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List of Changes

Organic Chemistry, 6th ed.
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New to this edition:

Students sometime ask if the facts of organic chemistry have significantly changed since the last edition. While the basic principles remain the same—carbon forms four bonds in stable compounds and oppositely charged species attract each other—organic chemistry is a dynamic subject that is continually refined as new facts are determined, and new editions reflect current understanding. Each year, novel compounds are discovered and new drugs are marketed, and these compounds replace older examples to illustrate particular concepts. Also of significance is how the material in the text is presented. I continue to endeavor to make this difficult subject as student-friendly as possible, by redesigning sample problems and end-of-chapter material, and rewriting sentences and paragraphs for improved clarity.

General:

Expanded Problem-Solving Approach. A central component of each chapter of *Organic Chemistry* has always been the Sample Problems, which illustrate how to solve key elements of the chapter. In this edition, Sample Problems are always paired with a follow-up Problem to allow students to apply what they have just learned. The Problems are followed by "More Practice," a list of end-of-chapter problems that are similar in concept. Students can find detailed solutions and verify their answers to *all* of the Problems from the book with the *Organic Chemistry* Student Study Guide/Solutions Manual.

Chapter Review. The end of chapter summary sections have been expanded into parts: **Key Concepts, Key Skills,** and **Key Reactions,** with structures and examples to illustrate each part, providing students with a broader and more detailed overview of each chapter's important concepts and skills. Extensive

cross-referencing has also been added to connect this material with relevant Sample Problems, Problems, Figures, and Tables within the body of the chapter.

Artwork and Chemical Structures. The colors in artwork throughout the text were revised for emphasis, clarity, and consistency. Color has also been used in many areas to help students better understand three-dimensional structure, stereochemistry, and reactions.

Problems. Over 300 new problems have been added, increasing the variety of problems for instructors and students alike.

New *How To's,* Sample Problems, and Illustrations. Much new content has also been added throughout the new edition to clarify topics and enhance the student learning experience.

Photos. Roughly one-half of the chapter-opening photos have been replaced with photos emphasizing relevant material within the chapter. More marginal photos of applications have also been added.

Online Only Content. The chapter on Lipids appears online and is available in customizable versions of the text in McGraw-Hill Create. A supplement covering Imine Derivatives is also available on the Online Learning Center's Instructor Resources, via the Library tab in Connect.

Chapter Specific:

Spectroscopy
The revisions to the spectroscopy coverage are designed to allow for more flexibility, making these chapters more portable to accommodate various lecture and lab arrangements. Three new spectroscopy chapters have been created for the sixth edition: Spectroscopy A Mass Spectrometry; Spectroscopy B Infrared Spectroscopy; and Spectroscopy C Nuclear Magnetic Resonance Spectroscopy. The coverage and problem sets for these chapters have also been expanded to include material previously covered in other sections of earlier editions. Extensive cross-referencing has been added so that whether spectroscopy is covered early or late in an organic chemistry course, students can readily find the material they need.

- **Spectroscopy A Mass Spectrometry:** There has been extensive revision of the molecular ion, molecular formulas, and fragmentation coverage. A new *How To* was added on proposing molecular formulas from molecular ions. New Sample Problems on using molecular ions and degrees of unsaturation to propose molecular formulas and on determining isomer identity using fragmentation were also added. Several mass spectra have been added to the text and in problems.
- **Spectroscopy B Infrared Spectroscopy:** A new *How To* on analyzing an IR spectrum has been added. The chapter also includes a new Sample Problem B.1 on carbonyl absorptions. Section B.3 has been expanded to include the effect of resonance on a carbonyl absorption, and a new section on IR absorptions based on functional groups also appears in the chapter. A new Table B.1 summarizes IR absorption by functional group.
- **Spectroscopy C Nuclear Magnetic Resonance Spectroscopy:** Section C.7 on complex splitting was extensively revised to add clarity and deeper understanding for students who often struggle with this topic. There are also two new sample problems: Sample Problem C.3 on determining proton equivalency in cyclic compounds and Sample Problem C.8 on looking for points of difference in the NMR spectra of similar compounds. More complex NMRs, previously found in later chapters, were imported to expand the breadth of the problems.

Carbonyls
The coverage of nitriles has been moved to the chapter on carboxylic acids, forming Chapter 19, Carboxylic Acids and Nitriles. This chapter has been moved to follow Aldehydes and Ketones, making this coverage closer to the chemistry of acyl derivatives of carboxylic acids. These revisions also allow for the coverage of the nucleophilic addition reactions that occur with nitriles in closer proximity to the coverage of nucleophilic additions of aldehydes and ketones.

Other New Coverage
Several sections include new material, including: Section 4.7, sources of methane in the atmosphere; Section 5.5, drawing an enantiomer of a complex compound; Section 7.4, drugs that contain fluorine; Section 13.9 the latest ozone map and updated information on CFC alternatives now in use; Section 19.4, new drugs that contain nitriles; Section 26.12, human milk oligosaccharides; and Section 29.7, how isoprene units are connected.