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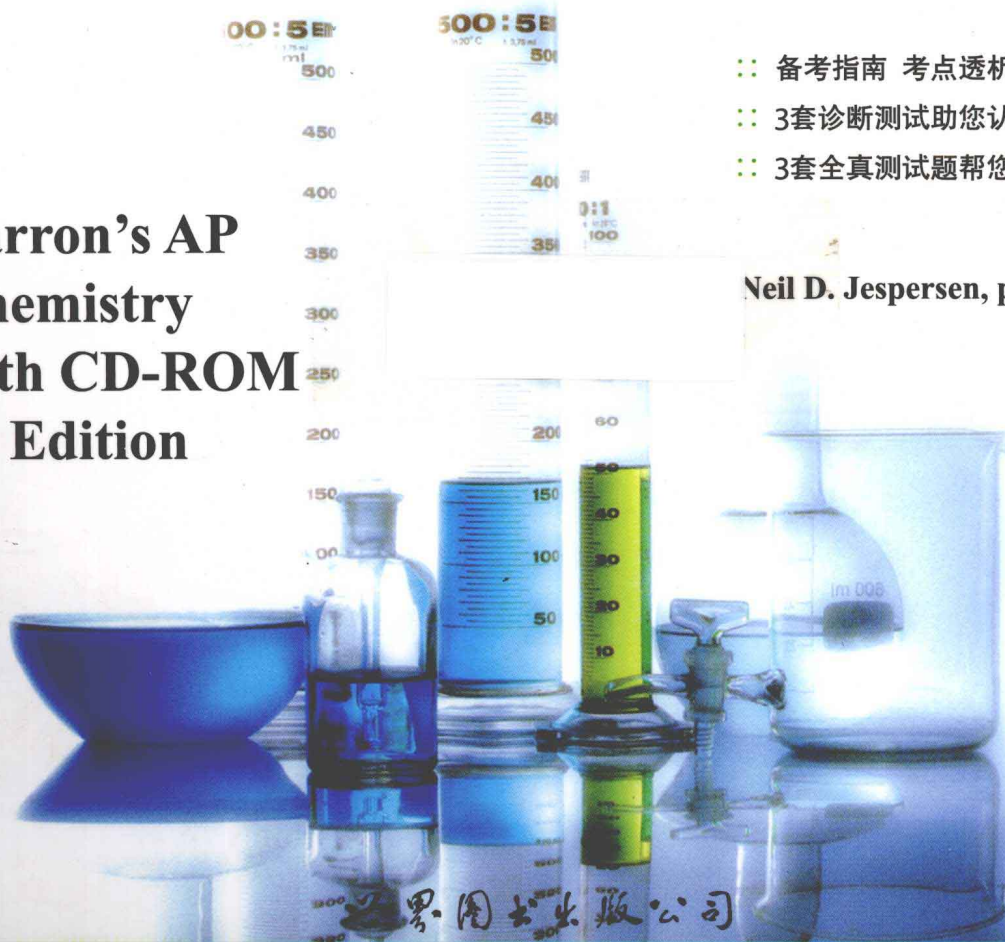
Barron's AP

化学 (第6版)

Barron's AP
Chemistry
with CD-ROM
6th Edition

- :: 备考指南 考点透析
- :: 3套诊断测试助您认清强弱项
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Neil D. Jespersen, ph.D.

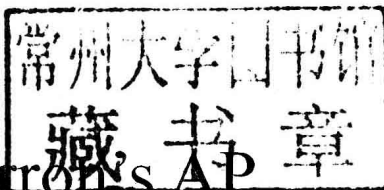


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AP

Barron's 化学 (第6版)



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Chemistry
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Neil D. Jespersen, Ph.D.

世界图书出版公司

北京·广州·上海·西安

图书在版编目 (CIP) 数据

Barron's AP 化学 = Barron's AP Chemistry: 英文 / (美) 叶斯帕森 (Jespersen, N. D.) 著.

—北京: 世界图书出版公司北京公司, 2012. 8

ISBN 978-7-5100-4956-9

I. ①B… II. ①叶… III. ①化学—高等学校—入学考试—美国—自学参考资料—英文
IV. ①O6

中国版本图书馆CIP数据核字 (2012) 第 148874 号

BARRON'S AP CHEMISTRY WITH CD-ROM (6th EDITION) BY NEIL D. JESPERSEN PH.D.

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ISBN: 978-1-4380-7128-2

This edition arranged with BARRON'S EDUCATIONAL SERIES, INC.

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Barron's AP 化学 (第6版)

原 书 名: Barron's AP Chemistry (6th Edition)

著 者: Neil D. Jespersen, Ph.D.

译 者: 魏 鑫

责任编辑: 郭晓慧

出 版: 世界图书出版公司北京公司

发 行: 世界图书出版公司北京公司

(地址: 北京市朝阳区大街137号 邮编: 100010 电话: 64077922)

销 售: 各地新华书店及外文书店

印 刷: 三河市国英印务有限公司

开 本: 880 mm × 1230 mm 1/16

印 张: 49.75

字 数: 675千

版 次: 2012年8月第1版 2012年8月第1次印刷

版权登记: 京权图字01-2011-2570

ISBN 978-7-5100-4956-9

定价: 99.00元 (含一张CD-ROM)

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As you review the content in this book to work toward earning that **5** on your AP CHEMISTRY exam, here are five things that you **MUST** know:

Barron's Essential

巴朗学习五要点

1

Knowing the basics is universally important. Writing formulas and naming them, writing and balancing chemical equations, counting atoms, and determining molar masses along with proper use of significant figures are the “little things” that make a big difference between a 4 and a 5! Knowing the basics well also speeds your work so you will *seem* to have more time for the tough questions. Basic theories of chemistry require an understanding that can be applied to explaining chemical principles. These include the atomic theory, acid-base theories (Arrhenius, Brønsted-Lowry, and Lewis) VSEPR theory, kinetic molecular theory, collision theory, and transition state theory.

2

Atomic and molecular structures are fundamental to explaining many of the physical and chemical properties of substances. Atomic structure involves electron configurations and helps explain relationships within the periodic table. Molecular structure involves Lewis structures and VSEPR theory to obtain three-dimensional shapes and polarities. Polarity, or the lack of polarity, is the fundamental feature that allows the assessment of the strengths of intermolecular forces of attraction that then allows the explanation of many physical properties.

3

Stoichiometric calculations are used to solve many AP Chemistry problems. These problems include questions on how much of one substance reacts with another, limiting reactant calculations, titration calculations, and empirical formula calculations.

4

Principles of chemical kinetics and chemical equilibrium are used to explain and/or solve many questions. Chemical kinetics describes what happens as substances react and is used to deduce what happens during a chemical reaction. A dynamic equilibrium is the state that occurs after chemical change has ceased and may be used to determine the extent of reaction or the composition of the equilibrium mixture. The approaches for kinetics and equilibrium are distinctly different and must not be confused.

5

Thermodynamics explains why chemical reactions occur in terms of changes in potential and kinetic energies. Thermodynamics also provides methods for relating the Gibbs free energy with equilibrium constants and galvanic (voltaic) cell voltages.

Preface 前言

You are about to embark on one of the more intellectually challenging experiences of your life, the Advanced Placement Examination in Chemistry. Fewer than 1 percent of all high school students take this exam. Whatever the outcome, you are to be congratulated as one of a select group. As a conscientious student, you can use this review book to help you increase your score. A higher score can lead to college course credit and a head start in your selected career.

The AP Examination in Chemistry is different from other exams and tests that you have taken. *Explain*, *compare*, and *predict* are three important words often used on the AP Chemistry Exam. Remembered facts and calculation procedures are the basic groundwork of chemistry; however, high scores require a thorough understanding of chemical principles and relationships. Chemistry is rich in these relationships. The key to success on the exam is to think like a chemist and to apply your knowledge of one or more basic principles to provide a logical description of how chemicals behave.

This review book is designed with you, the student, in mind. It concentrates on the topics that are essential for a good score on the AP Chemistry Exam. In particular, the book is designed to provide insights into the use of basic principles to answer seemingly complex questions.

The discussion in each chapter is interspersed with exercises in which subject-matter problems are presented and solved. At the end of each chapter are questions to test your understanding of the topics discussed. These, together with the three diagnostic and three practice tests, provide hundreds of questions with a range of difficulty and complexity typical of an advanced placement exam. This review material will help you to pinpoint weak areas on which you need more preparation, and the explained answers can be used to identify sources of error or confusion.

Finally, the Educational Testing Service has been reviewing and revising the entire Advanced Placement Course in Chemistry for several years now. A few small changes were recently made, and they are incorporated in this guide. At this writing, there are no major changes expected for the 2012 and 2013 exams. You can be sure that this edition of Barron's *AP Chemistry* is up to date.

Acknowledgments 致谢

First and foremost, a very special thank-you to my wife, Marilyn Zak Jespersen, who spent countless hours reading and correcting the manuscript and suggesting changes. Marilyn's contributions have made this book readable, understandable, and user-friendly. No other person could have been as dedicated to the work as she was.

I am grateful also to Professor James Brady for many fruitful discussions and ideas in the years we have been colleagues at St. John's. We share the idea that our job is not to teach chemistry but to excite students into learning it. In our recent projects, he has continued to hone my skills as a writer.

Finally, I thank the editors and reviewers for their suggestions and encouraging comments during the production of the book.

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Introduction 绪论

IMPORTANT FACTS ABOUT THE ADVANCED PLACEMENT EXAMINATION IN CHEMISTRY

关于AP化学考试的重要信息

This examination is given in May each year at selected sites throughout the country. Exact dates, locations, and application forms are available in most guidance counselor offices. Information is also available from the following College Board Advanced Placement Program Offices.

AP Services AP服务

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The direct URL for the AP Chemistry Web pages is <http://www.collegeboard.com/student/testing/ap/chemistry/samp.html>. Please check this website for late-breaking news and exam changes that may affect you. In addition, this site has important information about AP exam registration, sites, test dates and times, score reporting, and fees.

It is very important to check the schedules on this website and register on time so that you do not miss an exam or pay late-registration fees. In most instances, your AP teacher will guide you through this process.

TEST CONTENT AND DISTRIBUTION 考试内容和考点分布

The material on the AP Chemistry Examination parallels the suggested course content for an AP course. The following lists topics and the approximate percentage of the exam devoted to each one. Note that this is not an exhaustive list of all possible topics, but it is a general guide.

STRUCTURE OF MATTER (20%)**Atomic Theory and the Structure of the Atom**

Evidence supporting the atomic theory

Atomic masses, atomic numbers, mass number, isotopes

Electronic structure of the atom

Energy levels, atomic spectra

Quantum numbers, atomic orbitals

Periodic trends and relationships

Ionization energies, electron affinities, electronegativity

Atomic and ionic radii, oxidation states

Chemical Bonding

Inter- and intramolecular binding forces

Ionic and covalent bonding

Hydrogen bonds, dipole-dipole and van der Waals forces
(including London forces)

Forces related to states, properties, and structure of matter

Bond polarity, electronegativity

Models of molecules

Lewis structures, resonance

VSEPR

Valence bond theory, hybrid orbitals, sigma and pi bonds

Molecular geometry, structural isomerism

Geometry of simple molecules, organic and inorganic

Coordination complexes

Dipole moments, molecular polarity

Relationship of properties to structure

Nuclear Chemistry

Nuclear equations, radioactivity

Half-lives and chemical applications

STATES OF MATTER (20%)**Gases****Laws of ideal gases**

Ideal gas law (equation of state)

Partial pressures (Dalton's law)

Kinetic-molecular theory

Interpretation of gas laws

Avogadro's hypothesis

Relationship between kinetic energy and temperature

Deviations from ideal gases (real gases)

Liquids and Solids

Kinetic-molecular theory applied to liquids and solids

Phase diagrams of a pure substance, triple point, critical point

Changes of state

Structure of solids and crystals; lattice energy

Solutions

Types of solutions and solubility

Concentration units (normality is not tested)

Raoult's law

Colligative properties, osmosis

Nonideal behavior of solutions