Crystal Field Theory History

In 1845 a blight of unknown origin destroyed the potato crop in Ireland triggering a series of events that would change forever the course of Ireland's history. The British government called the famine an act of God. The Irish called it genocide. By any name the famine caused the death of over one million men, women, and children by starvation and disease. Another two million were forced to flee the country. With the famine as a backdrop, this is a story about two families as different as coarse wool and fine silk. Michael Ranahan, the son of a tenant farmer, dreams of breaking his bondage to the land and going to America. The passage money has been saved. He's made up his mind to go. And then-the blight strikes and Michael must put his dream on hold. The landlord, Lord Somerville, is a compassionate man who struggles to preserve a way of life without compromising his ideals. To add to his troubles, he has to deal with a recalcitrant daughter who chafes at being forced to live in a country of "bog runners."In The Time Of Famine is a story of survival. It's a story of duplicity. But most of all, it's a story of love and sacrifice.

This book is a presentation of a qualitative theory of chemical bonding stressing the physical processes which occur on bond formation. It differs from most (if not all) other books in that it does not seek to

“rationalize” the phenomena of bonding by a series of mnemonic rules. A principal feature is a unified and consistent treatment across all types of bonding in organic, physical and inorganic chemistry. Contents: How Science Deals with Complex ProblemsWhat We Know About Atoms and MoleculesA Strategy for Electronic StructureThe Pauli Principle and OrbitalsA Model Polyatomic: MethaneLone Pairs of ElectronsOrganic Molecules with Multiple BondsMolecular SymmetryDiatomics with Multiple BondsDative BondsDelocalised Electronic Substructures: AromaticityOrganic and Inorganic ChemistryFurther Down the Periodic TableReconsidering Empirical RulesMavericks and Other LawbreakersThe Transition ElementsOmissions and Conclusions Readership: Chemistry undergraduates and graduate students, tutors and lecturers.

In this book, a synthesis of old and new notions straddling the disciplines of physics and chemistry is described.

Since it was first published in 1995, Photonic Crystals has remained the definitive text for both undergraduates and researchers on photonic band-gap materials and their use in controlling the propagation of light. This newly expanded and revised edition covers the latest developments in the field, providing the most up-to-date, concise, and comprehensive book available on these novel

materials and their applications. Starting from Maxwell's equations and Fourier analysis, the authors develop the theoretical tools of photonics using principles of linear algebra and symmetry, emphasizing analogies with traditional solid-state physics and quantum theory. They then investigate the unique phenomena that take place within photonic crystals at defect sites and surfaces, from one to three dimensions. This new edition includes entirely new chapters describing important hybrid structures that use band gaps or periodicity only in some directions: periodic waveguides, photonic-crystal slabs, and photonic-crystal fibers. The authors demonstrate how the capabilities of photonic crystals to localize light can be put to work in devices such as filters and splitters. A new appendix provides an overview of computational methods for electromagnetism. Existing chapters have been considerably updated and expanded to include many new three-dimensional photonic crystals, an extensive tutorial on device design using temporal coupled-mode theory, discussions of diffraction and refraction at crystal interfaces, and more. Richly illustrated and accessibly written, Photonic Crystals is an indispensable resource for students and researchers. Extensively revised and expanded Features improved graphics throughout Includes new chapters on photonic-crystal fibers and combined index-and band-gap-guiding Provides an

introduction to coupled-mode theory as a powerful tool for device design Covers many new topics, including omnidirectional reflection, anomalous refraction and diffraction, computational photonics, and much more.

Scientific realists claim we can justifiably believe that science is getting at the truth. However, they have faced historical challenges: various episodes across history appear to demonstrate that even strongly supported scientific theories can be overturned and left behind. In response, realists have developed new positions and arguments. As a result of specific challenges from the history of science, and realist responses, we find ourselves with an ever-increasing dataset bearing on the (possible) relationship between science and truth. The present volume introduces new historical cases impacting the debate and advances the discussion of cases that have only very recently been introduced. At the same time, shifts in philosophical positions affect the very kind of case study that is relevant. Thus, the historical work must proceed hand in hand with philosophical analysis of the different positions and arguments in play. It is with this in mind that the volume is divided into two sections, entitled "Historical Cases for the Debate" and "Contemporary Scientific Realism." All sides agree that historical cases are informative with regard to how, or whether, science connects with truth. Defying proclamations as early as the 1980s

announcing the death knell of the scientific realism debate, here is that rare thing: a philosophical debate making steady and definite progress. Moreover, the progress it is making concerns one of humanity's most profound and important questions: the relationship between science and truth, or, put more boldly, the epistemic relation between humankind and the reality in which we find ourselves.

As it results from the very nature of things, the spherical symmetry of the surrounding of a site in a crystal lattice or an atom in a molecule can never occur. Therefore, the eigenfunctions and eigenvalues of any bound ion or atom have to differ from those of spherically symmetric respective free ions. In this way, the most simplified concept of the crystal field effect or ligand field effect in the case of individual molecules can be introduced. The conventional notion of the crystal field potential is narrowed to its non-spherical part only through ignoring the dominating spherical part which produces only a uniform energy shift of gravity centres of the free ion terms. It is well understood that the non-spherical part of the effective potential "seen" by open-shell electrons localized on a metal ion plays an essential role in most observed properties. Light adsorption, electron paramagnetic resonance, inelastic neutron scattering and basic characteristics derived from magnetic and thermal

measurements, are only examples of a much wider class of experimental results dependent on it. The influence is discerned in all kinds of materials containing unpaired localized electrons: ionic crystals, semiconductors and metallic compounds including materials as intriguing as high-Tc superconductors, or heavy fermion systems. It is evident from the above that we deal with a widespread effect relative to all free ion terms except those which can stand the lowered symmetry, e.g. S-terms. Despite the universality of the phenomenon, the available handbooks on solid state physics pay only marginal attention to it, merely making mention of its occurrence. Present understanding of the origins of the crystal field potential differs essentially from the pioneering electrostatic picture postulated in the twenties. The considerable development of the theory that has been put forward since then can be traced in many regular articles scattered throughout the literature. The last two decades have left their impression as well but, to the authors' best knowledge, this period has not been closed with a more extended review. This has also motivated us to compile the main achievements in the field in the form of a book.

From basic principles of luminescence to innovative technical applications, Phosphor Handbook will serve as the definitive resource on phosphors. Considering all the major changes in the field of

phosphors, the editors have produced the most current and comprehensive reference available today. Contributed by noted worldwide scientists and engineers, the handbook serves a ready audience among researchers in the field of luminescence. This book completely describes: powder phosphors, including information on solid state laser materials and organic EL properties and technical applications of phosphors, including the principal classes of phosphors, procedures to synthesize and manufacture these phosphors, manner of deployment, and materials that emit light under various kinds of excitation current developments of phosphor materials required in advanced display technologies, such as UV Plasma Display and Field Emission Display (FED) experimental techniques characterizing materials in their initial and final forms Other provisos include: tutorials of fundamental physical and chemical properties of phosphor materials descriptions of optical properties of phosphor materials profiles on methods of synthesis and manufacture of all practical phosphors analysis of experimental procedures for the optical characterization of raw phosphors and the creation of display devices or lamps specification of physical and optical requirements for all applications of phosphors in lighting and display technologies Japanese industry has and will continue to play a key role in developing these applications, and many

contributors to this volume acted as principals in the progress discussed. Display technologies will increase in importance, and no cohesive or comprehensive treatise exists - from basic to applied - on the nature, properties, synthesis, characterization, manufacture, and handling of phosphor materials in lighting and display technologies and applications. This exceptional handbook rectifies this deficiency, serving as the defining resource for all those engaged in research or in the application of phosphor materials - regardless of whether they are newcomers or veterans in this endeavor.

Introduction to Group Theory with Applications covers the basic principles, concepts, mathematical proofs, and applications of group theory. This book is divided into 13 chapters and begins with discussions of the elementary topics related to the subject, including symmetry operations and group concepts. The succeeding chapters deal with the properties of matrix representations of finite groups, the vibrations of molecular and crystals, vibrational wave function, selection rules, and molecular approximations. These topics are followed by reviews of the basic of quantum mechanics, crystal field theory, atomic physics, hybrid functions, and molecular orbital theory. The last chapters describe the symmetry of crystal lattices, the band theory of solids, and the full rotation group. This book will be of value to

undergraduate mathematics and physics students. Inorganic Chemistry for Geochemistry and Environmental Sciences: Fundamentals and Applications discusses the structure, bonding and reactivity of molecules and solids of environmental interest, bringing the reactivity of non-metals and metals to inorganic chemists, geochemists and environmental chemists from diverse fields. Understanding the principles of inorganic chemistry including chemical bonding, frontier molecular orbital theory, electron transfer processes, formation of (nano) particles, transition metal-ligand complexes, metal catalysis and more are essential to describe earth processes over time scales ranging from 1 nanosec to 1 Gigayr. Throughout the book, fundamental chemical principles are illustrated with relevant examples from geochemistry, environmental and marine chemistry, allowing students to better understand environmental and geochemical processes at the molecular level. Topics covered include: • Thermodynamics and kinetics of redox reactions • Atomic structure • Symmetry • Covalent bonding, and bonding in solids and nanoparticles • Frontier Molecular Orbital Theory • Acids and bases • Basics of transition metal chemistry including • Chemical reactivity of materials of geochemical and environmental interest Supplementary material is provided online, including PowerPoint slides, problem sets and solutions. Inorganic Chemistry for

Geochemistry and Environmental Sciences is a rapid assimilation textbook for those studying and working in areas of geochemistry, inorganic chemistry and environmental chemistry, wishing to enhance their understanding of environmental processes from the molecular level to the global level.

Mineralogical Applications of Crystal Field TheoryCambridge University Press

Beginning with 1953, entries for Motion pictures and filmstrips, Music and phonorecords form separate parts of the Library of Congress catalogue. Entries for Maps and atlases were issued separately 1953-1955.

This volume traces the history of liquid crystals from their discovery as a controversial new state of matter to their use as the active component in advanced opto-electronic visual displays. The story is told through reprinted original papers of key scientists published during the period 1888 to 1984, and the papers are accompanied by biographies of their authors.

Contributing Authors Include Fred Basolo, B. P. Block, Robert C. Brasted And Others.

with contributions by numerous experts

The fascinating phenomenon ferromagnetism is far from being fully understood, although it surely belongs to the oldest problems of solid state physics. For any investigation it appears recommendable to distinguish between materials whose spontaneous magnetization

stems from localized electrons of a partially ?lled atomic shell and those in which it is due to itinerant electrons of a partially ?lled conduction band. In the latter case one speaks of band-ferromagnetism, prototypes of which are the classical ferromagnets Fe, Co, and Ni. The present book is a status report on the remarkable progress that has recently been made towards a microscopic understanding of band-ferromagnetism as an electron c- relation e?ect. The authors of the various chapters of this book “Band-Ferromagnetism: Ground-State and Finite-Temperature Phenomena” participated as selected - perts in the 242nd WE-Heraeus-Seminar (4-6 October 2000) held under almost the same title in Wandlitz near Berlin (Germany). It was the second seminar of this type in Wandlitz. (The ?rst in 1998 dealt with the complementary topic of the physics of local-moment ferromagnets such as Gd). Twenty-six invited spe- ers from ten di?erent countries together with ?fty-?ve further participants, who presented contributions in form of posters, spent three days together discussing in an enthusiastic and fertile manner the hot topics of band-ferromagnetism.

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.

French science-fiction (SF) is as old as the French language. Cyrano de Bergerac wrote about a trip to the moon that was published back in 1657, as did Jules Verne in 1865, this time using hard, scientific facts. The first movie showing a trip to the moon was made by

Georges Méliès in 1902. In the comics' format, Hergé had Tintin walk on the moon in 1954, 15 years before Neil Armstrong. These are just a few of the many unique French contributions to SF that rightly deserve to be better known. One of the purposes of this collection is to introduce French SF to an English-speaking audience. Rediscovering French Science Fiction... first revisits proto science-fiction from authors like Cyrano de Bergerac and Jules Verne, before delving into contemporary science-fiction works from authors such as René Barjavel and Jacques Spitz. A contribution from preeminent SF author Élisabeth Vonarburg, from Québec, helps to understand the constraints and advantages of writing SF in French. A third section is devoted to French SF in movies and graphic novels, media where French creators have been recognized worldwide. This collection explores many aspects of French SF, including the genre's deep roots in popular culture, the influence of key authors on its historical development, and the form and function of science and fantasy, as well as the impact of films and graphic novels on the public perception of the genre's nature.

Advances in Inorganic Chemistry

Noboru Hirota has produced a major historical analysis of how the field of chemistry has evolved over centuries. Spanning more than eight hundred pages, this book presents an exhaustive study of the field, showing how ground-breaking discoveries were made and innovative theories were constructed, with personal portrayals and interesting anecdotes of pioneering scholars. Positioning chemistry carefully within the natural sciences, the

author rejects the traditional separation of physics, chemistry and biology, defines chemistry broadly as the 'science of atoms and molecules, ' and traces its dynamic history with an emphasis on 20th century developments and more recent findings. Professor Hirota himself has spearheaded research in physical chemistry for more than four decades in Japan and the United States, with cutting-edge engagement with magnetic resonance, spectroscopy, and photochemistry. This publication invites specialized researchers to traverse the pathways along which the subject developed into its present form and to understand how their own research fits into the broad scope of science as a whole.

*****Chosen as an Outstanding Academic Title for 2017 by Choice Magazine!! In addition, the Choice subject editors have chosen "A History of Modern Chemistry" as one of their top favorite 25 titles! ***"There are many books on the history of chemistry, but few that provide a comprehensive overview of the field up to the modern day. This book admirably fills that need. Overall, this is an excellent book and is strongly recommended." --Choice, Vol. 54, No. 7, March 2017 [Subject: History of Science, Chemistry

In order to use rare earths successfully in various applications, a good understanding of the chemistry of these elements is of paramount importance. Nearly three to four decades have passed since titles such as The Rare Earths edited by F.H. Spedding and A.H. Daane, The chemistry of the Rare Earth Elements by N.E. Topp and Complexes of the Rare Earths by S.P. Sinha were published. There have been many international

conferences and symposia on rare earths, as well as the series of volumes entitled Handbook of Physics and Chemistry of Rare Earths edited by K.A. Gschneidner and L. Eyring. Thus, there is a need for a new title covering modern aspects of rare earth complexes along with the applications. The present title consists of twelve chapters. 1. Introduction 2. General aspects 3. Stability of complexes 4. Lanthanide complexes 5. Structural chemistry of lanthanide compounds 6. Organometallic complexes 7. Kinetics and mechanisms of rare earths complexation 8. Spectroscopy of lanthanide complexes 9. Photoelectron spectroscopy of rare earths 10. Lanthanide NMR shift reagents 11. Environmental ecological biological aspects 12. Applications The authors studied in schools headed by pioneers in rare earth chemistry, have a combined experience of one hundred and fifty years in inorganic chemistry, rare earth complex chemistry, nuclear and radiochemistry of rare earths and supramolecular chemistry. The present monograph is a product of this rich experience.

This book provides an introduction to the important methods of chiroptical spectroscopy in general, and circular dichroism (CD) in particular, which are increasingly important in all areas of chemistry, biochemistry, and structural biology. The book can be used as a text for undergraduate and graduate students and as a reference for researchers in academia and industry, with or without the companion volume in this set. Experimental methods and instrumentation are described with topics ranging from the most widely used methods (electronic and vibrational CD) to frontier areas

such as nonlinear spectroscopy and photoelectron CD, as well as the theory of chiroptical methods and techniques for simulating chiroptical properties. Each chapter is written by one or more leading authorities with extensive experience in the field.

Perhaps the title of this conference "Ctystalline Electric Field and Structural Effects in f-Electron Systems" reflects best the growth and direction of the field. The title and the conference itself go beyond "CEF" in two broad and important respects. First, the inter-relations between CEF and mode softenings, distortions due to quadruplar ordering or the Jahn Teller effect, have gained greater focus, hence the inclusion of . •• "Structral Effects. " Second, much greater emphasis on the actinides and, in particular, comparisons between actinides and the lighter rare earths is seen in this conference, hence the more general terminology . . . Iff-Electron Systems. " It seems clear that this comparison will lead to an extension to the actinides of mixed valence and Kondo considerations, as well as CEF effects. The emergence of a broader discipline which includes all f-electron systems and which is concerned with unstable, as well as stable, valence reflects the maturation of the field and a coming to grips with the complexity, as well as the unity, of f-electron systems. This maturation is also seen in the growing realization of the effects of CEF on transport, thermodynamic properties, and superconductivity and its co-existence with magnetic order. This volume contains 63 articles, all but two of which were presented at the Conference held in Philadelphia, U. S. A. , on 12-15 November, 1979.

About 100 conferees from 13 countries attended the meeting which consisted of four full days of lecture presentations.

Axel Christian Klixbüll Jørgensen was a “Polyhistor”,one of the very few in the highly specialized science of our time.His interests and contributions in ch- istry covered the whole Periodic Table.This statement demonstrates the breadth of his interests,however,it also sheds light on the constraints of chemistry which deals with a large, yet limited number of elements. It is not surprising that Jørgensen went beyond these limits,exploring the probable or plausible ch- istry of yet unknown elements and elementary particles such as quarks. Even chemistry itself did not place rigid limits on his mind,he was able to transfer his chemical concepts to scientific problems far beyond the normal such as in astrophysics. “Structure and Bonding” is intimately associated with the name C.K. J- gensen both as initiator and author over several decades.The appearance of a special edition in memory of this great scientist is a self-evident prolongation of his many contributions to the success of this series.

Good,No Highlights,No Markup,all pages are intact, Slight Shelfwear,may have the corners slightly dented, may have slight color changes/slightly damaged spine.

Biological magnetic resonance (NMR and EPR) is a rapidly expanding area of research with much activity in most universities and research institutions. International conferences are held biennially with an increasing number of participants. With the introduction of sophisticated and continuously im proving instrumentation, biological magnetic resonance is

approaching the state of a common physical method in biochemical, biomedical, and bio logical research. The lack of monograpbs on the subject had been con spicuous for a long time. This gap started to close only recently. However, because of the rapid expansion and intensive research, many texts are dated by the time of their appearance. Therefore we have undertaken the editing of a series that is intended to provide the practicing chemist, biochemist, or biologist with the advances and progress in selected contemporary topics. In seeking to make the series as authoritative as possible, we have invited authors who have not only made significant contributions but who are also currently active in their fields. We hope that their expertise as well as their first hand experience as reflected in the chapters of this volume will be of benefit to the reader, inter alia, in planning his own experiments and in critically evaluating the current literature.

This Encyclopedia examines all aspects of the history of science in the United States, with a special emphasis placed on the historiography of science in America. It can be used by students, general readers, scientists, or anyone interested in the facts relating to the development of science in the United States. Special emphasis is placed in the history of medicine and technology and on the relationship between science and technology and science and medicine.

J.P. Dahl: Carl Johan Ballhausen (1926–2010).- J.R. Winkler and H.B. Gray: Electronic Structures of Oxo-Metal Ions.- C.D. Flint: Early Days in Kemisk Laboratorium IV and Later Studies.- J.H. Palmer:

Transition Metal Corrole Coordination Chemistry. A Review Focusing on Electronic Structural Studies.- W.C. Trogler: Chemical Sensing with Semiconducting Metal Phthalocyanines.- K.M. Lancaster: Biological Outer-Sphere Coordination.- R.K. Hocking and E.I. Solomon: Ligand Field and Molecular Orbital Theories of Transition Metal X-ray Absorption Edge Transitions.- K.B. Møller and N.E. Henriksen: Time-resolved X-ray diffraction: The dynamics of the chemical bond.

A complete, up-to-date treatment of ligand field theory and its applications Ligand Field Theory and Its Applications presents an up-to-date account of ligand field theory, the model currently used to describe the metal-ligand interactions in transition metal compounds, and the way it is used to interpret the physical properties of the complexes. It examines the traditional electrostatic crystal field model, still widely used by physicists, as well as covalent approaches such as the angular overlap model, which interprets the metal ligand interactions using parameters relating directly to chemical behavior. Written by internationally recognized experts in the field, this book provides a comparison between ligand field theory and more sophisticated treatments as well as an account of the methods used to calculate the energy levels in compounds of the transition metals. It also covers physical properties such as stereochemistry, light absorption, and magnetic behavior. An emphasis on the interpretation of experimental results broadens the book's field of interest beyond transition metal chemistry into the many other areas where these metal ions play an important role. As clear and accessible as Brian

Figgis's 1966 classic Introduction to Ligand Fields, this new book provides inorganic and bioinorganic chemists as well as physical chemists, chemical physicists, and spectroscopists with a much-needed overview of the many significant changes that have taken place in ligand field theory over the past 30 years.

The fourth edition of "The Chemistry of the Actinide and Transactinide Elements" comprises all chapters in volumes 1 through 5 of the third edition (published in 2006) plus a new volume 6. To remain consistent with the plan of the first edition, " ... to provide a comprehensive and uniform treatment of the chemistry of the actinide [and transactinide] elements for both the nuclear technologist and the inorganic and physical chemist," and to be consistent with the maturity of the field, the fourth edition is organized in three parts. The first group of chapters follows the format of the first and second editions with chapters on individual elements or groups of elements that describe and interpret their chemical properties. A chapter on the chemical properties of the transactinide elements follows. The second group, chapters 15-26, summarizes and correlates physical and chemical properties that are in general unique to the actinide elements, because most of these elements contain partially-filled shells of 5f electrons whether present as isolated atoms or ions, as metals, as compounds, or as ions in solution. The third group, chapters 27-39, focuses on specialized topics that encompass contemporary fields related to actinides in the environment, in the human body, and in storage or wastes. Two appendices at the end of volume 5 tabulate

important nuclear properties of all actinide and transactinide isotopes. Volume 6 (Chapters 32 through 39) consists of new chapters that focus on actinide species in the environment, actinide waste forms, nuclear fuels, analytical chemistry of plutonium, actinide chalcogenide and hydrothermal synthesis of actinide compounds. The subject and author indices and list of contributors encompass all six volumes.

With more than 40% new and revised materials, this second edition offers researchers and students in the field a comprehensive understanding of fundamental molecular properties amidst cutting-edge applications. Including ~70 Example-Boxes and summary notes, questions, exercises, problem sets, and illustrations in each chapter, this publication is also suitable for use as a textbook for advanced undergraduate and graduate students. Novel material is introduced in description of multi-orbital chemical bonding, spectroscopic and magnetic properties, methods of electronic structure calculation, and quantum-classical modeling for organometallic and metallobiochemical systems. This is an excellent reference for chemists, researchers and teachers, and advanced undergraduate and graduate students in inorganic, coordination, and organometallic chemistry.

The second edition of this classic book provides an updated look at crystal field theory and its applications.