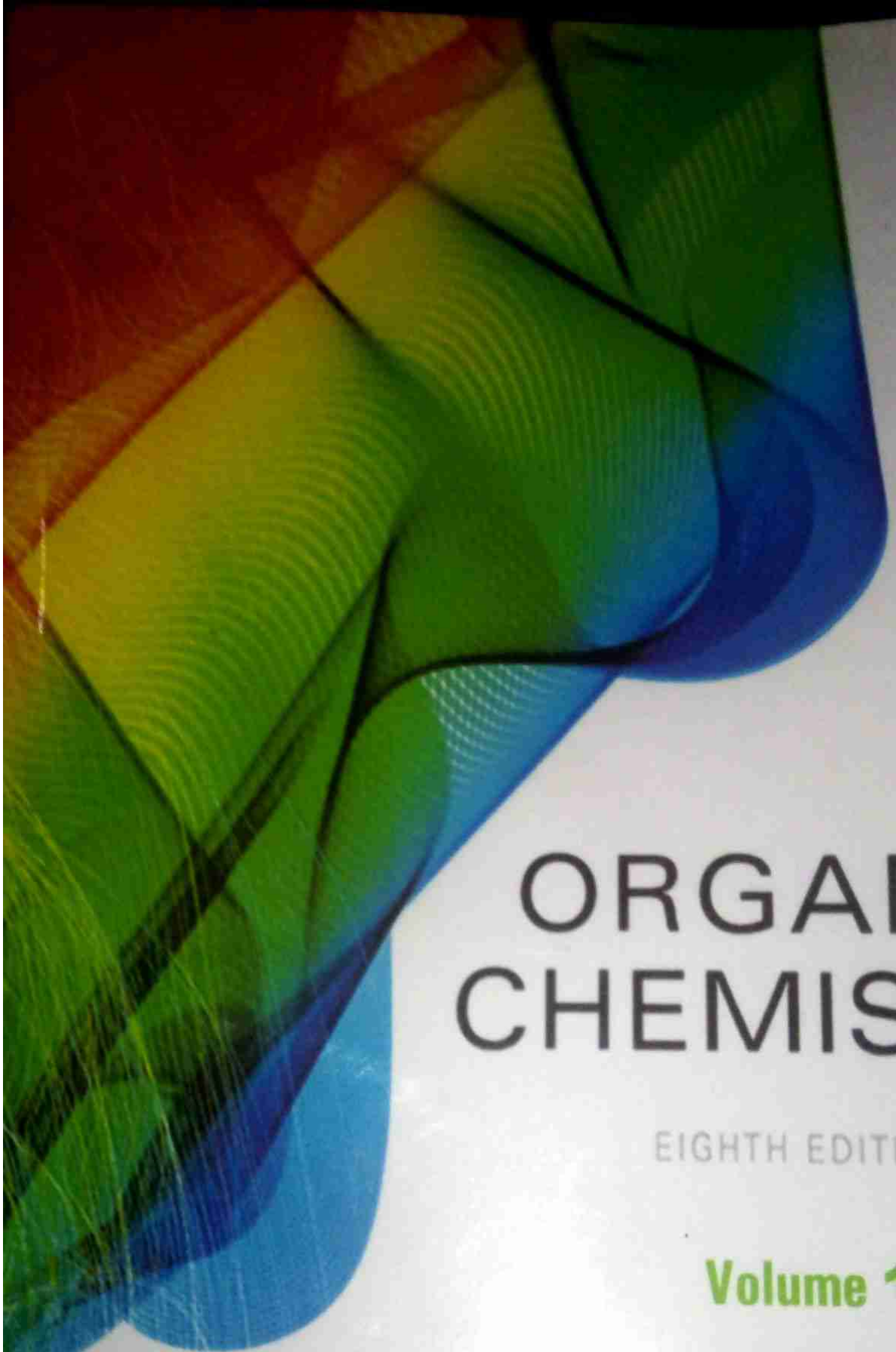




ORGANIC CHEMISTRY

EIGHTH EDITION

Volume 1

Julia Yurkanis Bruice

Organic Chemistry

EIGHTH EDITION

Paula Yurkanis Bruice

University Of California
Santa Barbara

14951

PEARSON

Editor in Chief: Jeanne Zalesky
 Senior Acquisitions Editor: Chris Hess
 Product Marketing Manager: Elizabeth Ellsworth
 Project Manager: Elisa Mandelbaum
 Program Manager: Lisa Pierce
 Editorial Assistant: Fran Falk
 Marketing Assistant: Megan Riley
 Executive Content Producer: Kristin Mayo
 Media Producer: Lauren Layn
 Director of Development: Jennifer Hart
 Development Editor: Matt Walker
 Team Lead, Program Management: Kristen Flathman
 Team Lead, Project Management: David Zielonka
 Production Management: GEX Publishing Services
 Compositor: GEX Publishing Services
 Art Specialist: Wynne Au Yeung
 Illustrator: Imagineering
 Text and Image Lead: Maya Gomez
 Text and Image Researcher: Amanda Larkin
 Design Manager: Derek Bacchus
 Interior and Cover Designer: Tamara Newnam
 Operations Specialist: Maura Zaldivar-Garcia
 Cover Image Credit: Olga Yakovenko/Shutterstock

Copyright © 2016, 2014, 2011, 2007, 2004, 2001 Pearson Education, Inc. All Rights Reserved. Printed in the United States of America. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise. For information regarding permissions, request forms and the appropriate contacts within the Pearson Education Global Rights & Permissions department, please visit www.pearsoned.com/permissions/.

Credits and acknowledgments of third party content appear on page C-1 which constitutes an extension of this copyright page.

PEARSON, ALWAYS LEARNING and MasteringChemistry are exclusive trademarks in the U.S. and/or other countries owned by Pearson Education, Inc. or its affiliates. Unless otherwise indicated herein, any third-party trademarks that may appear in this work are the property of their respective owners and any references to third-party trademarks, logos or other trade dress are for demonstrative or descriptive purposes only. Such references are not intended to imply any sponsorship, endorsement, authorization, or promotion of Pearson's products by the owners of such marks, or any relationship between the owner and Pearson Education, Inc. or its affiliates, authors, licensees or distributors.

Library of Congress Cataloging-in-Publication Data

Bruice, Paula Yurkanis
 Organic chemistry / Paula Yurkanis Bruice, University of California,
 Santa Barbara.
 Eighth edition. | Upper Saddle River, NJ: Pearson Education,
 Inc., 2015. | Includes index.
 LCCN 2015038746 | ISBN 9780134042282 | ISBN 013404228X
 LCSH: Chemistry. Organic—Textbooks.
 LCC QD251.3 .B78 2015 | DDC 547--dc23
 LC record available at <http://lcn.loc.gov/2015038746>

ISBN 10: 0-13-404228-X; ISBN 13: 978-0-13-404228-2 (Student edition)
 ISBN 10: 0-13-406659-6; ISBN 13: 978-0-13-406659-2 (Instructor's Review Copy)

1 2 3 4 5 6 7 8 9 10—CRK—16 15 14 13 12

PEARSON

www.pearsonhighered.com

Brief Table of Contents

	Preface	xiii
CHAPTER 1	Remembering General Chemistry: Electronic Structure and Bonding	2
CHAPTER 2	Acids and Bases: Central to Understanding Organic Chemistry	50
TUTORIAL	Acids and Bases	80
CHAPTER 3	An Introduction to Organic Compounds: Nomenclature, Physical Properties, and Structure	88
TUTORIAL	Using Molecular Models	142
CHAPTER 4	Isomers: The Arrangement of Atoms in Space	143
TUTORIAL	Interconverting Structural Representations	187
CHAPTER 5	Alkenes: Structure, Nomenclature, and an Introduction to Reactivity • Thermodynamics and Kinetics	190
TUTORIAL	Drawing Curved Arrows	225
CHAPTER 6	The Reactions of Alkenes • The Stereochemistry of Addition Reactions	235
CHAPTER 7	The Reactions of Alkynes • An Introduction to Multistep Synthesis	288
CHAPTER 8	Delocalized Electrons: Their Effect on Stability, pK_a , and the Products of a Reaction • Aromaticity and Electronic Effects An Introduction to the Reactions of Benzene	318
TUTORIAL	Drawing Resonance Contributors	382
CHAPTER 9	Substitution and Elimination Reactions of Alkyl Halides	388
CHAPTER 10	Reactions of Alcohols, Ethers, Epoxides, Amines, and Sulfur-Containing Compounds	458
CHAPTER 11	Organometallic Compounds	508
CHAPTER 12	Radicals	532
TUTORIAL	Drawing Curved Arrows in Radical Systems	563
CHAPTER 13	Mass Spectrometry; Infrared Spectroscopy; UV/Vis Spectroscopy	567
CHAPTER 14	NMR Spectroscopy	620
CHAPTER 15	Reactions of Carboxylic Acids and Carboxylic Acid Derivatives	

CHAPTER 16	Reactions of Aldehydes and Ketones • More Reactions of Carboxylic Acid Derivatives	739
CHAPTER 17	Reactions at the α -Carbon	801
TUTORIAL	Synthesis and Retrosynthetic Analysis	854
CHAPTER 18	Reactions of Benzene and Substituted Benzenes	868
CHAPTER 19	More About Amines • Reactions of Heterocyclic Compounds	924
CHAPTER 20	The Organic Chemistry of Carbohydrates	950
CHAPTER 21	Amino Acids, Peptides, and Proteins	986
CHAPTER 22	Catalysis in Organic Reactions and in Enzymatic Reactions	1030
CHAPTER 23	The Organic Chemistry of the Coenzymes, Compounds Derived from Vitamins	1063
CHAPTER 24	The Organic Chemistry of the Metabolic Pathways	1099
CHAPTER 25	The Organic Chemistry of Lipids	1127
CHAPTER 26	The Chemistry of the Nucleic Acids	1155
CHAPTER 27	Synthetic Polymers	1182
CHAPTER 28	Pericyclic Reactions	1212
APPENDICES	I pK_a Values	A-1
	II Kinetics	A-3
	III Summary of Methods Used to Synthesize a Particular Functional Group	A-8
	IV Summary of Methods Employed to Form Carbon–Carbon Bonds	A-11
	V Spectroscopy Tables	A-12
	VI Physical Properties of Organic Compounds	A-18
	VII Answers to Selected Problems	ANS-1
	Glossary	G-1
	Photo Credits	C-1
	Index	I-1