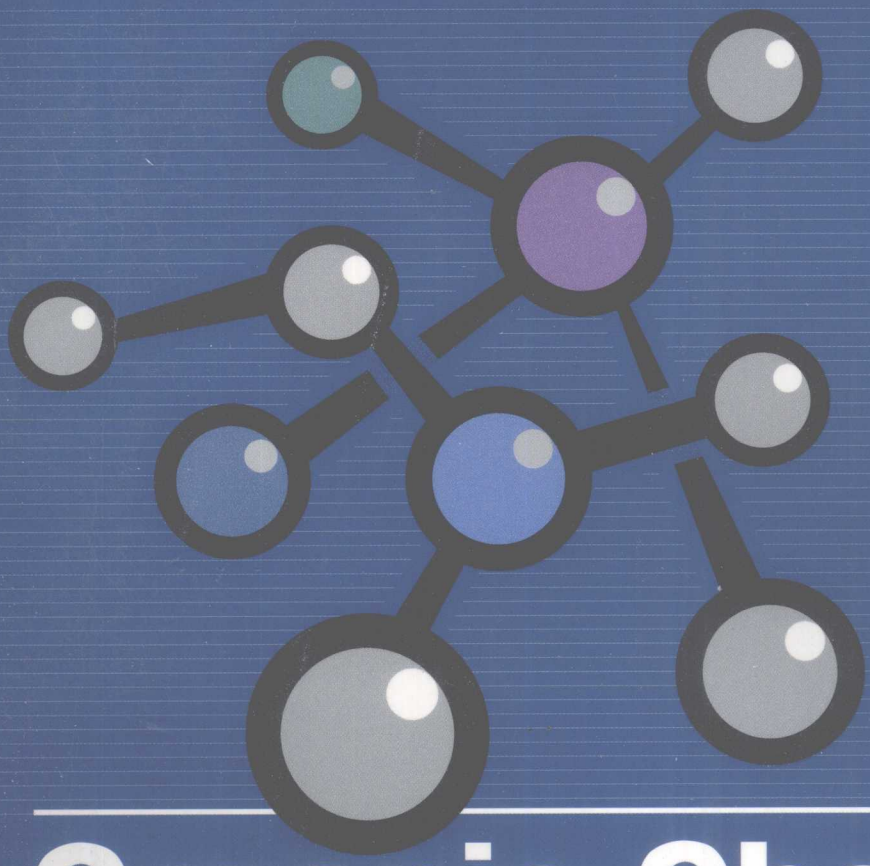

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改编版

Sixth Edition

Organic Chemistry

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（第6版）

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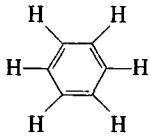
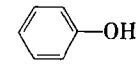
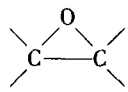
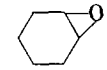
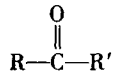
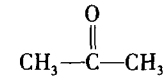
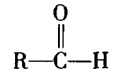
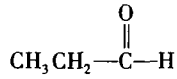
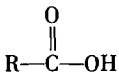
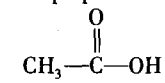
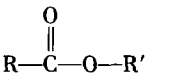
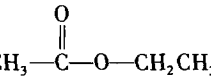
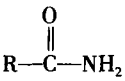
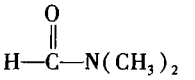
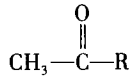
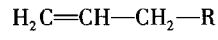
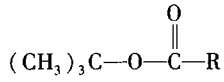
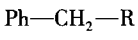
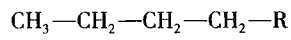
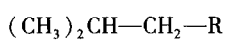
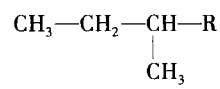
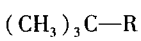
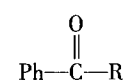
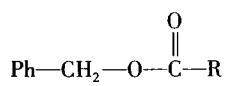
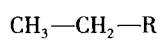
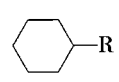
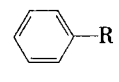
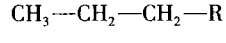
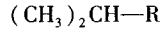
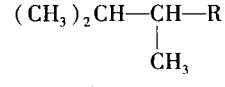
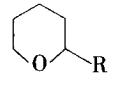
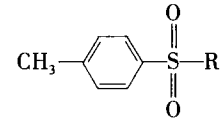
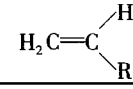
Common Organic Compounds and Functional Groups

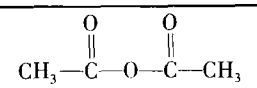
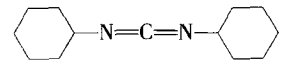
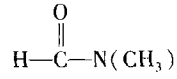
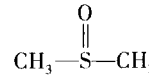
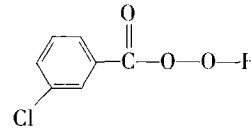
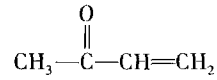
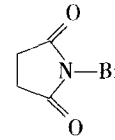
Class of Compound	General Structure	Functional Group	Example
alkanes	R—H	none	$CH_3CH_2CH_2CH_3$ butane
alkyl halides	R—X	X = F, Cl, Br, or I	$CH_3CH_2CH_2Cl$ 1-chloropropane
alkenes	R—CH=CH—R′	carbon-carbon double bond	$CH_3CH_2—CH=CH_2$ 1-butene
alkynes	R—C≡C—R′	carbon-carbon triple bond	$CH_3—C\equiv C—CH_3$ 2-butyne
aromatic compounds		benzene ring, also drawn 	 benzene
alcohols	R—OH	hydroxyl group	$CH_3CH_2—OH$ ethanol
phenols	Ar—OH	hydroxyl group on an aromatic ring	 phenol
thiols	R—SH	sulfhydryl group	$CH_3—SH$ methanethiol
ethers	R—O—R′	oxygen between two alkyl groups	$CH_3CH_2—O—CH_2CH_3$ diethyl ether
epoxides		ether in a 3-membered ring	 1,2-epoxycyclohexane
ketones		carbonyl group	 acetone
aldehydes		carbonyl group	 propanal
carboxylic acids		carboxyl group	 acetic acid
esters		carboalkoxy group	 ethyl acetate
amides		carboxamide group	 *N*,*N*-dimethylformamide
amines	$R—NH_2$	amino group	$CH_3CH_2—NH_2$ ethylamine
nitriles	R—C≡N	cyano group	$CH_3CH_2—C\equiv N$ propionitrile
nitroalkanes	$R—NO_2$	nitro group	$CH_3CH_2—NO_2$ nitroethane

Common Groups in Organic Chemistry

Organic Groups Abbreviation	Meaning	Structure
Ac	acetyl	
	allyl	
Boc	*t*-butyloxycarbonyl	
Bn	benzyl	
n-Bu	*n*-butyl	
i-Bu	isobutyl	
s-Bu	*sec*-butyl	
t-Bu	*tert*-butyl	
Bz	benzoyl	
Cbz (or Z)	benzyloxycarbonyl	
Et	ethyl	
c-Hx	cyclohexyl	
Me	methyl	
Ph	phenyl	
Pr	propyl	
i-Pr	isopropyl	
Sia	*secondary* isoamyl	
THP	tetrahydropyranyl	
Ts	*para*-toluenesulfonyl, "tosyl"	
	vinyl	

Not all of these abbreviations are used in this text, but they are provided for reference.

Common Reagents and Solvents

Abbreviation		Structure
Ac_2O	acetic anhydride	
DCC	dicyclohexylcarbodiimide	
DIBAL or DIBAH	diisobutylalumium hydride	$[(CH_3)_2CHCH_2]_2AlH$
DME, "glyme"	1,2-dimethoxyethane	$CH_3—O—CH_2CH_2—O—CH_3$
diglyme	bis (2-methoxyethyl) ether	$(CH_3—O—CH_2CH_2)_2O$
DMF	dimethylformamide	
DMSO	dimethyl sulfoxide	
EtOH	ethanol	CH_3CH_2OH
EtO^-	ethoxide ion	$CH_3CH_2—O^-$
Et_2O	diethyl ether	$CH_3CH_2—O—CH_2CH_3$
HMPA, HMPT	hexamethylphosphoric triamide	$[(CH_3)_2N]_3P=O$
LAH	lithium aluminum hydride	$LiAlH_4$
LDA	lithium diisopropylamide	$[(CH_3)_2CH]_2N^-\ Li^+$
MCPBA	*meta*-chloroperoxybenzoic acid	
MeOH	methanol	CH_3OH
MeO^-	methoxide ion	$CH_3—O^-$
MVK	methyl vinyl ketone	
NBS	*N*-bromosuccinimide	
PCC	pyridinium chlorochromate	$pyr \cdot CrO_3 \cdot HCl$
Pyr	pyridine	
t-BuOH	*tertiary* butyl alcohol	$(CH_3)_3C—OH$
t-BuOK	potassium *tertiary*-butoxide	$(CH_3)_3C—O^-\ K^+$
THF	tetrahydrofuran	
TMS	tetramethylsilane	$(CH_3)_4Si$

内容提要

本书是 L. G. Wade 编写的 *Organic Chemistry*（Sixth Edition）的改编版，是根据教育部关于高等学校本科教学质量工程要重视双语教学的文件精神，选择国外优秀英文原版有机化学教材，结合双语教学的实践经验改编而成的双语教材。全书共26章，涵盖内容与国内高等学校化学、化工类有机化学教材基本一致，包括有机化学概论、有机化合物命名、立体化学、结构表征、烃及卤代烃、含氧化合物、含氮化合物、天然有机化合物等内容。每章后有中文概要，书后附有索引和专业词汇中英文对照表。

本书可作为化学、化工专业的有机化学双语教材，亦可作为其他相关专业的教学参考书，可使学生在学习有机化学基础知识的同时提高专业英语水平。

前　言

为了推动全国高校的双语教学工作，教育部、财政部在《关于实施高等学校本科教学质量与教学改革工程的意见》（教高[2007]1号）中强调教学质量工程要重视双语教学。在《关于启动2007年度双语教学示范课程建设项目的通知》中，提出要在2007年至2010年建设500门国家双语教学示范课程，并且在2007年正式启动高等学校双语教学示范课程建设项目，审定了全国首批百门双语教学示范课程建设项目。这为规范全国高等学校双语教学，提高双语教学水平提供了很好的契机。

大连理工大学“有机化学及实验双语教学示范课程建设”项目是教育部首批百门双语教学示范课程建设项目之一。有机化学双语教学课程建设亟待进行的工作之一就是出版对国内教师和学生切实适用的有机化学双语教材。有机化学双语教学十余年的实践表明，改编英文原版有机化学教材是建设有机化学双语教学教材的有效途径，既可保持英文版教材的“原汁原味”，亦能适合中国国情。在教育部项目的支持下，我们将L. G. Wade编著的*Organic Chemistry*（第六版）改编为有机化学双语教材，适合普通高等学校化学、化工专业70～100学时的有机化学双语教学课程使用。

改编的有机化学双语教材具有以下特点：

1. 对英文原版教材只做章节顺序的调整和内容的删减，未增加新的英文内容，目的是使改编的双语教材保持英文版教材的“原汁原味”。
2. 本书突出双语教材特色，对部分有机化学专业词汇、术语及化合物名称给出中文注释，书后增加专业词汇中英文对照表（Vocabulary），方便学生自学和查阅。
3. 每章末增加中文概要（Summary in Chinese），有利于学生对教学重点的理解和掌握。
4. 为了使改编教材的章节编排遵循有机化学双语教学的特点，将有机化合物的命名部分从各章中抽出来，合并为新的一章，作为第3章“Brief Introduction and Nomenclature of Organic Compounds”。在双语教学中，有机化合物命名部分放在较前面的章节集中讲授，有利于学生自学和课堂理解教师英文授课内容。
5. 适当调整章节顺序，例如，将原版教材中第15章“Conjugated Systems, Orbital Symmetry, and Ultraviolet Spectroscopy”调换为第11章的内容，紧随烯烃（第9章）和炔烃（第10章）的章节之后，并将第15章中紫外光谱的内容抽出来与红外光谱合并作为第12章；将质谱与核磁共振谱合并作为第13章。调整后的双语教材的内容相对规整，符合国内的教学特点，方便教师双语教学使用。
6. 为了使改编的双语教材重点突出，篇幅精练，对英文教材中基础性重点章节的内容基本未做改动，保留原版教材讲解生动详细、语句通俗易懂的优点；对非重点处的内容、插图和举例适当删减；前后章节明显重复的内容适

当删减合并;根据每章的教学重点,筛选保留部分习题;对核酸、蛋白质、甾族化合物的内容适当缩减;删掉了原版教材第26章"Synthetic Polymers"。本书涵盖内容与国内的有机化学教材内容基本一致。

7. 本书保留英文原版教材Index的部分内容,方便读者查找相关内容。

全书共26章,第1~15章由王梅改编,第16~26章由姜文凤改编;王梅通读、修改全书稿;全国高等学校首届教学名师高占先教授审查了本书的改编大纲,提出许多指导性意见;试用本书的化工英语强化班的学生提出许多宝贵意见;高等教育出版社陈琪琳和翟怡为本书出版做了许多工作;在此一并表示衷心的感谢。

本书为作者第一次将英文原版教材改编为有机化学双语教材。由于初次尝试,加之改编者水平有限,难免有不妥之处,由衷地欢迎原书作者、专家、同行和使用本书的学生提出宝贵意见,以便改进和完善这本有机化学双语教材。与本书配套的双语多媒体教学课件将随后出版,方便高等学校师生教学使用。

改编者

2008年春于大连理工大学

Preface

To the Student

As you begin your study of organic chemistry, you might feel overwhelmed by the number of compounds, names, reactions, and mechanisms that confront you. You might even wonder whether you can learn all this material in a single year. The most important function of a textbook is to organize the material to show that most of organic chemistry consists of a few basic principles and many extensions and applications of these principles. Relatively little memorization is required if you grasp the major concepts and develop flexibility in applying those concepts. Frankly, I have a poor memory, and I hate memorizing lists of information. I don't remember the specifics of most of the reactions and mechanisms in this book, but I can work them out by remembering a few basic principles, such as "alcohol dehydrations usually go by E1 mechanisms."

Still, you'll have to learn some facts and fundamental principles to serve as the working "vocabulary" of each chapter. As a student, I learned this the hard way when I made a D on my second organic chemistry exam. I thought organic would be like general chemistry, where I could memorize a couple of equations and fake my way through the exams. For example, in the ideal gas chapter, I would memorize $pV = nRT$, and I was good to go. When I tried the same approach in organic, I got a D. We learn by making mistakes, and I learned a lot in organic chemistry.

In writing this book, I've tried to point out a small number of important facts and principles that should be learned to prepare for solving problems. For example, of the hundreds of reaction mechanisms shown in this book, about 20 are the fundamental mechanistic steps that combine into the longer, more complicated mechanisms. I've highlighted these fundamental mechanisms in *Key Mechanism* boxes to alert you to their importance. Spectroscopy is another area where a student might feel pressured to memorize hundreds of facts, such as NMR chemical shifts and infrared vibration frequencies. I couldn't do that, so I've always gotten by with knowing about a dozen NMR chemical shifts and about a dozen IR vibration frequencies, and knowing how they are affected by other influences.

Don't try to memorize your way through this course. It doesn't work; you have to know what's going on so you can apply the material. Also, don't think (like I did) that you can get by without memorizing *anything*. Read the chapter, listen carefully to the lectures, and *work the problems*. The problems will tell you whether or not you know the material. If you can do the problems, you should do well on the exams. If you can't do the problems, you probably won't be able to do the exams, either. If you keep having to look up an item to do the problems, that item is a good one to learn.

Here are some hints I give my students at the beginning of the course:

1. Read the material in the book before the lecture (expect 13-15 pages per lecture). Knowing what to expect and what is in the book, you can take fewer

notes and spend more time listening and understanding the lecture.

2. After the lecture, review your notes and the book, and do the in-chapter problems. Also, read the material for the next lecture.
3. If you are confused about something, visit your instructor during office hours immediately, before you fall behind. Bring your attempted solutions to problems with you to show the instructor where you are having trouble.
4. To study for an exam, begin by reviewing each chapter and your notes, then concentrate on the end-of-chapter problems. Also use old exams for practice, if available.

Remember the two "golden rules" of organic chemistry.

1. ***Don't Get Behind***! The course moves too fast, and it's hard to catch up.
2. ***Work Lots of Problems.*** Everyone needs the practice, and the problems show where you need more work.

About the Author

L. G. Wade decided to become a chemistry major during his sophomore year at Rice University, while taking organic chemistry from Professor Ronald M. Magid. After receiving his B. A. from Rice in 1969, Wade went on to Harvard University, where he did research with Professor James D. White. While at Harvard, he served as the Head Teaching Fellow for the organic laboratories and was strongly influenced by the teaching methods of two master educators, Professors Leonard K. Nash and Frank H. Westheimer.

After completing his Ph. D. at Harvard in 1974, Dr. Wade joined the chemistry faculty at Colorado State University. Over the course of fifteen years at Colorado State, Dr. Wade taught organic chemistry to thousands of students working toward careers in all areas of biology, chemistry, human medicine, veterinary medicine, and environmental studies. He also authored research papers in organic synthesis and in chemical education, as well as eleven books reviewing current research in organic synthesis. Since 1989, Dr. Wade has been a chemistry professor at Whitman College, where he teaches organic chemistry and pursues research interests in organic synthesis and forensic chemistry. Dr. Wade received the A. E. Lange Award for Distinguished Science Teaching at Whitman in 1993.

Dr. Wade's interest in forensic science has led him to testify as an expert witness in court cases involving drugs and firearms, and he has worked as a police firearms instructor, drug consultant, and boating safety officer. He also enjoys repairing and restoring old violins and bows, which he has done professionally for many years.

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