

## **Anthony West Solid State Chemistry 2nd Edition**

Aimed at senior undergraduates and first-year graduate students, this book offers a principles-based approach to inorganic chemistry that, unlike other texts, uses chemical applications of group theory and molecular orbital theory throughout as an underlying framework. This highly physical approach allows students to derive the greatest benefit of topics such as molecular orbital acid-base theory, band theory of solids, and inorganic photochemistry, to name a few. Takes a principles-based, group and molecular orbital theory approach to inorganic chemistry. The first inorganic chemistry textbook to provide a thorough treatment of group theory, a topic usually relegated to only one or two chapters of texts, giving it only a cursory overview. Covers atomic and molecular term symbols, symmetry coordinates in vibrational spectroscopy using the projection operator method, polyatomic MO theory, band theory, and Tanabe-Sugano diagrams. Includes a heavy dose of group theory in the primary inorganic textbook, most of the pedagogical benefits of integration and reinforcement of this material in the treatment of other topics, such as frontier MO acid-base theory, band theory of solids, inorganic photochemistry, the Jahn-Teller effect, and Wade's

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rules are fully realized Very physical in nature compare to other textbooks in the field, taking the time to go through mathematical derivations and to compare and contrast different theories of bonding in order to allow for a more rigorous treatment of their application to molecular structure, bonding, and spectroscopy Informal and engaging writing style; worked examples throughout the text; unanswered problems in every chapter; contains a generous use of informative, colorful illustrations

This resource volume, written especially for teachers of introductory chemistry courses, is in a ready-to-use format that will enable instructors to integrate materials chemistry into their curriculum. The book collects a critical mass of text, demonstrations, and laboratory experiments. The first ten chapters present a general introduction to solids; numerous easy-to-do teacher demonstrations are integrated into the material. The second part of the volume consists of fifteen laboratory experiments for students. Examples from cutting-edge research, as well as everyday life, spark student interest while illustrating the basic ideas that are important to an understanding of chemistry.

This book provides a clear introduction to topics which are essential to students in a wide range of scientific disciplines but which are otherwise only covered in specialised and mathematically detailed texts. It shows how crystal structures may be built up

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from simple ideas of atomic packing and coordination, it develops the concepts of crystal symmetry, point and space groups by way of two dimensional examples of patterns and tilings, it explains the concept of the reciprocal lattice in simple terms and shows its importance in an understanding of light, X-ray and electron diffraction. Practical examples of the applications of these techniques are described and also the importance of diffraction in the performance of optical instruments. The book is also of value to the general reader since it shows, by biographical and historical references, how the subject has developed and thereby indicates some of the excitement of scientific discovery.

This textbook provides students with a complete working knowledge of the properties of imperfections in crystalline solids. Readers will learn how to apply the fundamental principles of mechanics and thermodynamics to defect properties in materials science, gaining all the knowledge and tools needed to put this into practice in their own research.

Beginning with an introduction to defects and a brief review of basic elasticity theory and statistical thermodynamics, the authors go on to guide the reader in a step-by-step way through point, line, and planar defects, with an emphasis on their structural, thermodynamic, and kinetic properties. Numerous end-of-chapter exercises enable students to put their

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knowledge into practice, and with solutions for instructors and MATLAB® programs available online, this is an essential text for advanced undergraduate and introductory graduate courses in crystal defects, as well as being ideal for self-study. This text provides detailed coverage of physical methods used in bioinorganic chemistry. Individual chapters are devoted to electronic absorption spectroscopy, resonance Raman spectroscopy, electron paramagnetic resonance spectroscopy, ENDOR and ESEEM, magnetic circular dichroism, Mössbauer spectroscopy, magnetism, NMR spectroscopy as applied to paramagnetic systems, and x-ray absorption spectroscopy. The book aims to provide a fundamental understanding of each method and demonstrate how data obtained from a system of bioinorganic interest can be interpreted. Case studies are presented in the last chapter in which more than one technique has been applied to gain insight into each given bioinorganic problem. By integrating theory with experimentation and providing an orientation that is more biological than that presented in previously published books, *Physical Methods in Bioinorganic Chemistry: Spectroscopy and Magnetism* will serve as an important new text for students of bioinorganic chemistry, biochemistry, molecular biology, and their professors.

The Essential Reference for the Field, Featuring Protocols, Analysis, Fundamentals, and the Latest

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Advances Impedance Spectroscopy: Theory, Experiment, and Applications provides a comprehensive reference for graduate students, researchers, and engineers working in electrochemistry, physical chemistry, and physics. Covering both fundamentals concepts and practical applications, this unique reference provides a level of understanding that allows immediate use of impedance spectroscopy methods. Step-by-step experiment protocols with analysis guidance lend immediate relevance to general principles, while extensive figures and equations aid in the understanding of complex concepts. Detailed discussion includes the best measurement methods and identifying sources of error, and theoretical considerations for modeling, equivalent circuits, and equations in the complex domain are provided for most subjects under investigation. Written by a team of expert contributors, this book provides a clear understanding of impedance spectroscopy in general as well as the essential skills needed to use it in specific applications. Extensively updated to reflect the field's latest advances, this new Third Edition: Incorporates the latest research, and provides coverage of new areas in which impedance spectroscopy is gaining importance Discusses the application of impedance spectroscopy to viscoelastic rubbery materials and biological systems Explores impedance spectroscopy applications in

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electrochemistry, semiconductors, solid electrolytes, corrosion, solid state devices, and electrochemical power sources Examines both the theoretical and practical aspects, and discusses when impedance spectroscopy is and is not the appropriate solution to an analysis problem Researchers and engineers will find value in the immediate practicality, while students will appreciate the hands-on approach to impedance spectroscopy methods. Retaining the reputation it has gained over years as a primary reference, Impedance Spectroscopy: Theory, Experiment, and Applications once again present a comprehensive reference reflecting the current state of the field.

A modern and thorough treatment of the field for upper-level undergraduate and graduate courses in materials science and chemistry.

"A comprehensive guide to solid-state chemistry which is ideal for all undergraduate levels. It covers well the fundamentals of the area, from basic structures to methods of analysis, but also introduces modern topics such as sustainability." Dr. Jennifer Readman, University of Central Lancashire, UK "The latest edition of Solid State Chemistry combines clear explanations with a broad range of topics to provide students with a firm grounding in the major theoretical and practical aspects of the chemistry of solids." Professor Robert Palgrave, University College London, UK Building a foundation with a thorough description of crystalline structures, this fifth edition of Solid State Chemistry: An Introduction presents a wide range of the synthetic and physical techniques used to prepare and characterise solids.

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Going beyond this, this largely nonmathematical introduction to solid-state chemistry includes the bonding and electronic, magnetic, electrical, and optical properties of solids. Solids of particular interest—porous solids, superconductors, and nanostructures—are included. Practical examples of applications and modern developments are given. It offers students the opportunity to apply their knowledge in real-life situations and will serve them well throughout their degree course. New in the Fifth Edition A new chapter on sustainability in solid-state chemistry written by an expert in this field Cryo-electron microscopy X-ray photoelectron spectroscopy (ESCA) Covalent organic frameworks Graphene oxide and bilayer graphene Elaine A. Moore studied chemistry as an undergraduate at Oxford University and then stayed on to complete a DPhil in theoretical chemistry with Peter Atkins. After a two-year postdoctoral position at the University of Southampton, she joined the Open University in 1975, becoming a lecturer in chemistry in 1977, senior lecturer in 1998, and reader in 2004. She retired in 2017 and currently has an honorary position at the Open University. She has produced OU teaching texts in chemistry for courses at levels 1, 2, and 3 and written texts in astronomy at level 2 and physics at level 3. She was team leader for the production and presentation of an Open University level 2 chemistry module delivered entirely online. She is a Fellow of the Royal Society of Chemistry and a Senior Fellow of the Higher Education Academy. She was co-chair for the successful Departmental submission of an Athena Swan bronze award. Lesley E. Smart studied chemistry at Southampton University, United Kingdom. After completing a PhD in Raman spectroscopy, she moved to a lectureship at the (then) Royal University of Malta. After returning to the United Kingdom, she took an SRC Fellowship to Bristol University to work on X-ray crystallography. From

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1977 to 2009, she worked at the Open University chemistry department as a lecturer, senior lecturer, and Molecular Science Programme director, and she held an honorary senior lectureship there until her death in 2016. At the Open University, she was involved in the production of undergraduate courses in inorganic and physical chemistry and health sciences. She served on the Council of the Royal Society of Chemistry and as the chair of their Benevolent Fund.

Uses an integrated, scientists' approach to the principles regulating the synthesis, structure and physical characteristics of crystalline solids. Mathematical derivations are kept to a minimum. Covers electrical properties of metals and band semiconductors, superionic conductors, ferrites and solid electrolytes. Features end-of-chapter problem sets. Transition states play a significant role in the function of enzymes, but to make use of this fact in the design of novel catalysts it is necessary to understand the underlying chemistry of these states. Although other texts touch upon transitions states in relation to enzymes and catalysis this is the first to provide a focused and comprehensive overview of the topic. It discusses how an understanding of transition states impacts drug discovery and the engineering of novel biocatalysts, and highlights key problems in the field that remain to be addressed. Combining both computational and experimental research, this accessible text is a useful reference for those studying enzyme catalysed reactions at a postgraduate level, as well as being a handy primer for the more advanced researcher.

Molecular Driving Forces, Second Edition E-book is an introductory statistical thermodynamics text that describes the principles and forces that drive chemical and biological processes. It demonstrates how the complex behaviors of molecules can result from a few simple physical processes,

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and how simple models provide surprisingly accurate insights into the workings of the molecular world. Widely adopted in its First Edition, *Molecular Driving Forces* is regarded by teachers and students as an accessible textbook that illuminates underlying principles and concepts. The Second Edition includes two brand new chapters: (1) "Microscopic Dynamics" introduces single molecule experiments; and (2) "Molecular Machines" considers how nanoscale machines and engines work. "The Logic of Thermodynamics" has been expanded to its own chapter and now covers heat, work, processes, pathways, and cycles. New practical applications, examples, and end-of-chapter questions are integrated throughout the revised and updated text, exploring topics in biology, environmental and energy science, and nanotechnology. Written in a clear and reader-friendly style, the book provides an excellent introduction to the subject for novices while remaining a valuable resource for experts.

This the 100th anniversary of one of worst man-made disasters of the 20th century. When the Iroquois Theatre opened in Chicago on November 23, 1903, it was considered one of the grandest structures of its day, a monument to modern design and technology, as well as "absolutely fireproof." This was a theatre that would rival any in New York or Paris. Instead it became the funeral pyre for hundreds of victims. Tony Hatch, former CBS reporter and Emmy Award winner, tells the grisly story in meticulous, riveting detail, based on more than forty years of research, including many exclusive interviews with eyewitnesses. In *Tinder Box*, he tells the Iroquois story as it has never been told before. In a rush to open the theatre on time, corners were cut, and the Iroquois lacked the most basic fire-fighting equipment: sprinklers, fire alarm boxes, backstage telephone, exit signs and functioning asbestos curtain. Some exists, for aesthetic reasons, were hidden behind heavy draperies, doors opened

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inward and exterior fire escapes were unfinished. But Chicago officials, the theatre owners and managers, the contractor, stagehands—all looked the other way. Then, on December 30, 1903, disaster struck. The theatre was packed, overcrowded with a standing-room-only audience, mostly women and children who had come to see the popular comedian Eddie Foy perform in the musical fantasy *Mr. Bluebeard*. A short circuit in a single backstage spotlight touched off a small fire that, in minutes, erupted into an uncontrollable blaze. More than 600 people died. Because of the magnitude of the catastrophe and the obvious corruption that allowed it to happen, building and fire laws were changed to prevent it everhappening again. *Tinder Box* is a riveting history of a traumatic and costly calamity.

As 2019 has been declared the International Year of the Periodic Table, it is appropriate that Structure and Bonding marks this anniversary with two special volumes. In 1869 Dmitri Ivanovitch Mendeleev first proposed his periodic table of the elements. He is given the major credit for proposing the conceptual framework used by chemists to systematically inter-relate the chemical properties of the elements. However, the concept of periodicity evolved in distinct stages and was the culmination of work by other chemists over several decades. For example, Newland's Law of Octaves marked an important step in the evolution of the periodic system since it represented the first clear statement that the properties of the elements repeated after intervals of 8. Mendeleev's predictions demonstrated in an impressive manner how the periodic table could be used to predict the occurrence and properties of new elements. Not all of his many predictions proved to be valid, but the discovery of scandium, gallium and germanium represented sufficient vindication of its utility and they cemented its enduring influence. Mendeleev's periodic table was based on the atomic weights of the elements and it

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was another 50 years before Moseley established that it was the atomic number of the elements, that was the fundamental parameter and this led to the prediction of further elements. Some have suggested that the periodic table is one of the most fruitful ideas in modern science and that it is comparable to Darwin's theory of evolution by natural selection, proposed at approximately the same time. There is no doubt that the periodic table occupies a central position in chemistry. In its modern form it is reproduced in most undergraduate inorganic textbooks and is present in almost every chemistry lecture room and classroom. This second volume provides chemists with an overview of the important role played by the Periodic Table in advancing our knowledge of solid state and bioinorganic chemistry. It also illustrates how it has been used to fine-tune the properties of compounds which have found commercial applications in catalysis, electronics, ceramics and in medicinal chemistry.

Coordination chemistry, as we know it today, has been shaped by major figures from the past, one of whom was Joseph Chatt. Beginning with a description of Chatt's career presented by co-workers, contemporaries and students, this fascinating book then goes on to show how many of today's leading practitioners in the field, working in such diverse areas as phosphines, hydrogen complexes, transition metal complexes and nitrogen fixation, have been influenced by Chatt. The reader is then brought right up-to-date with the inclusion of some of the latest research on these topics, all of which serves to underline Chatt's continuing legacy. Intended as a permanent record of Chatt's life, work and influence, this book will be of interest to lecturers, graduate students, researchers and science historians.

An easy-to-read textbook linking together bond strength and the arrangement of atoms in space with

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the properties that they control.

Solid State Chemistry and its Applications, 2nd Edition: Student Edition is an extensive update and sequel to the bestselling textbook Basic Solid State Chemistry, the classic text for undergraduate teaching in solid state chemistry worldwide. Solid state chemistry lies at the heart of many significant scientific advances from recent decades, including the discovery of high-temperature superconductors, new forms of carbon and countless other developments in the synthesis, characterisation and applications of inorganic materials. Looking forward, solid state chemistry will be crucial for the development of new functional materials in areas such as energy, catalysis and electronic materials. This revised edition of Basic Solid State Chemistry has been completely rewritten and expanded to present an up-to-date account of the essential topics and recent developments in this exciting field of inorganic chemistry. Each section commences with a gentle introduction, covering basic principles, progressing seamlessly to a more advanced level in order to present a comprehensive overview of the subject. This new Student Edition includes the following updates and new features: Expanded coverage of bonding in solids, including a new section on covalent bonding and more extensive treatment of metallic bonding. Synthetic methods are covered extensively and new topics include

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microwave synthesis, combinatorial synthesis, mechano-synthesis, atomic layer deposition and spray pyrolysis. Revised coverage of electrical, magnetic and optical properties, with additional material on semiconductors, giant and colossal magnetoresistance, multiferroics, LEDs, fibre optics and solar cells, lasers, graphene and quasicrystals. Extended chapters on crystal defects and characterisation techniques. Published in full colour to aid comprehension. Extensive coverage of crystal structures for important families of inorganic solids is complemented by access to CrystalMaker® visualization software, allowing readers to view and rotate over 100 crystal structures in three dimensions. Solutions to exercises and supplementary lecture material are available online. Solid State Chemistry and its Applications, 2nd Edition: Student Edition is a must-have textbook for any undergraduate or new research worker studying solid state chemistry.

In this book we explore how thermodynamics can help us predict how the properties of materials and mixtures change during chemical reactions and alongside this show how the underlying molecular structures, interactions and entropy, determine the reactions.

Offers advice on estate-planning, identifies key documents, and explains the technical jargon.

Bridging the fields of conservation, art history, and

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museum curating, this volume contains the principal papers from an international symposium titled "Historical Painting Techniques, Materials, and Studio Practice" at the University of Leiden in Amsterdam, Netherlands, from June 26 to 29, 1995. The symposium—designed for art historians, conservators, conservation scientists, and museum curators worldwide—was organized by the Department of Art History at the University of Leiden and the Art History Department of the Central Research Laboratory for Objects of Art and Science in Amsterdam. Twenty-five contributors representing museums and conservation institutions throughout the world provide recent research on historical painting techniques, including wall painting and polychrome sculpture. Topics cover the latest art historical research and scientific analyses of original techniques and materials, as well as historical sources, such as medieval treatises and descriptions of painting techniques in historical literature. Chapters include the painting methods of Rembrandt and Vermeer, Dutch 17th-century landscape painting, wall paintings in English churches, Chinese paintings on paper and canvas, and Tibetan thangkas. Color plates and black-and-white photographs illustrate works from the Middle Ages to the 20th century.

Basic Solid State Chemistry, Second Edition is a thorough revision of this best selling introductory

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text. This new edition provides the reader with an up to date account of the essential topics in this exciting and developing area. Whilst the structure of the first edition has been retained, introducing topics in a logical and coherent way, the text has been revised to include latest developments and concepts. There is a new chapter on Synthetic Methods covering solid state, precursor, chemie douce, intercalation, gas phase (MOCVD, vapour phase transport), hydrothermal and other methods. In addition there is new material on fullerenes, spinels and applications of phase diagrams. The coverage of solid solutions has been expanded and many of the diagrams have been considerably improved, as have the examples and problems.

The field of highly frustrated magnetism has developed considerably and expanded over the last 15 years. Issuing from canonical geometric frustration of interactions, it now extends over other aspects with many degrees of freedom such as magneto-elastic couplings, orbital degrees of freedom, dilution effects, and electron doping. It is thus shown here that the concept of frustration impacts on many other fields in physics than magnetism. This book represents a state-of-the-art review aimed at a broad audience with tutorial chapters and more topical ones, encompassing solid-state chemistry, experimental and theoretical physics.

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Devoted to a diverse group of solid state scientists, the book has two objectives, both relating to structural chemistry: (i) a progressive analytic familiarization with the main parameters that govern the organization of crystallized matter and related crystal structures, (ii) a study of what are the various ways to 'read' a structure far beyond its representation in scientific articles. Hence, the reader will, from numerous examples illustrated in color, analyze what are the main characteristics of these structures, from their geometric characteristics, their coordination polyhedra, their connections with the resulting dimensionalities of these solids, including also the defects they exhibit, before looking at possibilities to classify structures, within which recurrence laws can emerge. Chemists are required to understand the potentials of a new structure for becoming future materials scientists. The first part of the book is by no means a database for known structures, but facilitates a progressive understanding of the organization of the solid state. With these tools in hand, the reader is invited in the later part of the book to analyze new structures, and to also use new concepts for viewing structures in a more synthetic way for the future. Such new vision is already leading to the creation of completely new solids with outstanding characteristics that find applications in societal problems concerning energy, energy savings, environment and health. The content is not exclusively academic but relates to the creation of innovative materials, through a more physical approach, that might condition the future of materials.

Beginning with the absolutely critical first moments of the

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outbreak in China, and ending with an epilogue on the vaccine rollout and the unprecedented events between the election of Joseph Biden and his inauguration, Lawrence Wright's *The Plague Year* surges forward with essential information--and fascinating historical parallels--examining the medical, economic, political, and social ramifications of the COVID-19 pandemic.

Crystallography and diffraction are widely used throughout many branches of science for studying structure. However, many students find these subjects abstruse and difficult. The aim of this book is to show, through relevant examples and without relying on complex mathematics, that the basic ideas behind crystallography and diffraction are simple and easily comprehensible. It is written by an experienced teacher with the needs of the student to the fore.

This first volume in the International Technology Education Series offers a unique, worldwide collection of national surveys into the developments of Technology Education in the past two decades.

This classic book gives, in extensive tables, the irreducible representations of the crystallographic point groups and space groups. These are useful in studying the eigenvalues and eigenfunctions of a particle or quasi-particle in a crystalline solid. The theory is extended to the corepresentations of the Shubnikov groups.

Do you need to know what's new in organosilicon chemistry? This book provides in-depth coverage of the latest developments in this interdisciplinary and fast-evolving field: - selectivity and reactivity of organosilicon compounds - new synthetic applications - structure and

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bonding - applications in materials and polymer science  
Written by leading experts, this book is a well-referenced and critical overview of modern silicon chemistry. 'I recommend this book to the student and the practitioner in this new, very different, and very exciting field'.

Eugene G. Rochow /Harvard University

The scientific exploration of solid materials represents one of the most important, fascinating and rewarding areas of scientific endeavour in the present day, not only from the viewpoint of advancing fundamental understanding but also from the industrial perspective, given the immense diversity of applications of solid materials across the full range of commercial sectors. *Turning Points in Solid-State, Materials and Surface Science* provides a state-of-the-art survey of some of the most important recent developments across the spectrum of solid-state, materials and surface sciences, while at the same time reflecting on key turning points in the evolution of this scientific discipline and projecting into the directions for future research progress. The book serves as a timely tribute to the life and work of Professor Sir John Meurig Thomas FRS, who has made monumental contributions to this field of science throughout his distinguished 50-year career in research, during which he has initiated, developed and exploited many important branches of this field. Indeed, the depth and breadth of his contributions towards the evolution and advancement of this scientific discipline, and his critical role in elevating this field to the important position that it now occupies within modern science, are demonstrated recurrently throughout the chapters of this

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book. Individual chapters are contributed by internationally leading experts in their respective fields, and the topics covered include solid-state chemistry of inorganic and organic materials, heterogeneous catalysis, surface science and materials science, with one section of the book focusing on modern developments in electron microscopy and its contributions to chemistry and materials science. The book serves as a modern and up-to-date monograph in these fields, and provides a valuable resource to researchers in academia and industry who require a comprehensive source of information on this important and rapidly developing subject.

Nuclear magnetic resonance (NMR) spectroscopy is one of the most powerful and widely used techniques in chemical research for investigating structures and dynamics of molecules. Advanced methods can even be utilized for structure determinations of biopolymers, for example proteins or nucleic acids. NMR is also used in medicine for magnetic resonance imaging (MRI). The method is based on spectral lines of different atomic nuclei that are excited when a strong magnetic field and a radiofrequency transmitter are applied. The method is very sensitive to the features of molecular structure because also the neighboring atoms influence the signals from individual nuclei and this is important for determining the 3D-structure of molecules. This new edition of the popular classic has a clear style and a highly practical, mostly non-

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mathematical approach. Many examples are taken from organic and organometallic chemistry, making this book an invaluable guide to undergraduate and graduate students of organic chemistry, biochemistry, spectroscopy or physical chemistry, and to researchers using this well-established and extremely important technique. Problems and solutions are included.

Tensors, matrices, symmetry, and structure-property relationships form the main subjects of the book.

While tensors and matrices provide the mathematical framework for understanding anisotropy, on which the physical and chemical properties of crystals and textured materials often depend, atomistic arguments are also needed to qualify the property coefficients in various directions. The atomistic arguments are partly based on symmetry and partly on the basic physics and chemistry of materials.

Inorganic materials chemistry is a central theme in chemistry teaching and research, but it is poorly covered in the main inorganic textbooks. This primer fills the gap in the literature, and provides a comprehensive, inexpensive introduction that covers all the salient points required in an undergraduate course on solid materials. It also addresses the major experimental technique used in this area, powder X-ray diffraction. Topics covered include transition metal oxides, non-stoichiometry, zeolites,

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the chemistry of layer compounds, high temperature superconductors, and fullerides, and presents the synthesis of these compound types.

Bridging the Gap Between Organic Chemistry Fundamentals and Advanced Synthesis Problems Introduction to Strategies of Organic Synthesis bridges the knowledge gap between sophomore-level organic chemistry and senior-level or graduate-level synthesis to help students more easily adjust to a synthetic chemistry mindset. Beginning with a thorough review of reagents, functional groups, and their reactions, this book prepares students to progress into advanced synthetic strategies. Major reactions are presented from a mechanistic perspective and then again from a synthetic chemist's point of view to help students shift their thought patterns and teach them how to imagine the series of reactions needed to reach a desired target molecule. Success in organic synthesis requires not only familiarity with common reagents and functional group interconversions, but also a deep understanding of functional group behavior and reactivity. This book provides clear explanations of such reactivities and explicitly teaches students how to make logical disconnections of a target molecule. This new Second Edition of Introduction to Strategies for Organic Synthesis: Reviews fundamental organic chemistry concepts including functional group transformations, reagents,

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stereochemistry, and mechanisms Explores advanced topics including protective groups, synthetic equivalents, and transition-metal mediated coupling reactions Helps students envision forward reactions and backwards disconnections as a matter of routine Gives students confidence in performing retrosynthetic analyses of target molecules Includes fully-worked examples, literature-based problems, and over 450 chapter problems with detailed solutions Provides clear explanations in easy-to-follow, student-friendly language Focuses on the strategies of organic synthesis rather than a catalogue of reactions and modern reagents The prospect of organic synthesis can be daunting at the outset, but this book serves as a useful stepping stone to refresh existing knowledge of organic chemistry while introducing the general strategies of synthesis. Useful as both a textbook and a bench reference, this text provides value to graduate and advanced undergraduate students alike.

Ultrasonic Methods in Solid State Physics is devoted to studies of energy loss and velocity of ultrasonic waves which have a bearing on present-day problems in solid-state physics. The discussion is particularly concerned with the type of investigation that can be carried out in the megacycle range of frequencies from a few megacycles to kilomegacycles; it deals almost entirely with short-duration pulse methods rather than with standing-

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wave methods. The book opens with a chapter on a classical treatment of wave propagation in solids. This is followed by separate chapters on methods and techniques of ultrasonic pulse echo measurements, and the physics of ultrasonically measurable properties of solids. It is hoped that this book will provide the reader with the special background necessary to read critically the many research papers and special articles concerned with the use of ultrasonic methods in solid state physics. The book is intended to help the person beginning work in this field. At the same time, it will also be useful to those actively involved in such work. An attempt has been made to provide a fairly general and unified treatment suitable for graduate students and others without extensive experience.

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