

## Oxford Chemistry Primers Paperback

Organic chemists need to know how to design effective syntheses. This Primer uses a wide range of examples to teach students how to adopt a logical and flexible approach to the design of synthetic routes. It describes how then to design and control syntheses, and compares four syntheses of pyrrolidine alkaloids using the principles elucidated in the main text. Practice examples are provided throughout, making this concise book a useful study resource for the undergraduate.

The renowned Oxford Chemistry Primers series, which provides focused introductions to a range of important topics in chemistry, has been refreshed and updated to suit the needs of today's students, lecturers, and postgraduate researchers. The rigorous, yet accessible, treatment of each subjectarea is ideal for those wanting a primer in a given topic to prepare them for more advanced study or research. Moreover, cutting-edge examples and applications throughout the texts show the relevance of the chemistry being described to current research and industry.This new edition of NMR Spectroscopy in Inorganic Chemistry has been extensively updated to include worked examples, problems, self-test questions, and interactive online questions encouraging active learning and promoting a deeper understanding. With a concise and accessible introduction topredicting NMR spectra and expanded sections on quadrupolar nuclei, this excellent introductory text will help students get to grips with the basics before building on that understanding through diagrammatic content to explain the more challenging concepts.Examples are included from many different areas of inorganic chemistry which are then closely related to the theory described. By giving a simple overview of the relevant theory and avoiding the "pattern recognition" approach frequently used, it demystifies NMR.

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This book is an account for students of how the three-dimensional shapes of molecules influence their chemical and physical properties. It begins with the structures of molecules and then describes how such structures can be changed.

Electrochemistry

Chemistry

Foundations of Organic Chemistry

Alicyclic Chemistry

Foundations of Physical Chemistry

*This Primer presents an introduction to molecular symmetry and point groups with an emphasis on their applications. The author has adopted a non-mathematical approach as far as possible and the text will supplement those that are too advanced or gloss over important information. Chapter topics include symmetry elements, operations and point groups; matrices, multiplications tables and representations; the reduction formula; molecular vibrations; vibrational spectroscopy and degenerate vibrations; symmetry aspects of chemical bonding and matrices in higher order point groups*

*All the basic principles of the field of aromatic chemistry are clearly presented in this important account. Many compounds of industrial and biological significance are used as examples with consideration given to structure, reactions, and properties. Topics such as thermodynamic versus kinetic control and pericyclic reactions are also introduced. In addition to benzene and the classes of aromatic compounds derived from it, the text covers polycyclic arenes, and the small and large ring systems which are embraced by the wider definition of aromaticity. The text will be especially useful for courses in organic chemistry.*

*Protecting Group Chemistry provides an overview of the general methods that are used to block the reactivity of - i.e. protect - specific functional groups thus allowing others, present within the same molecule, to be manipulated unambiguously. An introductory chapter outlines protecting group strategy, relevant aspects of functional group reactivity, temporary protection, and introduces the concept of protecting group devices as an aid to unifying the wide range of available methods. Therest of the book is divided on the basis of broad classes of the experimental conditions that lead to cleavage of each protecting group (acid/electrophile, base/nucleophile, oxidising or reducing agent). The treatment differs from traditional texts in that it places the emphasis on making a connection between the fundamental mechanisms of organic chemistry - ionisation, substitution, addition, elimination, oxidation and reduction, etc. - and how a particular protecting group can best be selected in a given situation.*

*'provides up-to-date information and clearly explains some of the principles, concepts, and rationale for the foundation of current understanding in inorganic chemistry.'* Education in Chemistry, November 2001*Intended to complement Foundations of Organic Chemistry, the best-selling Primer by Michael Hornby and Josephine Peach, this text is a broad overview of inorganic chemistry. Writing in an informal and relaxed style, Mark Winter and John Andrew cover the basics and also highlight the industrial and environmental relevance of inorganic chemistry.*

Electron Paramagnetic Resonance

Foundations of Inorganic Chemistry

Pericyclic Reactions

Top Drugs: Top Synthetic Routes

Chemical Bonding

***This book will allow students to see how the organic chemistry taught in undergraduate courses is applied by medicinal chemists in industry. Many of today's best selling drugs are first made in the chemical laboratory on a very small scale many years before they enter the market place. During the intervening period, organic chemists investigate alternative methods both to improve the overall yield of the process and to ensure that it operates safely on a manufacturing scale. This book describes briefly how each drug works and then reviews the most efficient routes to their synthesis. The transition metals titanium, vanadium, chromium, manganese, iron, cobalt, nickel and copper are essential for many life-processes, are at the heart of important industrial processes, and are used in everyday life. Their properties are dependent on the electronic structure of the metals. The connection between this and the chemical behaviour of these metals is described in this book.***

***1. Introduction 2. Conformational analysis of alicyclic rings 3. Ring synthesis 4. Conformation and reactivity 5. Polycyclic systems Index***

***Molecular spectroscopy provides a straightforward introduction to the spectroscopy of diatomic molecules and is written at the level of intermediate undergraduate courses in physical chemistry and chemical physics. Following a general introduction to the subject, Chapter 2 lays out the essential quantum mechanical tools required to understand spectroscopy. Chapter 3 uses this quantum mechanical framework to establish the selection rules which govern spectroscopic transitions. Chapters 4-8 describe the various branches of spectroscopy covered by the book: rotational, rotational-vibrational, Raman, electronic, and photoelectron spectroscopy. Very little previous knowledge is assumed and mathematics is kept to a minimum. The author uses a range of examples to describe how spectra arise and what information on the structure of the molecules can be acquired from their study.***

***Foundations of Physics for Chemists***

***Organic Synthesis***

***Fractals in Chemistry***

### ***From Molecules to Crystallizers***

This primer provides an introduction to the subject of surfaces at the level of undergraduates and first year postgraduates. There are four chapters, the first concerns basic thermodynamic material used to understand the properties of surfaces including; surface tension, Gibbs adsorption, surface pressure and surface phase equilibria, surfactants and micelles, wetting, detergency, and contact angle. The second chapter concentrates on gas adsorption at solid surfaces and covers topics including adsorption, Langmuir isotherms, heats of adsorption, BET isotherms, physisorption, chemisorption, precursor adsorption kinetics, well-defined surfaces, UHV, surface sensitivity and selectivity, surface diffusion and electrons interacting with matter. Chapter three then outlines the physico-chemical principles of XPS, AES, LEED, STM, AFM, work function measurements, UPS, TPD, molecular beams, HREELS and PAIRS and the types of fundamental surface information each of these techniques provides. The final chapter contains a series of worked examples and problems, bringing together the various strands developed in Chapters 1-3 in order to elucidate surface phenomena. The book is unique in its mix of 'Classical' and 'Modern' surface science and should be relevant to physicists, chemists and material scientists.

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The authors, who have more than two decades of combined experience teaching an atoms-first course, have gone beyond reorganizing the topics. They emphasize the particulate nature of matter throughout the book in the text, art, and problems, while placing the chemistry in a biological, environmental, or geological context. The authors use a consistent problem-solving model and provide students with ample opportunities to practice.

Introduction to Organic Spectroscopy

Electrode Potentials

Aromatic Chemistry

Computational Chemistry

Organic Stereochemistry

An understanding of spectroscopic techniques in the analysis of chemical structures is essential to all chemistry degree courses. This new addition to the Oxford Chemistry Primers series provides the essential material needed by undergraduates, in a compact form. It will be beneficial to postgraduates in organic chemistry as reference material in their daily research.

Another winning primer! This new addition to the popular series provides a basic introduction to equilibrium electrochemistry, focusing on electrode potentials and their applications. It builds on a knowledge of elementary thermodynamics giving the student an appreciation of the origin of electrode potentials and shows how these are used to deduce a wealth of chemically important information and data such as equilibrium constants, the free energy, enthalpy and entropy changes of chemical reactions, activity coefficients, the selective sensing of ions. It is mathematically simple, the emphasis throughout is on understanding the foundations of the subject and how it may be used to study problems of chemical interest.

The concept of fractals provides a language to describe the shape and behaviour of a wide variety of irregular objects. Such objects could be as varied as a rugged coastline or the frost patterns on a winter window, and the fractals concept implies that all these diverse objects possess a new form of symmetry. This stimulating book introduces the fractal dimension and describes simple experiments that will bring the principles involved to life in a modestly equipped laboratory. The relevance of the concepts to the structure and chemistry of porous solids, and to the growth of polymers and colloids in liquid and gaseous phases is emphasised.

An excellent new primer which uses real examples to show the range of problems which may be encountered in scaling up chemical syntheses and the ways in which they may be overcome.

SURFACES. Edition en anglais

Modern Liquid Phase Kinetics

Statistical Thermodynamics

Worked Examples

Nuclear Magnetic Resonance

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This work examines crystallisation, one of the oldest separation processes used in the chemical industry and still one of the most important.

An ideal introduction to this fast growing area, this Primer describes the many computational methods currently used by practising chemists. The authors describe the various techniques available, and how they can be applied to single molecules, to assemblies of molecules, and to molecules undergoing reaction. An introductory chapter outlines hardware and software options, as well as investigating some applications and developments. Subsequent chapters cover quantum mechanics, molecular mechanics, statistical mechanics, the modelling of biomolecules, and drug design.

The fascinating subject of photochemistry is the explained in a basic and comprehensive manner in this primer. Aimed at an undergraduate audience, the text describes the new chemistry that follows the absorption of light and explains how light has this extraordinary influence on chemical behaviour.

Magnetochemistry

Introduction to Molecular Symmetry

Thermodynamics of Chemical Processes OCP

Protecting Group Chemistry

Photochemistry

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*Advanced school students and beginning undergraduates will find this book a readable and stimulating summary of the fundamentals of organic chemistry. The first three chapters introduce some basic physical chemistry, and lay the groundwork for the mechanistic organic chemistry covered later in the book. The importance of bonding and mechanism are stressed throughout, and students are encouraged to apply their chemical knowledge in new and unfamiliar situations in order to develop and sustain their interest. A wide range of examples including natural products and pharmaceuticals is included, with the final chapter exploring some new developments and providing an introduction to current research.*

*The transition between school and university presents new challenges and ideas for the student of chemistry. This Primer, written jointly by two undergraduates and a university professor is ideally suited to the needs of students at the school/university interface by taking material familiar from school and linking it with a selection of ideas that will be encountered in the freshman year. As well as stimulating preuniversity students it will provide a sound basis for university courses in chemistry and related subjects. The early chapters cover the structure of atoms, ions and molecules, reactivity, kinetics, and equilibria. The final chapter gives an insight into more advanced areas, drawing on real world examples.*

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further reading, and glossary definitions all help to enhance a student's understanding of these essential areas of chemistry. This brand new addition to the series provides the most accessible first introduction to electrochemistry, combining explanation of the fundamental concepts with practical examples of how they are applied in a range of real-world situations.

**Mechanisms of Organic Reactions**

**X-ray Crystallography**

**Mass Spectrometry**

**Fine Chemicals from Grams to Kilograms**

**Process Development**

**Electrochemistry**

*Mechanisms of Organic Reactions is aimed at first and second year chemistry undergraduates. This authoritative and up-to-date overview begins with a chapter in which modern terminology, definitions, and concepts of mechanisms and reactivity are introduced. The following four chapters are accounts of the mechanisms of four of the main classes of reactions of aliphatic compounds. However, rather than simply being presented with the mechanism, the reader is first given the experimental evidence, and then shown how this leads to the mechanistic deductions. With problems at the end of each chapter and a short bibliography this book will be invaluable to first and second year chemistry undergraduates.*

*This Primer has two main objectives: to provide an overview of the influence of organometallic chemistry on homogeneous and heterogenous catalysis and to provide an account of the principle commercial applications of homogeneous catalysis in industry. The book builds on the coverage of organometallic chemistry in two Primers by Bochmann, OCPs 12 and 13.*

*Electron Paramagnetic Resonance (EPR) applications remain very significant in modern analytical science and this volume compiles critical coverage of developments in the recent literature by a handpicked group of researchers at the cutting-edge of the field. The topics covered in this volume describe contrasting types of EPR application, including light induced hyperpolarization and disordered proteins to spin labels and nanomaterials. Providing a snap shot of the area, this book is a useful addition to any library supporting this research.*

**D-block Chemistry**

**Chemistry of the First Row Transition Metals**

**Molecular Spectroscopy**

**NMR Spectroscopy in Inorganic Chemistry**

**Quantum Mechanics**

The world is not at equilibrium, and the events that give vitality and movement are transitions towards equilibrium from the present state of imbalance. Chemical transformations often contribute fundamentally to this process and their study is challenging and important. The early chapters of this text provide a basic introduction to the kinetics of simple and complex reaction systems in solution. The remaining chapters present a treatment of the more advanced topics, comprising solvent effects, fast reaction techniques, and heterogeneous liquid - liquid two-phase systems. The last introduces currently active and important research areas in solution kinetics, including phase-transfer catalysis, and diffusion and transport in chemical and biological membranes.

The authors discuss the chemistry of the lanthanides and actinides, collectively known as the f elements, emphasise the aspects that are unique to them and examine their most important applications in a wide range of modern technologies.

In contrast to the common ionic and radical reactions of organic chemistry, pericyclic reactions are a third distinct class. They have cyclic transition structures in which all bond-forming and bond-breaking takes place in concert, without the formation of an intermediate.

Magnetochemistry is the study of the magnetic properties of materials which is of central importance in the study of transition-metal complexes, providing information on the chemical bonding in these molecules. This book provides an introductory survey of properties of chemical compounds.

**An Atoms-Focused Approach**

**The F Elements**

**Applied Organometallic Chemistry and Catalysis**

This physical chemistry primer is specifically designed to introduce physics to undergraduate chemistry students, and show them how a knowledge of physics is relevant to their degree.

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Nuclear Magnetic Resonance Spectroscopy is the only "tool" available for the determination of high-resolution biological molecule structure in solution. This volume includes methods for expeditiously analyzing the vast amount of data produced by the new 3D and 4D NMR techniques and for generating structures from the data and for assessing the quality of those structures. Application to various classes of important proteins and protein-ligand complexes illustrate uses of the methodology presented. Examination of techniques to explore the dynamic nature of proteins complete the volume.

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