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KEY=BARRY - PRECIOUS PETTY

CATALYSTS FOR NITROGEN FIXATION

NITROGENASES, RELEVANT CHEMICAL MODELS AND COMMERCIAL PROCESSES

Springer Science & Business Media Biological nitrogen fixation provides more than 50% of the total annual input of the essential element nitrogen to world agriculture. Thus, it is of immense agronomic importance and critical to food supplies, particularly in developing countries. This book, with chapters authored by internationally renowned experts, provides a comprehensive and detailed account of the fascinating history of the process - including the surprising discoveries of molybdenum-independent nitrogenases and superoxide-dependent nitrogenase; a review of Man's attempts to emulate the biological process - most successfully with the commercially dominant Haber-Bosch process; and the current state of the understanding art with respect to the enzymes - called nitrogenases - responsible for biological nitrogen fixation. The initial chapters use a historical approach to the biological and industrial processes, followed by an overview of assay methodologies. The next set of chapters focuses on the classical enzyme, the molybdenum nitrogenase, and details its biosynthesis, structure, composition, and mechanism of action as well as detailing both how variants of its two component proteins are constructed by recombinant DNA technology and how computational techniques are being applied. The sophisticated chemical modelling of the metal-containing clusters in the enzyme is reviewed next, followed by a description of the two molybdenum-independent nitrogenases - first, the vanadium-containing enzyme and then the iron-only nitrogenase - together with some thoughts as to why they exist! Then follows an up-to-date treatment of the clearly "non-classical" properties of the superoxide-dependent nitrogenase, which more closely resembles molybdenum-containing hydroxylases and related enzymes, like nitrate reductase, that it does the other nitrogenases. Each chapter contains an extensive list of references. This book is the self-contained first volume of a comprehensive seven-volume series. No other available work provides the up-to-date and in-depth coverage of this series and this volume. This book is intended to serve as an indispensable reference work for all scientists working in this area, including agriculture and the closely related metals-in-biology area; to assist students to enter this challenging area of research; and to provide science administrators easy access to vital relevant information.

NITROGEN FIXATION: FROM MOLECULES TO CROP PRODUCTIVITY

PROCEEDINGS OF THE 12TH INTERNATIONAL CONGRESS ON NITROGEN FIXATION, FOZ DO IGUAÇU, PARANÁ, BRAZIL, SEPTEMBER 12–17, 1999

Springer Science & Business Media These proceedings bring together diverse disciplines that study nitrogen fixation and describe the most recent advances made in various fields: chemists are now studying FeMoco, the active site of nitrogenase in non-protein surroundings, and have refined the crystal structure of the enzyme to 1.6 angstroms.

EJB REVIEWS

Springer Science & Business Media In the mid-1980s the European Journal of Biochemistry set out to publish review articles. The enterprise proved successful resulting in high-level reviews written by well-known scientists appearing in the Journal. The reviews represent emerging and rapidly growing fields of research in fundamental as well as applied areas of biochemistry, such as medicine, biotechnology, agriculture and nutrition. Novel methodological andtechnological approaches which stimulate biochemical research are also included. The authors of the reviews are explicitly asked to be critical, selective, evaluative and interdisciplinarily oriented. The reviews should encourage young scientists toward independent and creative thinking, and inform active investigators about the state of the art in a given field.

TRANSITION METALS IN MICROBIAL METABOLISM

CRC Press The key role played by iron, as well as other transition metals, in microbial metabolism is investigated in this volume. Topics covered include: iron chelation and siderophores; receptor-mediated bacterial iron transport; and the nitogenases.

NITROGEN FIXATION RESEARCH PROGRESS

PROCEEDINGS OF THE 6TH INTERNATIONAL SYMPOSIUM ON NITROGEN FIXATION, CORVALLIS, OR 97331, AUGUST 4–10, 1985

Springer Science & Business Media This Symposium, held August 4-10, 1985 on the campus of Oregon State University in Corvallis, is the sixth of a series of international symposia concerned with broad aspects of the fixation of nitrogen gas by biological and chemical means. The first symposium of this series was held in Pullman, Washington (1974), the second in Salamanca, Spain (1976), the third in Madison, Wisconsin (1978), the fourth in Canberra, Australia (1980) and the fifth in Noordwij~erhout, The Netherlands (1983). Prior to the organization of these symposia, small groups of usually no more than 10 or 12 of the now "old guard" in the field met in some obscure places, including Butternut Lake, Wisconsin, Sanabel Island, Florida and Camp Sage hen in California, to discuss developments in the field. Concern about an energy crisis in the nineteen seventies served as an impetus for the organization of workshops and preparatiol. of publications urging government agencies to provide funds for the support of several neglected areas in the field, including the genetics of nitrogen-fixing organisms and the biology of Frankia. In looking back, it becomes apparent that there have been drastic changes in the extent of research support in the field and in the contents of the programs of the continuing series of symposia.

IRON-SULFUR PROTEINS

Academic Press Advances in Inorganic Chemistry presents timely and informative summaries of the current progress in a variety of subject areas within inorganic chemistry, ranging from bioinorganic to solid state. This acclaimed serial features reviews written by experts in the area and is an indispensable reference to advanced researchers. Each volume of Advances in Inorganic Chemistry contains an index, and each chapter is fully referenced.

MOLYBDENUM CHEMISTRY OF BIOLOGICAL SIGNIFICANCE

Springer Science & Business Media In retrospect, it was obvious that we were both, quite inde pendently, contemplating a conference on the role of molybdenum in biology and related chemistry. At the time though, the meeting of minds on this matter was quite surprising. Although this subject has been treated in previous meetings within the overall context of, say, magnetic resonance or nitrogen fixation, it was apparent to us both that research in molybdenum-containing enzymes and molyb denum chemistry had progressed rapidly in the last several years. Jointly, we decided to organize the first meeting on Molybdenum Chemistry of Biological Significance which was held at the Hotel Lake Biwa, Shiga, Japan, on April 10-13, 1979. This volume con stitutes the Proceedings of that international conference and covers the broad spectrum of interests from enzymes to coordination chemistry. It should serve not only as a source of new information on the latest research results in this area and as a useful ref erence tool, but should also allow a newcomer or other peripherally interested researcher to become conversant very rapidly with the "state-of-the-art" in this specialized and important area

of research. The conference was sponsored by the Japan Society for the Promotion of Science, the Japan World Exposition Commemerative Fund the Yamada Science Foundation, the Nissan Science Foundation, the Chemical Society of Japan (Kinki Regional Office) and the Agri cultural Chemical Society of Japan (Kansai Branch). We thank these organizations sincerely for their interest and generosity.

METALS IONS IN BIOLOGICAL SYSTEM

VOLUME 39: MOLYBDENUM AND TUNGSTEN: THEIR ROLES IN BIOLOGICAL PROCESSES:

CRC Press Volume 39: Molybdenum and Tungsten: Their Roles in Biological Processes is devoted soley to the vital research area on molybdenum and tungsten and their role in biology. It offers a comprehensive and timely account of this fascinating topic by 40 distinguished international authorities. Topics include: transport, homeostasis, regulation and binding

BIOINORGANIC CATALYSIS

CRC Press "Provides the latest research results and suggests new topics for interdisciplinary study of metal ions, catalysis, and biochemical systems. Second Edition highlights potential applications; includes new chapters on zinc and FeS clusters; presents new X-ray analysis of metalloenzymes; and more."

GENOMES AND GENOMICS OF NITROGEN-FIXING ORGANISMS

Springer Science & Business Media Genomes and Genomics of Nitrogen-fixing Organisms This is Volume 3 of a seven-volume series on all aspects of Nitrogen Fixation. The series aims to be the definitive authority in the field and to act as a benchmark for some years to come. Rather than attempting to cram the whole field into a single volume, the subject matter is divided among seven volumes to allow authors the luxury of writing in depth with a comprehensive reference base. All authors are recognized practicing scientists in the area of their contribution, which ensures the high quality, relevance, and readability of the chapters. In establishing the rationale for, and the organization of, this book, we realized the need to divide it into two sections. The first section should be organism based and should review our current knowledge of the genomes of nitrogen-fixing organisms and what these nucleotide sequences tell us. The second section should then be technology based. It should review what technologies are available to mine the data inherent in the nucleotide sequences and how they are now being used to produce gene-function data from differential gene expression.

ASSOCIATIVE AND ENDOPHYTIC NITROGEN-FIXING BACTERIA AND CYANOBACTERIAL ASSOCIATIONS

Springer Science & Business Media This self-contained volume covers fundamental and applied aspects of nitrogen-fixation research. The book describes milestones in the discovery of the associative and endophytic nitrogen-fixing bacteria found involved with cereal crops, forage grasses, and sugar cane. It provides a comprehensive overview of their phylogeny, physiology, and genetics as well as of the biology of their association with their host plants, including tools for in situ localization and population-dynamics analysis. Also included are chapters describing the functions required for a bacterium to be competent and competitive in the rhizosphere, and analysis of associations of cyanobacteria with fungi, diatoms, bryophytes, cycads, Azolla, and Gunnera.

ELECTRON SPIN RESONANCE

Royal Society of Chemistry Reflecting the growing volume of published work in this field, researchers will find this book an invaluable source of information on current methods and applications.

NITROGEN-FIXING LEGUMINOUS SYMBIOSES

Springer Science & Business Media Nodules produced on legume roots by root-nodule bacteria provide the major nitrogenous input into natural and agricultural systems worldwide. This book provides an in-depth and up-to-the-minute analysis of what is known about this symbiosis, its origins, the process of nodule formation and development, and the biochemistry and genetics of nodular nitrogen fixation. It also reviews the physiology of the root-nodule bacteria themselves, their ecology in both natural and agricultural systems, and how we can introduce new legumes along with the bacteria they require. This book is recommended for scientists working with root nodule bacteria or host legumes, agronomists, forestry scientists, and soil scientists.

NITROGEN-FIXING ACTINORHIZAL SYMBIOSES

Springer Science & Business Media For researchers and graduates with any interest in plant or soil sciences, this fascinating study will be a godsend – it's the complete state of the art with regard to actinorhizal symbioses. The self-contained sixth volume of a comprehensive series on nitrogen fixation, it includes chapters that deal with all aspects of this symbiosis between actinorhizal plants and nitrogen-fixing bacteria. It also contains information both about symbionts and their ecological role and use. Other chapters tackle the global distribution of different actinorhizal plants and their microsymbionts and how this impacts the question of co-evolution of the micro- and macrosymbionts as well as comparing the actinorhizal and leguminous symbioses. No other book provides the up-to-date and in-depth coverage of this volume.

EJB REVIEWS

JOURNAL OF BIOLOGICAL EDUCATION

THE ALCHEMY OF AIR

A JEWISH GENIUS, A DOOMED TYCOON, AND THE SCIENTIFIC DISCOVERY THAT FED THE WORLD BUT FUELED THE RISE OF HITLER

Crown A sweeping history of tragic genius, cutting-edge science, and the Haber-Bosch discovery that changed billions of lives—including your own. At the dawn of the twentieth century, humanity was facing global disaster: Mass starvation was about to become a reality. A call went out to the world' s scientists to find a solution. This is the story of the two men who found it: brilliant, self-important Fritz Haber and reclusive, alcoholic Carl Bosch. Together they discovered a way to make bread out of air, built city-sized factories, and saved millions of lives. But their epochal triumph came at a price we are still paying. The Haber-Bosch process was also used to make the gunpowder and explosives that killed millions during the two world wars. Both men were vilified during their lives; both, disillusioned and disgraced, died tragically. The Alchemy of Air is the extraordinary, previously untold story of a discovery that changed the way we grow food and the way we make war–and that promises to continue shaping our lives in fundamental and dramatic ways.

ANNUAL REPORT

ABSTRACTS OF PAPERS

THE ECOLOGY OF RECENTLY-DEGLACIATED TERRAIN

A GEOECOLOGICAL APPROACH TO GLACIER FORELANDS

Cambridge University Press The first comprehensive review of the available information on the ecology of recently-deglaciated terrain, this volume evaluates critically the methodology employed in such studies.

WHO'S WHO IN SCIENCE IN EUROPE

Volumes for 1972- include also scientists from the East European countries.

DIRECTIONS IN TROPICAL AGROFORESTRY RESEARCH

ADAPTED FROM SELECTED PAPERS PRESENTED TO A SYMPOSIUM ON TROPICAL AGROFORESTRY ORGANIZED IN CONNECTION WITH THE ANNUAL MEETINGS OF THE AMERICAN SOCIETY OF AGRONOMY, 5 NOVEMBER 1996, INDIANAPOLIS, INDIANA, USA

Springer Science & Business Media Large areas of the warm, humid tropics in Southeast Asia, the Pacific, Latin America, the Caribbean, and Africa are hilly or mountainous. Jackson and Scherr (1995) estimate that these tropical hillside areas are inhabited by 500 million people, or one-tenth of the current world population, many of whom practice subsistence agriculture. The region most affected is Asia which has the lowest area of arable land per capita. Aside from limited areas of irrigated terraces, most of the sloping land, which constitutes 60% to 90% of the land resources in many Southeast Asian countries, has been by-passed in the economic development of the region (Maglinao and Hashim, 1993). Poverty in these areas is often high, in contrast to the relative wealth of irri gated rice farms in lowland areas that benefited from the green revolution. Rapid population growth in some countries is also exacerbating the problems of hillside areas. Increasingly, people are migrating from high-potential lowland areas where land is scarce to more remote hillside areas. Such migra tion, together with inherent high population growth, is forcing a transforma tion in land use from subsistence to permanent agriculture on fragile slopes, and is creating a new suite of social, economic, and environmental problems (Garrity, 1993; Maglinao and Hashim, 1993).

ANNUAL REPORT

ANNUAL REPORT - JOHN INNES INSTITUTE

METAL IONS IN BIOLOGICAL SYSTEMS

VOLUME 31: VANADIUM AND ITS ROLE FOR LIFE

CRC Press "Volume 31, devoted solely to the role of vanadium in life processes, offers a comprehensive and timely account of this fascinating field by 37 distinguished, international authorities. Highlights the properties of the various oxidation states of vanadium, their affinity for biogenic ligands, the effects of vanadium species on enzyme activity, the role of vanadium in nitrogenases and haloperoxidases, and more."

AGRICULTURAL & VETERINARY SCIENCES INTERNATIONAL WHO'S WHO

WHO'S WHO IN EUROPEAN RESEARCH AND DEVELOPMENT

BIOCHEMICAL JOURNAL

BIOGEOCHEMISTRY

AN ANALYSIS OF GLOBAL CHANGE

Academic Press "Biogeochemistry considers how the basic chemical conditions of the Earth-from atmosphere to soil to seawater-have been and are being affected by the existence of life. Human activities in particular, from the rapid consumption of resources to the destruction of the rainforests and the expansion of smog-covered cities, are leading to rapid changes in the basic chemistry of the Earth. This expansive text pulls together the numerous fields of study encompassed by biogeochemistry to analyze the increasing demands of the growing human population on limited resources and the resulting changes in the planet's chemical makeup. The book helps students extrapolate small-scale examples to the global level, and also discusses the instrumentation being used by NASA and its role in studies of global change. With extensive cross-referencing of chapters, figures and tables, and an interdisciplinary coverage of the topic at hand, this updated edition provides an excellent framework for courses examining global change and environmental chemistry, and is also a useful self-study guide."--Publisher's website.

AMERICAN BOOK PUBLISHING RECORD

PEOPLE OF TODAY

ELECTRON SPIN RESONANCE

OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES

INFORMATION AND NOTICES

METAL IONS IN BIOLOGICAL SYSTEMS

SCIENTIFIC AMERICAN

MICROBIAL ASPECTS OF POLLUTION

Elsevier Microbial Aspects of Pollution is the first of a new series that emerged from the annual Summer Conference of Society for Applied Bacteriology, focusing on microbiological subjects of general topical interest. The subject of the 1971 symposium ""Microbial Aspects of Pollution"" is particularly topical. Pollution is an environmental problem and almost invariably arises from the activities of man. Micro-organisms have their part to play, both advantageously and disadvantageously, and the 16 contributions, written by recognized experts in the field, range widely over the subject. They include considerations of the health hazards of pollution, embracing the consequences of sewage pollution of our water supplies and a most important topic to the laboratory worker—the safe disposal of infected material. A series of papers deals with water purification problems and the disposal of sewage and other wastes, and their effects on the waters of rivers and lakes. Special attention is given in this context to the disposal of industrial wastes. Other contributions deal with the disposal of the newer industrial products of the organic chemist, namely, pesticides, herbicides, fungicides, and plastic materials.

FEDERAL YELLOW BOOK

EXPERIMENT STATION RECORD

BIOINORGANIC CHEMISTRY

Univ Science Books Written by major contributors to the field, Bioinorganic Chemistry provides students with an introduction and overview of the subject and gives them the background required to read and follow the current research literature.

BACTERIA IN AGROBIOLOGY: STRESS MANAGEMENT

Springer Science & Business Media The future of agriculture strongly depends on our ability to enhance productivity without sacrificing long-term production potential. An ecologically and economically sustainable strategy is the application of microorganisms, such as the diverse bacterial species of plant growth promoting bacteria (PGPB). The use of these bio-resources for the enhancement of crop productivity is gaining worldwide importance. "Bacteria in Agrobiology: Stress Management" covers the major aspects on PGPR in amelioration of both abiotic and biotic stresses. PGPR mediated in priming of plant defense reactions, nutrient availability and management in saline and cold environment, hormonal signaling, ACC deaminase and its role in ethylene regulation under harsh conditions are suitably described.