecules Unique sections in this new release include discussions on polysaccharide degrading enzymes from marine gastropods radical SAM epimerases from sponge microbes DMS P demethylase in bacteria reconstitution of particulate methane monooxygenase into membrane mimetics the structure and function of cyanobactin enzymes marine cyanobacterial polyketide beta branching enzymology marine cyanobacterial PKS NRPS enzymology and structural biology biochemical profiling of DMSP lyases and more Subject not before covered in a methods book Authority and expertise of the contributors Recent Advances in Trace Elements Katarzyna

Chojnacka, Agnieszka Saeid, 2018-02-23 Comprehensive and multidisciplinary presentation of the current trends in trace elements for human animals plants and the environment This reference provides the latest research into the presence characterization and applications of trace elements and their role in humans animals and plants as well as their use in developing novel functional feeds foods and fertilizers It takes an interdisciplinary approach to the subject describing the biological and industrial applications of trace elements It covers various topics such as the occurrence role and monitoring of

trace elements and their characterization as well as applications from the preliminary research to laboratory trials Recent Advances in Trace Elements focuses on the introduction and prospects of trace elements tackles environmental aspects such as sources of emission methods of monitoring and treatment remediation processes goes over the biological role of trace elements in plants animals and human organisms and discusses the relevance of biomedical applications and commercialization A compendium of recent knowledge in interdisciplinary trace element research Uniquely covers production and characterization of trace elements as well as the industrial and biomedical aspects of their use Paves the way for the development of innovative products in diverse fields including pharmaceuticals food environment and materials science Edited by well known experts in the field of trace elements with contributions from international specialists from a wide range of areas Unique in presenting comprehensive and multidisciplinary information of the key aspects of trace elements research in a digestible form this book is essential reading for the novice and expert in the fields of environmental science analytical chemistry biochemistry materials science pharmaceutical science nutraceutical and pharmaceutical sciences It is also valuable for companies that implement new products incorporating trace elements to the market

**Binding, Transport and Storage of Metal Ions in Biological Cells** Wolfgang Maret, Anthony Wedd, 2014-07-09 Metal ions play key roles in biology Many are essential for catalysis for electron transfer and for the fixation sensing and metabolism of gases Others compete with those essential metal ions or have toxic or pharmacological effects This book is structured around the periodic table and focuses on the control of metal ions in cells It addresses the molecular aspects of binding transport and storage that ensure balanced levels of the essential elements Organisms have also developed mechanisms to deal with the non essential metal ions However through new uses and manufacturing processes organisms are increasingly exposed to changing levels of both essential and non essential ions in new chemical forms They may not have developed defenses against some of these forms such as nanoparticles Many diseases such as cancer diabetes and neurodegeneration are associated with metal ion imbalance There may be a deficiency of the essential metals overload of either essential or non essential metals or perturbation of the overall natural balance This book is the first to comprehensively survey the molecular nature of the overall natural balance of metal ions in nutrition toxicology and pharmacology It is written as an introduction to research for students and researchers in academia and industry and begins with a chapter by Professor R J P Williams FRS

**Monitoring Artificial Materials and Microbes in Marine Ecosystems: Interactions and Assessment Methods** Toshiyuki Takahashi, 2020-02-10 Marine ecosystems offer several benefits to human communities To make sustainable use of these benefits it is necessary to elucidate and conserve marine ecology and strive to maintain a sustainable natural resource management program For this reason understanding the diversity and behavior of both macro ecosystems and micro ecosystems are crucial Monitoring Artificial Materials and Microbes in Marine Ecosystems explores microbial roles and their interaction with artificial materials in marine

environments After starting with simple topics for beginners chapters explore methods to detect microorganisms in marine ecosystems and interactions of marine organisms with artificial materials The sequential progression into advanced topics makes it easier to understand how to solve the reduction in marine ecosystem viability caused by adverse events Readers are provided with useful information for rehabilitating marine environments to make them sustainable for communities Topics are covered in 3 parts Part 1 is an introductory guide to marine ecosystems and environmental monitoring assessment Readers are introduced to coral reef ecosystems algal blooms and the role of environmental monitoring services in maintaining and restoring the quality of marine environments This is followed by examples of sustainable marine environment assessment Part 2 provides information about methods to detect microorganisms viruses and bacteria and evaluate marine environments This includes sample enrichment methods electrochemical analysis and single cell imaging techniques The highly sensitive and specific techniques presented in the book are applicable in a wide variety of situations Part 3 is dedicated to interactions between artificial metallic materials and microorganisms in marine environments Chapters in this section share results from several experiments conducted to separate microorganisms and biofilms from such environments This book is intended primarily for marine ecologists microbiologists environmental engineers and engineers associated with industrial projects This book is also useful as a text for undergraduate and graduate level courses in marine biology ecology and microbiology

*Metal Toxicology Handbook* Debasis Bagchi, Manashi Bagchi, 2020-11-19 Heavy metals and metalloids singly or in combination induce toxic manifestations either through acute or chronic pathology In particular long term chronic exposure to diverse heavy metals and metalloids to humans and animals can lead to numerous physical muscular neurological nephrological and diverse degenerative diseases and dysfunctions including multiple sclerosis muscular dystrophy Parkinson s and Alzheimer s diseases cardiovascular disorders and several others Recognized heavy metals such as lead mercury arsenic cadmium thallium and hexavalent chromium are known for enormous toxicity The immediate vital signs of acute heavy metal exposure include nausea vomiting diarrhea and acute abdominal pain Mercury has been identified as the most toxic heavy metal and mercury poisoning is known as acrodynia or pink disease Similarly lead another toxic heavy metal was at one time an integral part of painting *Metal Toxicology Handbook* further explains and discusses the varying attributes of metals discussing toxicity safety and proper human utilization of metals Beginning with a broad overview of metals metalloids redox biology and neurodegeneration and going further into the roles benefits and toxicity of metals with each section the text contains 28 chapters from eminent researchers and scientists in their respective fields and is a must have for anyone researching the potential toxicity in metals Key Features Discusses the pathology of metal toxicity Highlights the benefits of metals Explains the mechanism and salient features of restoring metabolic homeostasis Highlights dose dependent beneficial and adverse effects of vanadium safety and toxicity The initial introductory section provides a broad overview of metals metalloids redox biology and neurodegeneration The second section discusses

the pathology of metal toxicity in two chapters while the third section highlights the mechanism and salient features of restoring metabolic homeostasis in two chapters The fourth section demonstrates the aspect of radionuclides toxicity In a change of pace the fifth section discusses the benefits of metals in four chapters The sixth section titled Toxic Manifestations by Diverse Heavy Metals and Metalloids provides fourteen chapters that discuss the toxicological mechanism and manifestation of individual metals The editors have crafted a commentary titled A Treatise on Metal Toxicity and summarized a vivid scenario of metal toxicity and its consequences

Iodine Chemistry and Applications Tatsuo Kaiho, 2014-10-09 This book comprehensively covers iodine its chemistry and its role in functional materials reagents and compounds Provides an up to date detailed overview of iodine chemistry with discussion on elemental aspects characteristics properties iodides and halogen bonding Acts as a useful guide for readers to learn how to synthesize complex compounds using iodine reagents or intermediates Describes traditional and modern processing techniques such as starch copper blowing out and ion exchange resin methods Includes seven detailed sections devoted to the applications of iodine Characteristics Production Synthesis Biological Applications Industrial Applications Bioorganic Chemistry and Environmental Chemistry and Radioisotopes Features hot topics in the field such as hypervalent iodine mediated cross coupling reactions agrochemicals dye sensitized solar cells and therapeutic agents

Catalytic Oxidation Reagents Philip L. Fuchs, 2013-07-29 The Handbook is part of the Handbook of Reagents for Organic Chemistry series aiming at collecting articles on a particular theme that individual researchers in academia or industry can use on a daily basis The Handbook starts with a section discussing the most important aspects of heteroarene functionalization The introduction is followed by the alphabetical listing of the most relevant reagents drawn from the EROS database The Editor Andr Charette from the University of Montreal has selected 120 reagent descriptions many of them updated with heteroarene specific reactions for this Handbook Following the standard format for EROS each article contains an overview of the synthesis and physical properties of the reagents or catalyst conditions for its storage and purification methods Given the importance of heteroarenes in biology and especially in medicinal chemistry a Handbook that focuses exclusively on heteroarene functionalization has been long overdue This Handbook will have a broad appeal to many individuals engaged in the area of medicinal chemistry fine chemical synthesis and industrial scale chemistry Key features Builds on the success of the previously published Handbooks of Reagents for Organic Synthesis Compares the numerous new C H functionalization reactions that have been developed in the past decade Heteroarene functionalization is widely used in the development of pharmaceuticals and other bioactive compounds Contains listings of secondary reagents for which more information is available in the online edition

*Neurotoxicity of Metals: Old Issues and New Developments*, 2021-04-17 The volume discusses novel issues associated with the neurotoxicity of select metals Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in the Advances in Neurotoxicology series Updated release includes the latest information on the mechanisms

associated with neurodegeneration neurodevelopmental effects and brain accumulation of metals New approaches for the study of metal neurotoxicity      Developmental Genomics of Ascidians Noriyuki Satoh,2013-11-26 The simplicity and lack of redundancy in their regulatory genes have made ascidians one of the most useful species in studying developmental genomics In Developmental Genomics of Ascidians Dr Noriyuki Satoh explains the developmental genomics of ascidians stresses the simplicity of Ciona developmental system and emphasizes single cell level analyses This book actively accentuates the advantages of using ascidians as model organisms in an up and coming field of developmental genomics

**Toxicology of Essential and Xenobiotic Metals** João Batista Teixeira da Rocha,Michael Aschner,Pablo Andrei Nogara,2024-11-01 This book explores how metals like cadmium mercury lead aluminium manganese and chromium can harm our health whether through short term or long term exposure It covers symptoms ranging from immediate nausea to long term issues like Parkinson s and Alzheimer s diseases Understanding how these metals interact with our bodies is crucial for identifying their harmful effects The book divided into 11 chapters provides straightforward explanations about how these metals affect our health making it useful for anyone interested in understanding how metals can impact the environment as well as human and animal health      *Biocatalytic Synthesis of Bioactive Compounds* Josefina Aleu,2020-12-02

Biocatalysis the application of enzymes as catalysts for chemical synthesis has become an increasingly valuable tool for the synthetic chemist Enzymatic transformations carried out by enzymes or whole cell catalysts are used for the production of a wide variety of compounds ranging from bulk to fine chemicals The primary consideration for the incorporation of biotransformation in a synthetic sequence is regio and stereocontrol that can be achieved with enzyme catalyzed reactions Biotransformations are thus becoming accepted as a method for generating optically pure compounds as well as for developing efficient routes to target compounds This Special Issue aims to address the main applications of biocatalysts isolated enzymes and whole microorganisms in the synthesis of bioactive compounds and their precursors      **Advances in**

**Organometallic Chemistry and Catalysis** Armando J. L. Pombeiro,2013-10-11 A contemporary compilation of recent achievements in organometallic chemistry The prestigious International Conference on Organometallic Chemistry ICOMC was launched in 1963 providing a forum for researchers from around the world to share their findings and explore new paths to advance our knowledge and application of organometallic chemistry The 25th ICOMC held in Lisbon in 2012 gathered more than 1 200 participants from 54 countries This volume celebrates the 25th Silver Edition and the 50th Gold Year of the ICOMC Featuring contributions from invited 25th ICOMC speakers *Advances in Organometallic Chemistry and Catalysis* highlights recent achievements and new and emerging areas of research in the field Its seven sections cover Activation and Functionalization of Carbon Single Bonds and Small Molecules Organometallic Synthesis and Catalysis Organometallic Polymerization Catalysis Organometallic Polymers and Materials Organometallic Chemistry and Sustainable Energy Bioorganometallic Chemistry Organometallic Electrochemistry Chapters discuss fundamental underlying concepts offer

illustrative examples and cases and explore future avenues for continued research Readers will discover basic principles and properties of organometallic compounds reaction mechanisms and detailed descriptions of current applications Collectively these chapters underscore the versatility richness and potential of modern organometallic chemistry including its interrelationships with other scientific disciplines All the contributions are extensively referenced providing a gateway to the most important original research papers and reviews in organometallic chemistry Presenting a contemporary understanding of organometallic chemistry and its many applications *Advances in Organometallic Chemistry and Catalysis* is recommended for all researchers in the field from students to advanced investigators Hamilton and Hardy's Industrial Toxicology

Raymond D. Harbison, Marie M. Bourgeois, Giff T. Johnson, 2015-04-13 Providing a concise yet comprehensive reference on all aspects of industrial exposures and toxicants this book aids toxicologists industrial hygienists and occupational physicians to investigate workplace health problems Updates and expands coverage with new chapters covering regulatory toxicology toxicity testing physical hazards high production volume HPV chemicals and workplace drug use Includes information on occupational and environmental sources of exposure mammalian toxicology industrial hygiene medical management and ecotoxicology Retains a succinct chapter format that has become the hallmark for the previous editions Distills a vast amount of information into one resource for both academics and professionals Vanadium Alan S. Tracey, Gail R. Willsky, Esther S. Takeuchi, 2007-03-19 The first comprehensive resource on the chemistry of vanadium Vanadium Chemistry Biochemistry Pharmacology and Practical Applications has evolved from over a quarter century of research that concentrated on delineating the aqueous coordination reactions that characterize the vanadium V oxidation state The authors distill information o

*Nanoscopic Materials* Emil Roduner, 2014-08-12 An accessible overview of the underlying physico chemical and physical principles of nanoscience **Functional Nanometer-Sized Clusters of Transition Metals** Wei

Chen, Shaowei Chen, 2014-08-20 This book highlights recent progress and challenges in size controlled synthesis size dependent properties characterization and applications of metal nanoclusters **Trace Metals in the Environment and Living Organisms** Philip S. Rainbow, 2018-08-23 Trace metals play key roles in life all are toxic above a threshold bioavailability yet many are essential to metabolism at lower doses It is important to appreciate the natural history of an organism in order to understand the interaction between its biology and trace metals The countryside and indeed the natural history of the British Isles are littered with the effects of metals mostly via historical mining and subsequent industrial development This fascinating story encompasses history economics geography geology chemistry biochemistry physiology ecology ecotoxicology and above all natural history Examples abound of interactions between organisms and metals in the terrestrial freshwater estuarine coastal and oceanic environments in and around the British Isles Many of these interactions have nothing to do with metal pollution All organisms are affected from bacteria plants and invertebrates to charismatic species such as seals dolphins whales and seabirds All have a tale to tell **Biomedical Index to PHS-supported**



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