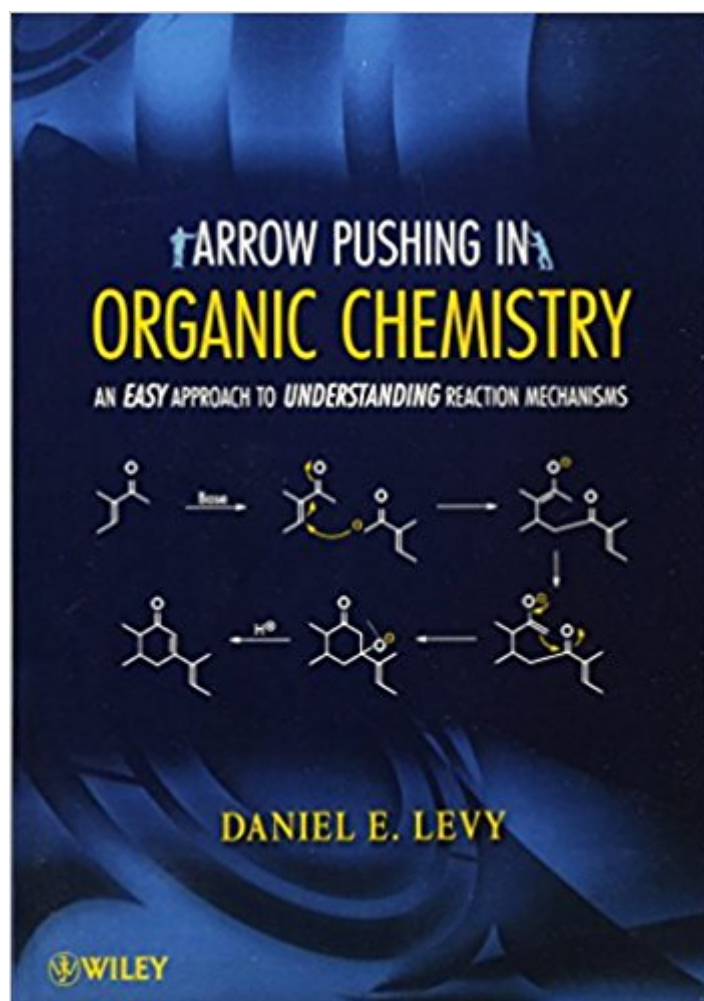


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Arrow-Pushing In Organic Chemistry: An Easy Approach To Understanding Reaction Mechanisms



Synopsis

Find an easier way to learn organic chemistry with *Arrow-Pushing in Organic Chemistry: An Easy Approach to Understanding Reaction Mechanisms*, a book that uses the arrow-pushing strategy to reduce this notoriously challenging topic to the study of interactions between organic acids and bases. Understand the fundamental reaction mechanisms relevant to organic chemistry, beginning with S_N2 reactions and progressing to S_N1 reactions and other reaction types. The problem sets in this book, an excellent supplemental text, emphasize the important aspects of each chapter and will reinforce the key ideas without requiring memorization.

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Customer Reviews

"Arrow Pushing in Organic Chemistry is not meant to replace a traditional textbook, a point that Levy makes clear in the preface. Rather, the text serves as a valuable workbook to counteract student memorization and compartmentalization of organic chemistry material. Review topics are presented in the context of new information, and major concepts are constantly reiterated and highlighted. Levy's book is a great supplemental resource to guide the novice organic chemistry student down the path to a true understanding of the subject." (Chemical Education Today, June 2010) "The discussion of each class or reaction is both readable and informative and normally includes comparison of relative rates of similar reactions to demonstrate concepts such as nucleophilicity or steric hindrance. The major strength of the book involved the inclusion of problems at the end of each chapter. These are coupled with a set of very well discussed answers provided in the

appendix. The problems fit well with the topic under discussion at each stage and the mechanistic answers and associated explanations are of a high quality. . . this text will make a useful addition to a university library or the supplementary reading list of a first year organic chemistry course."

(Reviews, 1 December 2009) "Does serve as a good support text for a more comprehensive organic text book. The high point of the book is the provision of a large number of carefully targeted problems at the end of each chapter, complete with well explained worked answers. I am sure that these will be highly useful to students who wish to practice the use of the $\rightarrow$ curly arrow."

(Physical Sciences Centre Reviews, 1 December 2009) "The most valuable materials in the book are the many solved problems." (Journal of Medicinal Chemistry, January 22, 2009) "Arrow Pushing in Organic Chemistry fills an important gap in undergraduate education, and I would encourage every instructor of organic chemistry to seriously evaluate this text, as a substantive aid. This book is definitely well worth its price!" (Angewandte Chemie International Edition, January 12, 2009) The first two semesters of organic chemistry are almost universally daunting to the student. The use of organic reaction mechanisms has greatly reduced the memorization, but most organic books skimp a bit on explaining how to write a clear reaction mechanism in order to limit their already gargantuan size (and cost). Along comes Arrow Pushing in Organic Chemistry by Levy (director of synthetic chemistry, Intradigm Corp.), a book that tries to clearly and succinctly explain writing organic mechanisms to these students. It does an excellent job in this. The work includes a large number of challenging end-of-chapter problems, with complete answers in the appendix (this appendix accounts for nearly half of the book). These problems may be too challenging for the typical sophomore organic student who may rely too much on the complete answers. This monograph is an excellent supplement but not a replacement for sophomore-level organic chemistry course resources. Most other monographs on organic reaction mechanisms are geared for the advanced undergraduate or graduate student. Summing Up: Recommended. Lower-division undergraduate organic chemistry students. (J.H. Glans, Sacred Heart University, Choice, February 2009)

A formula for success in organic chemistry Look at any typical organic chemistry book and you'll probably be intimidated by its sheer size, the encyclopedic presentation of reactions, and the huge amount of material to memorize. As this book explains, there is a better and easier way to approach the subject $\rightarrow$ the arrow pushing strategy that reduces organic chemistry to the study of interactions between organic acids and bases and builds from there. This approach helps you develop deductive or predictive insight into the progression of starting materials to products and by what mechanisms the transformations occurred. A valuable companion to any introductory organic

chemistry textbook, *Arrow Pushing in Organic Chemistry*: Defines the concept of arrow pushing in context with various reaction types, functional groups, mechanism types, reagents/nucleophiles, and leaving groups. Explains the concepts of organic acids and organic bases, and then uses them to explain fundamental reaction mechanisms, beginning with S_N2 reactions and progressing to S_N1 reactions and other reaction types. Emphasizes electron flow from atom to atom. Includes a summary and problem sets with each chapter to help you solidify learning. Using this approach, you should be able to derive predicted products from almost any hypothetical organic reaction. Instead of relying on rote memorization, you develop an in-depth understanding of, and an almost intuitive insight into, reactions. This excellent companion text makes organic chemistry more approachable and exciting for students. It's also ideal for professionals who want to refresh their knowledge or for scientists from other disciplines, such as inorganic and physical chemists, biochemists, biologists, and pharmaceutical scientists who are new to the field.

A different way of learning. Memorizing reactions doesn't make sense when you don't understand what is happening. This book helps you predict reactions instead of learning by heart.

The key to successfully learning (and teaching) organic chemistry is to identify the core themes and skills that are found throughout the entire year. It is the resulting unification of o-chem's seemingly unrelated topics that makes the subject a manageable one, rather than a giant, random list of things that are impossible to memorize. Since this book presents such themes and develops such skills, it is a valuable tool for students at all levels. Beginning students have the advantage of learning these skills early on, which they can then apply to all future material. But students who are already well into their organic courses, or are coming back for advanced coursework will also benefit from the book since it goes beyond being a simple introduction. The book provides a very good foundation of such critical topics as resonance and acid strength. The discussion of bases and nucleophiles also touches on relative reactivity and solvent effects. The substitution chapters include S_N2 , S_N2' and S_N1 , including carbocation rearrangements. I felt the approach taken on the Eliminations and Additions reactions was not aligned with most sophomore-level textbooks, which could prove to be difficult for some students. Still, the arrow-pushing exercises in these chapters would provide excellent practice for students. Approximately half of the book is dedicated to the presentation of detailed solutions to the end-of-chapter problems. The thorough explanations provided for each solution are often missing in traditional textbooks, leaving students wondering what went wrong when their answer doesn't "match" the solution manual. The very first problem in the first chapter is

an arrow-pushing exercise covering 14 reactions of all types. For students who have just begun studying organic chemistry, the only part of the solution they need to worry about are the arrows drawn, but for more advanced students a useful description is provided to explain the reaction shown. No opportunity is missed to give students at all levels a more in-depth understanding of the lessons being learned and the problems being solved. This study guide is NOT a simple rehashing of material found in the full, traditional textbook, nor is it a dumbed-down version. It will most definitely push the reader with challenging and thought-provoking problems, while providing the skills needed to thrive in the study of organic chemistry.

Reading this book brought me back to the time when I started to learn organic chemistry. After one year studying chemistry at the University of Montreal, I managed to find a summer internship position in one of the research labs. Aside from generating a much needed money influx, this was the most incredible opportunity for an undergraduate chemistry student. For 16 weeks, I had a handful of graduate students teaching me the ins and outs of organic chemistry, including mechanistic details and arrow pushing. The book "Arrow pushing in organic chemistry" by Daniel Levy is as close to this as it could be with a book. It demystifies organic chemical reactions because it does not concentrate on the name, the product or the overall transformation but on how it works and why it works that way. I found the book to be well written with very few typos. The author separated the subject matter in well defined chapters that are arranged in a logical order. Each chapter is illustrated with examples, tables and figures presenting the basic concepts of arrow pushing with all the appropriate explanations. More importantly, each chapter comes with a series of exercises. The author went to great length to provide explanations to all exercises in the second part of the book. This is much more useful than just the answers. Following an introductory chapter where definitions are provided, a brief discussion on polarization and charges brings the reader to chapter two. This chapter is interesting and very important. It serves as foundations for the remaining of the book. Many key concepts and information are given that will be needed throughout chapters 3-7. Chapter 3 is a natural continuation from the second chapter as the discussion is centered on bases and nucleophiles, including hardness/softness concept. Chapters 4 and 5 introduce substitution reactions (S_N2 and S_N1), tying in stereogenic implications for both types of substitution. In chapter 5, the author explains solvolysis, carbocations and their stabilities, orbital hybridization, 1,2-hydride and 1,2-alkyl shifts. This leads naturally to the next topic covered in chapter 6. This chapter touches on elimination processes, both unimolecular ($E1$) and bimolecular ($E2$). Chapter 7 discusses addition reactions and introduces the Markovnikov rule. The author

finishes this chapter with the first combination of the simple chemical processes (addition-elimination reactions). Chapter 8 prepares the reader to more complex reactions, still using the basic principles of arrow pushing. There is a very good appendix on pKa values. The second appendix presents all the answers to the exercises found at the end of each chapter. This has tremendous value for any organic chemistry student. Because of the structure of the book, the subject is presented naturally. It flows easily and one builds upon what is presented in the earlier chapters. I would highly recommend this book to any college level student to gain a deep understanding of organic reaction mechanisms. Jean-Marc Lapierre, Ph.D. Associate Director, ChemistryArQule Inc. 19 Presidential Way Woburn, MA 01801

I had originally purchased this book as a supplemental text for first semester organic chemistry. For this purpose, this book was semi-useful. Having had little experience in organic terminology, this was a fairly difficult read at times; the vernacular is succinct, and many concepts are introduced in quick succession. However, once you have a more solid grasp on organic vocabulary, this book can be an excellent tool. There are plenty of practice problems presented (with solutions in the back), and all of the most essential concepts are covered to some extent. Additionally, it's really helpful to read over something other than your textbook for concepts that you haven't quite grasped fully. That said, I didn't use this book a whole lot for first semester organic, but it was an invaluable tool for reviewing the concepts over the summer in preparation for second semester organic, due to its concise nature. I have only taken away one star from a perfect rating because the language could, at times, be even more dense than that of my actual organic textbook. All in all, a good book to have around.

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