High Nuclearity Metal Cyanide Clusters Synthesis

Modern Inorganic Synthetic Chemistry, Second Edition captures, in five distinct sections, the latest advancements in inorganic synthetic chemistry, providing materials chemists, chemical engineers, and materials scientists with a valuable reference source to help them advance their research efforts and achieve breakthroughs. Section one includes six chapters centering on synthetic chemistry under specific conditions, such as high-temperature, low-temperature and cryogenic, hydrothermal and solvothermal, high-pressure, photochemical and fusion conditions. Section two focuses on the synthesis and related chemistry problems of highly distinct categories of inorganic compounds, including superheavy elements, coordination compounds and coordination polymers, cluster compounds, organometallic compounds, inorganic polymers, and nonstoichiometric compounds. Section three elaborates on the synthetic chemistry of five important classes of inorganic functional materials, namely, ordered porous materials, carbon materials, advanced ceramic materials, host-guest materials, and hierarchically structured materials. Section four consists of four chapters where the synthesis of functional inorganic aggregates is discussed, giving special attention to the growth of single crystals, assembly of nanomaterials, and preparation of amorphous materials and membranes. The new edition's biggest highlight is Section five where the frontier in inorganic synthetic chemistry is reviewed by focusing on biomimetic synthesis and rationally designed synthesis. Focuses on the chemistry of inorganic synthesis, assembly, and organization of wide-ranging inorganic systems Covers all major methodologies of inorganic synthesis Provides state-of-the-art synthetic methods Includes real examples in the organization of complex inorganic functional materials Contains more than 4000 references that are all highly reflective of the latest advancement in inorganic synthetic chemistry Presents a comprehensive coverage of the key issues involved in modern inorganic synthetic chemistry as written by experts in the field

A one-stop, comprehensive, and thoroughly updated resource for students, professors, and researchers alike Thoroughly revised and updated, the Third Edition of Supramolecular Chemistry delivers a comprehensive and integrated approach to this rapidly evolving and quickly expanding field. Distinguished professors and authors Jonathan Steed and Jerry Atwood provide readers with a broad and exhaustive resource that assumes little in the way of prior knowledge of supramolecular chemistry. Extensive new content on cutting edge research throughout the field including molecular machines and the mechanical bond, mechanochemistry, halogen bonding, and crystal nucleation accompanies full-color imagery and study problems designed to help students understand and apply the principles introduced within the book. Additional material is provided in the supplementary online resources, including solutions to the student exercises and PowerPoint slides of the figures in the book. Supramolecular Chemistry, Third Edition also includes: The latest research and developments reported over the last decade A unique "key references" system that highlights crucial reviews and primary literature A description of key experimental techniques included in accessible "boxes" for the non-expert Exercises and problems for students, complete with online solutions Full-color illustrations and imagery designed to facilitate learning and retention of the key concepts and state-of-the art of the field Perfect for undergraduate and postgraduate students taking courses on supramolecular chemistry, the Third Edition of Supramolecular Chemistry also belongs on the bookshelves of all researchers in this, and any closely related, fields. Academics, in particular postdoctoral students and professors, will benefit significantly from this text.

An advanced-level textbook of inorganic chemistry for the graduate (B.Sc) and postgraduate (M.Sc) students of Indian and foreign universities. This book is a part of four volume series, entitled "A Textbook of Inorganic Chemistry - Volume I, II, III, IV". CONTENTS: Chapter 1. Stereochemistry and Bonding in Main Group Compounds: VSEPR theory, d? -p? bonds, Bent rule and energetic of hybridization. Chapter 2. Metal-Ligand Equilibria in Solution: Stepwise and overall formation constants and their interactions, Trends in stepwise constants, Factors affecting stability of metal complexes with reference to the nature of metal ion and ligand, Chelate effect and its thermodynamic origin, Determination of binary formation constants by pH-metry and spectrophotometry. Chapter 3. Reaction Mechanism of Transition Metal Complexes - I: Inert and labile complexes, Mechanisms for ligand replacement reactions, Formation of complexes from aquo ions, Ligand displacement reactions in octahedral complexes- acid hydrolysis, Base hydrolysis, Racemization of tris chelate complexes, Electrophilic attack on ligands. Chapter 4. Reaction Mechanism of Transition Metal Complexes - II: Mechanism of ligand displacement reactions in square planar complexes, The trans effect, Theories of trans effect, Mechanism of electron transfer reactions - types; Outer sphere electron transfer mechanism and inner sphere electron transfer mechanism, Electron exchange. Chapter 5. Isopoly and Heteropoly Acids and Salts: Isopoly and Heteropoly acids and salts of Mo and W: structures of isopoly and heteropoly anions. Chapter 6. Crystal Structures: Structures of some binary and ternary compounds such as fluorite, antifluorite, rutile, antirutile, crystobalite, layer lattices- CdI2, BiI3; ReO3, Mn2O3, corundum, pervoskite, Ilmenite and Calcite. Chapter 7. Metal-Ligand Bonding: Limitation of crystal field theory, Molecular orbital theory, octahedral, tetrahedral or square planar complexes, ?-bonding and molecular orbital theory. Chapter 8. Electronic Spectra of Transition Metal Complexes: Spectroscopic ground states, Correlation and spin-orbit coupling in free ions for Ist series of transition metals, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d1 - d9 states), Calculation of Dq, B and ? parameters, Effect of distortion on the d-orbital energy levels, Structural evidence from electronic spectrum, John-Tellar effect, Spectrochemical and nephalauxetic series, Charge transfer spectra, Electronic spectra of molecular addition compounds. Chapter 9. Magantic Properties of Transition Metal Complexes: Elementary theory of magneto - chemistry, Guoy's method for determination of magnetic susceptibility, Calculation of magnetic moments, Magnetic properties of free ions, Orbital contribution, effect of ligand-field, Application of magneto-chemistry in structure determination, Magnetic exchange coupling and spin state cross over. Chapter 10. Metal Clusters: Structure and bonding in higher boranes, Wade's rules, Carboranes, Metal Carbonyl Clusters - Low Nuclearity Carbonyl Clusters, Total Electron Count (TEC). Chapter 11. Metal-? Complexes: Metal carbonyls, structure and bonding, Vibrational spectra of metal carbonyls for bonding and structure elucidation, Important reactions of metal carbonyls; Preparation, bonding, structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes; Tertiary phosphine as ligand.

Synthesis and Characterization of Transition Metal Clusters

From Mononuclear High-Spin Iron(II) Complexes to Cyano-Bridged Chain Compounds

Directory of Graduate Research

Modern Inorganic Synthetic Chemistry

Spectroscopic Properties of Inorganic and Organometallic Compounds

The sciences and engineering. B

In recent years the world economy has been undergoing drastic changes, the East Asian miracle, the financial crisis, and today, globalization and the fundamental changes associated with the ?new economy?. This book integrates these developments with macroeconomics for business managers and policymakers.Macroeconomics is essential background for the business manager and policymaker. Consequently macroeconomics is an integral part of the business curriculum in mature and developing countries alike. And well it should be. The economy affects decisions by investors, manufacturers, distributors, importers and exporters, etc. in all parts of the world. Often, it is the difference between growth and profitability on one hand, and stagnation or failure on the other. In recent years as the world economy has undergone overwhelming changes, especially in East Asia and now in the advanced countries, understanding what is going on in the local economy and ?out there in the world? has become a particular challenge to managers. The new developments, of which the ?new economy? is the most recent one, do not supercede the basic theoretical framework of macroeconomics. But they add greatly to the challenge of understanding the economic situation and to its uncertainty.This book was originally written to meet the needs of a business curriculum based on the program at the Sasin Graduate Institute of Business Administration of Chulalongkorn University in Bangkok in collaboration with the Wharton and Kellogg Business Schools in the United States. The book is intended for a broad audience ? both domestic and international ? that includes mature MBA business students, intermediate level undergraduates, and informed laypersons.

Previously by Angelici, this laboratory manual for an upper-level undergraduate or graduate course in inorganic synthesis has for many years been the standard in the field. In this newly revised third edition, the manual has been extensively updated to reflect new developments in inorganic chemistry. Twenty-three experiments are divided into five sections: solid state chemistry, main group chemistry, coordination chemistry, organometallic chemistry, and bioinorganic chemistry. The included experiments are safe, have been thoroughly tested to ensure reproducibility, are illustrative of modern issues in inorganic chemistry, and are capable of being performed in one or two laboratory periods of three or four hours. Because facilities vary from school to school, the authors have included a broad range of experiments to help provide a meaningful course in almost any academic setting. Each clearly written & illustrated experiment begins with an introduction that hig! hlights the theme of the experiment, often including a discussion of a particular characterization method that will be used, followed by the experimental procedure, a set of problems, a listing of suggested Independent Studies, and literature references.

Faculties, publications and doctoral theses in departments or divisions of chemistry, chemical engineering, biochemistry and pharmaceutical and/or medicinal chemistry at universities in the United States and Canada.

2000 International Chemical Congress of Pacific Basin Societies, Pacifichem 2000 : Honolulu, Hawaii, December 14-19, 2000

Bioinorganic Vanadium Chemistry

From Cluster-expanded Prussian Blue Analogues to Single-molecule Magnets

Toward Acetylide- and N-heterocycle-bridged Materials with Strong Electronic and Magnetic Coupling

Synthesis of High Nuclearity Metal Thiolate Clusters and Low Coordinate Chromous Siloxides

"... the book does an excellent job of putting together several different classes of materials. Many common points emerge, and the book may facilitate the development of hybrids in which the qualities of the "parents" are enhanced." –Angew. Chem. Int. Ed. 2011 With optoelectronics and photonics, quantum information processing, nanotechnology and data storage, molecular materials enrich our daily lives in countless ways. These materials have properties that depend on their exact structure, the degree of order in the way the m aligned and their crystalline nature. Small, delicate changes in molecular structure can totally alter the properties of the material in bulk. There has been increasing emphasis on functional metal complexes that demonstrate a wide range of physical phenomena. Mole represents the diversity of the area, encapsulating magnetic, optical and electrical properties, with chapters on: Metal-Based Quadratic Nonlinear Optical Materials Physical Properties of Metallomesogens Molecular Magnetic Materials Molecular Inorganic Conductors Superconductors Molecular Nanomagnets Structured to include a clear introduction, a discussion of the basic concepts and up-to-date coverage of key aspects, each chapter provides a detailed review which conveys the excitement of work in that field. Additional vo

Inorganic Materials Series: Low-Dimensional Solids | Molecular Materials | Porous Materials | Energy Materials

This series provides inorganic chemists and materials scientists with a forum for critical, authoritative evaluations of advances in every area of the discipline. Volume 56 continues to report recent advances with a significant, up-to-date selection of contributions by inte recognized researchers.

Towards High-spin Molecular SpeciesSynthesis, Characterization, and Reactivity of High-nuclearity Metal-cyanide ClustersMagnetic Properties of High-spin Metal-cyanide Clusters and the Directed Assembly of a Single-molecule MagnetThe Chemistry of Nanostruct MaterialsWorld Scientific

The Chemistry of Cyano Complexes of the Transition Metals

Book of Abstracts

Synthesis of High Nuclearity M/Fe/S Clusters

Molecular Materials

Polyoxometalates in Catalysis, Biology, Energy and Materials Science

Inorganic Chemistry of the Transition Elements

Covering everything from the basics to recent applications, this monograph represents an advanced overview of the field. Edited by internationally acclaimed experts respected throughout the community, the book is clearly divided into sections on fundamental and applied surface organometallic chemistry. Backed by numerous examples from the recent literature, this is a key reference for all chemists.

In recent years, micro- and nanosystems with magnetic properties have been extensively investigated in many fields, ranging from physics to medicine. The research in these areas has lately shown that if the magnetic compounds are opportunely functionalized and modified with moieties and specific functional groups, a plethora of challenging multidisciplinary applications is available, including the development of magnetically controlled particles, stimuli-responsive materials, magnetically guided chemical/drug-delivery systems, sensors, spintronics, separation and purification of contaminated groundwater and soils, ferrofluids and magnetorheological fluids, contrast agents for MRI, and internal sources of heat for the thermoablation of cancer. Magnetic compounds have been found to be highly selective and effective in all these application fields, from the molecular level to the microscale. This book aims at underlining the latest advances in the field of magnetic compounds, nanosystems, and materials, covering a large variety of topics related to novel synthesis and functionalization methods and the properties, applications, and use of magnetic systems in chemistry, materials science, diagnostics, and medical therapy.

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

Supramolecular Chemistry

Synthesis, Properties and Applications

New Insights into Inorganic Magnetic Systems and Materials

A Developed/developing Country Perspective on the "new Economy"

Mössbauer Spectroscopy and Transition Metal Chemistry

Inorganic, bio-inorganic, physical, theoretical & analytical chemistry. Section A

A widely-acclaimed serial, Advances in Organometallic Chemistry 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 compounds on both large and small scales. Industrial processes involving plastics, polymers, electronic materials, and pharmaceuticals all depend on advancements in organometallic chemistry.

The work herein describes the design, synthesis, and characterization of magnetic molecules and chain compounds, with an emphasis on probing slow magnetic relaxation. Chapter 1 presents an extensive survey of the literature of cyano-bridged single-molecule and single-chain magnets, focusing on a building block approach wherein simple cyanometalate precursor complexes direct the assembly of larger architectures. Specific synthetic strategies to obtain multinuclear clusters and chain compounds of desired structure and magnetic properties are outlined in detail. Finally, perspectives on the future directions in the field are presented. Chapter 2 exemplifies the utility of the building block approach in generating high-nuclearity cyano-bridged clusters. It describes the design and synthesis of the facially-capped tricyanide building unit, [TpCr(CN)3]-, as its incorporation into the face-centered cubic cluster [Tp8(H2O)6Cu6Cr8(CN)24]4+. Ferromagnetic exchange between CrIII and CuII ions gives rise to an S = 15 spin ground state, one of the highest yet observed for a cyano-bridged cluster. In addition, the formation of this cluster is accompanied by a linkage isomerism of 12 of the 24 cyanide ligands, providing the first example of a molecule undergoing partial cyanide isomerism. Chapter 3 presents a survey of actinide-containing molecules that have demonstrated evidence of magnetic exchange coupling. The strong magnetic anisotropy characteristic of these elements marks them as promising candidates for single-molecule magnets, however the spin-orbit coupling that gives rise to this anisotropy also complicates analysis of exchange interactions. Current methods for extracting coupling information in these systems are outlined in detail. In addition, molecules that bear exchange-coupled centers but as of yet have not been thoroughly characterized are presented. Chapter 4 describes a detailed investigation of a series of iron(II) pyrrolide complexes of formulae [(tpaR)Fe]-, representing the first examples of transition metal-based mononuclear single-molecule magnets. Static magnetic measurements and high-field EPR spectroscopy reveal the presence of exceptionally strong uniaxial anisotropy in the complexes. Moreover, dynamic magnetic measurements carried out in a small dc field demonstrate that this anisotropy leads to slow relaxation in the complexes. In addition, this relaxation dynamics is probed through Mössbauer spectroscopy, which reveals that the phenomenon occurs in zero applied field in at least two complexes. Chapter 5 describes the synthesis and characterization of a series of cyano-bridged single-chain magnets. Reaction of the S = 3/2, high-anisotropy building unit [ReCl4(CN)2]2- with [M(DMF)6]2+ (M = Mn, Fe, Co, Ni) is shown to direct the formation of the chain compounds (DMF)4MReCl4(CN)2. Dc susceptibility measurements uncover the presence of intrachain antiferromagnetic (Mn) and ferromagnetic (Fe, Co, Ni) exchange. Most importantly, ac susceptibility measurements reveal that all of the chain compounds exhibit slow magnetic relaxation at low temperature. Notably, the Fe congener displays significant magnetic hysteresis at low temperatures, thus demonstrating classical magnet-like behavior in a one-dimensional system. Chapter 6 describes the synthesis the incorporation of [ReCl4(CN)2]2- into the zig-zag chain compound (Bu4N)[TpCuReCl4(CN)2], which is found to demonstrate the strongest ferromagnetic exchange yet observed through cyanide. The strong coupling arises from judicious selection of ReIV and CuII ions, whose molecular orbitals interact through the cyanide bridge such that orbital overlap is minimized. Moreover, the compound is shown to display metamagnetic behavior, and the complete magnetic phase diagram is elucidated through a combination of experimental and theoretical analysis. Finally, the anisotropy tensors of the ReIV centers are shown to cancel, leading to a small effective chain anisotropy and thus the absence of single-chain magnet behavior. Chapter 7 concludes this work by demonstrating that [ReCl4(CN)2]2- can also be employed in the assembly of molecular magnets, as it presents the synthesis and characterization of two linear trinuclear clusters of formulae [(PY5Me2)2M2ReCl4(CN)2]2+ (M = Mn, Ni; PY5Me2 = 2,6-bis(1,1-bis(2-pyridyl)ethyl)-pyridine). Dc susceptibility measurements reveal the presence of antiferromagnetic exchange in the Mn congener, while ferromagnetic exchange is observed in the Ni analogue. In addition, dc magnetization experiments show the presence of axial magnetic anisotropy in both clusters.

Advances in Inorganic Chemistry

From Biology to Nanotechnology

Dissertation Abstracts International

Magnetic Properties of High-spin Metal-cyanide Clusters and the Directed Assembly of a Single-molecule Magnet

Synthesis and Characterization of Cyanide-bridged Materials

Functional Nanometer-Sized Clusters of Transition Metals

Towards High-spin Molecular Species

Concise overview of synthesis and characterization of single molecule magnets Molecular magnetism is explored as an alternative to conventional solid-state magnetism as the basis for ultrahigh-density memory materials with extremely fast processing speeds. In particular single-molecule magnets (SMM) are in the focus of current research, both because of their intrinsic magnetization properties, as well as because of their potential use in molecular spintronic devices. SMMs are fascinating objects on the example of which one can explain many concepts. Single-Molecule Magnets: Molecular Architectures and Building Blocks for Spintronics starts with a general introduction to single-molecule magnets (SMM), which helps readers to understand the evolution of the field and its future. The following chapters deal with the current synthetic methods leading to SMMs, their magnetic properties and their characterization by methods such as high-field electron paramagnetic resonance, paramagnetic nuclear magnetic resonance, and magnetic circular dichroism. The book closes with an overview of radical-bridged SMMs, which have shown application potential as building blocks for high-density memories. Covers a hot topic – single-molecule magnetism is one of the fastest growing research fields in inorganic chemistry and materials science Provides researchers and newcomers to the field with a solid foundation for their further work Single-Molecule Magnets: Molecular Architectures and Building Blocks for Spintronics will appeal to inorganic chemists, materials scientists, molecular physicists, and electronics engineers interested in the rapidly growing field of study.

Vanadium is named after Vanadis, the most aristocratic of Norse goddesses, who symbolises beauty and fertility - essential features of vanadium chemistry. It is a ubiquitous trace element, with a surprising range of biological functions. In Bioinorganic Vanadium Chemistry, Dieter Rehder addresses the major aspects of vanadium chemistry related to living organisms and the mutual impact between biological and inorganic vanadium chemistry. Topics covered include: the history, natural occurrence, distribution and impact of vanadium inorganic aspects of the function of vanadium in biological systems interaction of aqueous vanadate and vanadyl with biogenic ligands vanadium coordination compounds the vanadium-carbon bond methods of characterisation of biogenic and model vanadium systems (EPR and ENDOR for oxovanadium(IV); 51V NMR for vanadium(V); XAS) vanadium in ascidians and polychaeta worms the concentration of vanadium in the form of amavadin by Amanita mushrooms vanadate-dependent haloperoxidases vanadium and the nitrogen cycle vanadate as energiser for bacteria, and vanadophores medicinal aspectsm including the anti-diabetic potential of vanadium compounds interaction of vanadium with proteins and protein substrates vanadium and phosphate-metabolising enzymes Bioinorganic Vanadium Chemistry conveys the essential aspects of vanadium bioinorganic chemistry, making this book a valuable complement to more general bioinorganic chemistry texts and more specialized topical reviews for researchers and students alike.

The volumes in this continuing series provide a compilation of current techniques and ideas in inorganic synthetic chemistry. Includes inorganic polymer syntheses and preparation of important inorganic solids, syntheses used in the development of

pharmacologically active inorganic compounds, small-molecule coordination complexes, and related compounds. Also contains valuable information on transition organometallic compounds including species with metal-metal cluster molecules. All syntheses presented here have been tested.

Molecular Nanomagnets

A Textbook of Inorganic Chemistry – Volume 1

Single-Molecule Magnets

Indian Journal of Chemistry

Progress in Inorganic Chemistry

Functional Materials Through Coordination Chemistry

Metal nanoclusters, which bridge metal atoms and nanocrystals, are gaining attention due to their unique chemical and physical properties which differ greatly from their corresponding large nanoparticles and molecular compounds. Their electronic and optical properties are of particular interest for their use in sensing, optoelectronics, photovoltaics and catalysis. The book highlights recent progress and challenges in size-controlled synthesis, size-dependent properties, characterization and applications of metal nanoclusters. Specific topics include organochalcogenolate-stabilized metal nanoparticles, water-soluble fluorescent silver nanoclusters, thiolate-protected Au and Ag nanoclusters, DNA-templated metal nanoclusters, fluorescent platinum nanoclusters and janus nanoparticles by interfacial engineering. Edited by active researchers in the area, the book provides a valuable reference for researchers in the area of functional nanomaterials. It also provides a guide for graduate students, academic and industrial researchers interested in the fundamentals of the materials or their applications.

This book is a sequel to the first volume of The Chemistry.of Nanostructured Materials. It covers the most exciting developments in the nanostructured materials field for the past five to ten years, with a particular.focus on their applications in energy conversion and energy storage. Prominent authors of recognized authority in the field contribute their expertise in the review chapters. --Book Jacket.

Specialist Periodical Reports provide systematic and detailed review coverage of progress in the major areas of chemical research. Written by experts in their specialist fields the series creates a unique service for the active research chemist, supplying regular critical in-depth accounts of progress in particular areas of chemistry. For over 80 years the Royal Society of Chemistry and its predecessor, the Chemical Society, have been publishing reports charting developments in chemistry, which originally took the form of Annual Reports. However, by 1967 the whole spectrum of chemistry could no longer be contained within one volume and the series Specialist Periodical Reports was born. The Annual Reports themselves still existed but were divided into two, and subsequently three, volumes covering Inorganic, Organic and Physical Chemistry. For more general coverage of the highlights in chemistry they remain a 'must'. Since that time the SPR series has altered according to the fluctuating degree of activity in various fields of chemistry. Some titles have remained unchanged, while others have altered their emphasis along with their titles; some have been combined under a new name whereas others have had to be discontinued. The current list of Specialist Periodical Reports can be seen on the inside flap of this volume.

Directed Assembly of Cubic Metal-cyanide Clusters

The Chemistry of Nanostructured Materials

Synthesis, Characterization, and Reactivity of High-nuclearity Metal-cyanide Clusters

Journal

From the Isolation of Ligand-stabilized Solid Fragments to the Tuning of Magnetic Anisotropy and Host-guest Selectivity and Approaches to Science Teaching ; Development of an Observation Instrument with a Measurement Model Based on Item Response Theory

Molecular Architectures and Building Blocks for Spintronics

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.

Comprehensive Coordination Chemistry II (CCC II) is the sequel to what has become a classic in the field, Comprehensive Coordination Chemistry, published in 1987. CCC II builds on the first and surveys new developments authoritatively in over 200 newly comissioned chapters, with an emphasis on current trends in biology, materials science and other areas of contemporary scientific interest.

Nanomagnetism is a rapidly expanding area of research which appears to be able to provide novel applications. Magnetic molecules are at the very bottom of the possible size of nanomagnets and they provide a unique opportunity to observe the coexistence of classical and quantum properties. The discovery in the early 90's that a cluster comprising twelve manganese ions shows hysteresis of molecular origin, and later proved evidence of quantum effects, opened a new research area which is still flourishing through the collaboration of chemists and physicists. This book is the first attempt to cover in detail the new area of molecular nanomagnetism, for which no other book is available. In fact research and review articles, and book chapters are the only tools available for newcomers and the experts in the field. It is written by the chemists originators and by a theorist who has been one of the protagonists of the development of the field, and is explicitly addressed to an audience of chemists and physicists, aiming to use a language suitable for the two communities.

Pacifichem 2000 : Honolulu, Hawaii, December 14-19, 2000

Modern Surface Organometallic Chemistry

Synthesis and Technique in Inorganic Chemistry

New Rhenium-containing Metal-cyanide Complexes, Clusters, and Solids

Inorganic Syntheses

Directed Assembly of Single-Molecule and Single-Chain Magnets

Two decades have passed since the original discovery of recoilless nuclear gamma resonance by Rudolf Mossbauer; the spectroscopic method based on this resonance effect - referred to as Mossbauer spectroscopy - has developed into a powerful tool in solid-state research. The users are chemists, physicists, biologists, geologists, and scientists from other disciplines, and the spectrum of problems amenable to this method has become extraordinarily broad. In the present volume we have confined ourselves to applications of Mossbauer spectroscopy to the area of transition elements. We hope that the book will be useful not only to non-Mossbauer special ists with problem-Oriented activities in the chemistry and physics of transition elements, but also to those actively working in the field of Mossbauer spectroscopy on systems (compounds as well as alloys) of transition elements. The first five chapters are directed to introducing the reader who is not familiar with the technique to the principles of the recoilless nuclear resonance effect, the hyperfme interactions between nuclei and electronic properties such as electric and magnetic fields, some essential aspects about measurements, and the evaluation of Moss bauer spectra. Chapter 6 deals with the interpretation of Mossbauer parameters of iron compounds. Here we have placed emphasis on the information about the electronic structure, in correlation with quantum chemical methods, because of its importance for chemical bonding and magnetic properties.

Smart Tools for Smart Applications

Advances in Organometallic Chemistry

From Building Blocks to Core Rearrangements

2000 International Chemical Congress of Pacific Basin Societies

Macroeconomics for Business and Society

A Laboratory Manual