Molecular Orbitals And Organic Chemical Reactions Reference Edition

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winner of the prose award for chemistry physics 2010 acknowledging the very best in professional and scholarly publishing the annual

prose awards recognise publishers and authors commitment to pioneering works of research and for contributing to the conception production and design of landmark works in their fields judged by peer publishers librarians and medical professionals wiley are pleased to congratulate professor ian fleming winner of the prose award in chemistry and physics for molecular orbitals and organic chemical reactions molecular orbital theory is used by chemists to describe the arrangement of electrons in chemical structures it is also a theory capable of giving some insight into the forces involved in the making and breaking of chemical bonds the chemical reactions that are often the focus of an organic chemist s interest organic chemists with a serious interest in understanding and explaining their work usually express their ideas in molecular orbital terms so much so that it is now an essential component of every organic chemist s skills to have some acquaintance with molecular orbital theory molecular orbitals and organic chemical reactions is both a simplified account of molecular orbital theory and a review of its applications in organic chemistry it provides a basic introduction to the subject and a wealth of illustrative examples in this book molecular orbital theory is presented in a much simplified and entirely non mathematical language accessible to every organic chemist whether student or research worker whether mathematically competent or not topics covered include molecular orbital theory molecular orbitals and the structures of organic molecules chemical reactions how far and how fast ionic reactions reactivity ionic reactions stereochemistry pericyclic reactions radical reactions photochemical reactions slides for lectures and presentations are available on the supplementary website wiley com go fleming student molecular orbitals and organic chemical reactions student edition is an invaluable first textbook on this important subject for students of organic physical organic and computational chemistry the reference edition edition takes the content and the same non mathematical approach of the student edition and adds extensive extra subject coverage detail and over 1500 references the additional material adds a deeper understanding of the models used and includes a broader range of applications and case studies providing a complete in depth reference for a more advanced audience this edition will find a place on the bookshelves of researchers and advanced students of organic physical organic and computational chemistry further information can be viewed here these books are the result of years of work which began as an attempt to write a second edition of my 1976 book frontier orbitals and organic chemical reactions i wanted to give a rather more thorough introduction to molecular orbitals while maintaining my focus on the organic chemist who did not want a mathematical account but still wanted to understand organic chemistry at a physical level i m delighted to win this prize and hope a new generation of chemists will benefit from these books professor ian fleming

the organic chemist s book of orbitals focuses on the mechanisms stereochemistry and reactivity of molecular orbitals composed of four chapters the book outlines how molecular orbitals are created by delocalization concerns include cc and ch single bond orbitals bond orbitals and group orbitals and the localized orbitals of ch2 and ch3 groups schematic diagrams are presented to show the nature reactions and compositions of molecular orbitals the text offers a list of molecules and orbital occupancies orbital drawings are presented to show the differences of the molecular orbitals of hydrogen water ammonia methane nitrogen carbon monoxide and acetylene the book also provides an index of references for the molecular geometries and orbital energies employed in the orbital

drawings considering the weight of data presented the book is a great find for readers interested in studying molecular orbitals

molecular orbital theory and frontier orbitals for organic chemistry a practical guide is a crucial text for students of organic chemistry this book provides simple yet quantifiable explanations based on molecular orbital based reasoning it seeks to deepen the reader s understanding of long standing concepts in mo theory while also formulating new ones through perturbation molecular orbital theory written for undergraduates graduates and researchers the book includes many problems with detailed solutions allowing readers to test their knowledge as they progress through each chapter the book emphasizes a practical and pedagogical approach perfected through the authors extensive teaching experience it is ideal for those wishing to gain a thorough understanding of molecular orbital theory from students to seasoned chemists the text aims to be distinct in its methodology making it accessible to a wide audience the inclusion of in chapter problems helps reinforce learning ensuring that readers can immediately apply what they have learned this book serves as an indispensable resource for anyone seeking to master this fundamental aspect of organic chemistry provides clear explanations of the recent concepts and ideas concerning the structure and properties of organic molecules based on molecular orbital theory outlines the genesis of the stereoelectronic effect from perturbation theory the salem klopman equation and the underlying rules of engagement covering ionic pericyclic radical and photochemical reactions includes in chapter problems with detailed worked solutions to reinforce the main themes in the text

a practical introduction to orbital interaction theory and its applications in modern organic chemistry orbital interaction theory is a conceptual construct that lies at the very heart of modern organic chemistry comprising a comprehensive set of principles for explaining chemical reactivity orbital interaction theory originates in a rigorous theory of electronic structure that also provides the basis for the powerful computational models and techniques with which chemists seek to describe and exploit the structures and thermodynamic and kinetic stabilities of molecules orbital interaction theory of organic chemistry second edition introduces students to the fascinating world of organic chemistry at the mechanistic level with a thoroughly self contained well integrated exposition of orbital interaction theory and its applications in modern organic chemistry professor rauk reviews the concepts of symmetry and orbital theory and explains reactivity in common functional groups and reactive intermediates in terms of orbital interaction theory aided by numerous examples and worked problems he guides readers through basic chemistry concepts such as acid and base strength nucleophilicity electrophilicity and thermal stability in terms of orbital interactions and describes various computational models for describing those interactions updated and expanded this latest edition of orbital interaction theory of organic chemistry includes a completely new chapter on organometallics increased coverage of density functional theory many new application examples and worked problems the text is complemented by an interactive computer program that displays orbitals graphically and is available through a link to a site orbital interaction theory of organic chemistry second edition is an excellent text for advanced level undergraduate and graduate students in organic chemistry it is also a valuable working resource for professional chemists seeking

guidance on interpreting the quantitative data produced by modern computational chemists

increase your understanding of molecular properties and reactions with this accessible textbook the study of organic chemistry hinges on an understanding and capacity to predict molecular properties and reactions molecular orbital theory is a model grounded in quantum mechanics deployed by chemists to describe electron organization within a chemical structure it unlocks some of the most prevalent reactions in organic chemistry basic concepts of orbital theory in organic chemistry provides a concise accessible overview of this theory and its applications beginning with fundamental concepts such as the shape and relative energy of atomic orbitals it proceeds to describe the way these orbitals combine to form molecular orbitals with important ramifications for molecular properties the result is a work which helps students and readers move beyond localized bonding models and achieve a greater understanding of organic chemical interactions in basic concepts of orbital theory in organic chemistry readers will also find comprehensive explorations of stereoelectronic interactions and sigmatropic cheletropic and electrocyclic reactions detailed discussions of hybrid orbitals bond formation in atomic orbitals the hückel molecular orbital method and the conservation of molecular orbital symmetry sample exercises for organic chemistry students to help reinforce and retain essential concepts basic concepts of orbital theory in organic chemistry is ideal for advanced undergraduate and graduate students in chemistry particularly organic chemistry

this textbook is where you the student have an introduction to organic chemistry regular time spent in learning these concepts will make your work here both easier and more fun

approx 528 pagesapprox 528 pages

a modern guide to environmental chemistry chemistry of environmental systems fundamental principles and analytical methods offers a comprehensive and authoritative review of modern environmental chemistry discussing the chemistry and interconnections between the atmosphere hydrosphere geosphere and biosphere written by internationally recognized experts the textbook explores the chemistries of the natural environmental systems and demonstrates how these chemical processes change when anthropogenic emissions are introduced into the whole earth system this important text combines the key areas of environmental chemistry needed to understand the sources fates and impacts of contaminants in the environment describes a range of environmental analytical methodologies explores the basic environmental effects of energy sources including nuclear energy encourages a proactive approach to environmental chemistry with a focus on preventing future environmental problems includes study questions at the end of each chapter written for students of environmental chemistry environmental science environmental engineering geoscience earth and atmospheric sciences chemistry of environmental systems fundamental principles and analytical methods covers the key aspects and mechanisms of currently identified environmental issues which can be used to address both current and future environmental

problems

this text develops photochemical and photophysical concepts from a set of familiar principles principles of molecular photochemistry provides in depth coverage of electronic spin the concepts of electronic energy transfer and electron transfer and the progress made in theoretical and experimental electron transfer

the updated third edition of the only textbook on colour the revised third edition of colour and the optical properties of materials focuses on the ways that colour is produced both in the natural world and in a wide range of applications the expert author offers an introduction to the science underlying colour and optics and explores many of the most recent applications the text is divided into three main sections behaviour of light in homogeneous media which can largely be explained by classical wave optics the way in which light interacts with atoms or molecules which must be explained mainly in terms of photons and the interaction of light with insulators semiconductors and metals in which the band structure notions are of primary concern the updated third edition retains the proven concepts outlined in the previous editions and contains information on the significant developments in the field with many figures redrawn and new material added the text contains new or extended sections on photonic crystals holograms flat lenses super resolution optical microscopy and modern display technologies this important book offers and introduction to the science that underlies the everyday concept of colour reviews the cross disciplinary subjects of physics chemistry biology and materials science to link light colour and perception includes information on many modern applications such as the numerous different colour displays now available optical amplifiers lasers super resolution optical microscopy and lighting including leds and oleds contains new sections on photonic crystals holograms flat lenses super resolution optical microscopy and display technologies presents many worked examples with problems and exercises at the end of each chapter written for students in materials science physics chemistry and the biological sciences the third edition of colour and the optical properties of materials covers the basic science of the topic and has been thoroughly updated to include recent advances in the field

this book is a basic reference providing concise accurate definitions of the key terms and concepts of organic chemistry not simply a listing of organic compounds structures and nomenclatures the book is organized into topical chapters in which related terms and concepts appear in close proximity to one another giving context to the information and helping to make fine distinctions more understandable areas covered include bonding symmetry stereochemistry types of organic compounds reactions mechansims spectroscopy and photochemistry

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