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Book Review

Modern Molecular Photochemistry of Organic Molecules

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The book will be of interest to scientists doing organic chemistry, as well as nanotechnology, chemical biology, physical chemistry and polymer and materials science. It contains a wealth of information on photochemical and photophysical processes with a systematic approach and readers will not be disappointed.

Organic photochemistry first emerged in the 1960s as a significant discipline. Now, some 50 years later, the book shows how diverse the field has become. The authors who are well-recognized photochemists connect topics old and new, from the incorporation of quantum and molecular orbital theory to the present state of the discipline. There are 15 chapters; each contains many subsections, where the authors pay close attention to the basic principles of photochemistry and photophysics of organic compounds.

Chapters 1–3 include an introduction and overview to organic photochemistry in the 21st century, and the merits for studying it. Descriptions of atomic and molecular orbitals and electronic configurations are provided, including a vector model of electron spin. I found it particularly interesting to read about the role of orbital orientation in spin–orbit coupling. The topics were written making it easy to follow, and lacked any lengthy mathematical treatments.

Chapters 4 and 5 cover radiative transitions between electronic states in processes, such as light absorption and emission of compounds. Pictorial representations are given that always help the reader in what is being explained. There are many diagrams to help visualize processes, such as spin–orbit coupling-induced radiationless transitions in intersystem crossing and other electronic relaxations.

A theoretical treatment of organic photoreactions is given in Chapter 6. This treatment is based on potential energy surfaces and correlation diagrams, among other things, including funnels that effectively ''mate'' surfaces. One discussion was aimed at an energy surface paradigm for organic photochemical reactions.

Chapters 7 and 8 describe energy transfer and electron transfer reactions, including triplet–triplet annihilation of energy transfer from electron exchange interactions. Mechanistic organic photochemistry is introduced with the focus on a great number of examples that transformed the field. Moreover, described are methods, from pulsed excitation and matrix isolation to the determination of rate constants and Stern–Volmer kinetics.

Next is a set of four chapters that use a functional group and chromophore approach to the organic photochemistry of carbonyl, alkene, enone and aromatic compounds. There are many wonderful examples given. Chapter 9 describes the photochemistry of carbonyl compounds. There is the formation of $^*R(n,\pi^*)$ species in primary photoreactions, and secondary thermal reactions of radical pairs, free radicals and biradicals. Other topics covered include intermolecular H-transfer, α-cleavage, [2 + 2] cycloadditions, and also strategies on designing phototriggers and photoprotecting groups.

Chapter 10 describes the photochemistry of alkenes and the formation of $^*R(\pi,\pi^*)$ species. Topics also covered were *cis–trans* isomerism, pericyclic reactions, di-π-methane reactions and photoinduced electron transfer reactions. This is followed by Chapters 11 and 12 that describe the photochemistry of enones and dienones, and of aromatic compounds.

Chapter 13 contains the topic of supramolecular organic photochemistry, which is a rather ''grand'' approach that has emerged more recently in the discipline (the pun is intended). This chapter describes crystals and porous solids, host/guest complexes, cavity effects, preorganization of the guest within the host, as well as the persistence of reactive intermediates *via* host incarceration. The penultimate chapter (Chapter 14) describes singlet oxygen chemistry, including its triplet-sensitized production. The final chapter (Chapter 15) describes extending paradigms to understand the photochemistry of other functional groups, such as the compounds containing nitro, azo, diazo and thioketone groups.

In conclusion, this book is a full-scale work and was written for students and researchers who conduct (or may wish to conduct) photochemistry. The book is an outgrowth of the earlier book *Modern Molecular Photochemistry*, which first appeared in 1978 and contained seven chapters. I think the readers of *Photochemistry and Photobiology* will enjoy the new book and it will stimulate new ideas. The text is written in such a way that it offers researchers of diverse backgrounds an opportunity to grasp the material to understand how it can be used to complement their own research effort.

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photoexcited organic molecule;photoexcited molecules;transition states;radiationless transitions;photochemistry. Read more. Article. Modern Molecular Photochemistry of Organic Molecules. May 2010 Â· Journal of the American Chemical Society. Mark G Steinmetz.Â Modern Molecular Photochemistry of Organic Molecules. by N. J. Turro, V. Ramamurthy, J. C. Scaiano. September 2011 Â· ChemPhysChem. Werner M Nau. Molecular oxygen and organic photochemistry. A generalization of the photochemistry of organic molecules. Summary. This complete revision of Turro's classic text "Modern Molecular Photochemistry" presents a clearly written introduction to organic photochemistry and goes on to cover advanced and special topics. This title provides a complete revision of the author's classic text "Modern Molecular Photochemistry" published in 1991. It offers a clearly written introduction to organic photochemistry. It covers the methods for determining the mechanisms of organic photoreactions. It comprehensively describes the photochemistry of the basic functional groups of organic chemistry. Modern Molecular Photochemistry book. Read 3 reviews from the world's largest community for readers. During the last two decades the photochemistry of or...Â During the last two decades the photochemistry of organic molecules has grown into an important and pervasive branch of organic chemistry. In Modern Molecular Photochemistry, the author brings students up to date with the advances in this field - the development of the theory of photoreactions, the utilization of photoreactions in synthetic sequences, and the advancement o During the last two decades the photochemistry of organic molecules has grown into an important and pervasive branch of organic chemistry. Paradigms of Molecular Organic Photochemistry . 10 1.10 From a Global Paradigm to the Everyday Working Paradigm 11 1.11 Singlet States, Triplet States, Diradicals, and.Â 176 4.6 Absorption and Emission Spectra of Organic Molecules: The State Energy Diagram as a Paradigm for Molecular. Photophysics . 178 4.7 Some Examples of Experimental Absorption and Emission. Spectra of Organic Molecules: Benchmarks . 178 4.8 The Nature of Light: From Particles to Waves to Wave. Particles . Book Review. Modern Molecular Photochemistry of Organic Molecules. Authors: Nicholas J. Turro.Â Organic photochemistry rst emerged in the 1960s as a signicant discipline. Now, some 50 years later, the book shows how diverse the eld has become. The authors who are well-recognized photochemists connect topics old and new, from the incorporation of quantum and molecular orbital theory to the present state of the discipline.Â The book is an outgrowth of the earlier book Modern Molecular Photochemistry, which rst appeared in 1978 and contained seven chapters. I think the readers of Photochemistry and Photobiology will enjoy the new book and it will stimulate new ideas.