

<<化学>>

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前言

随着化学学科的不断发展和教学方法的提高,该书已经再版9次,4位作者都曾经多次获得过不同层次的教学奖。

其中Brown在学术上造诣较深,曾获Guggenheim学者奖、美国化学会无机化学研究奖和无机化学进步服务优异奖等,现为Illinois大学(Urbana Champaign)资深化学教授。

leMay教授有近30年的教学经验,并因此多次获得国家级教学奖。

Bursten教授是Ohio大学杰出化学教授,在过渡金属和铜系元素化合物研究方面有较高的水平。

特别贡献作者Murphy教授有化学和生物化学的双学士学位,在Wisconsin大学得到化学博士学位。

她的研究重点是无机纳米材料的合成和光学特性,以及DNA双螺旋结构的局部结构和动力学。

该书图文并茂,插图精美。

全书共分25章,其内容安排和理论深度与国内现有的普通化学或大学一年级化学相近。

应当认为,这类教材是20世纪70年代以来对我国普通化学或大学一年级化学影响最大的一类国外教材,比较重视化学基础理论的完整性和系统性。

该书的初等量子力学和化学热力学部分写得比较适合大学一年级学生的水平。

作为化学学科的学习,该书有较好的实用性。

该书为学生设计了一个学习系统,这个系统从构建概念框架(Building a Conceptual Frame work)、解题(Problem Solving)、可视化(Visualization)、应用(Applications)四个方面构建。

每一方面通过若干模块实现,例如构建概念框架通过每章开头的What's Ahead、Give It Some Thought检验对概念的理解、每章结尾的Visualizing Concepts三个模块逐层加深概念的理解。

对于学生而言,本教材提供了核心的、不可缺少的学习工具,无论是用作学习、提高,还是参考、准备考试,都能胜任。

对于老师也有很好的参考价值,Chemistry at Work和Chemistry and Life模块中的内容是国内教材所没有的。

前5章从宏观现象的角度阐明化学的基本概念,第6~9章讲述电子结构和电子键,随后重点转移到物质构成的另一个阶段:物质状态(第10~11章)和溶液(第13章)。

在学生理解了化学键和分子间相互作用的基础上,第12章关于现代材料,是实用性的章节,增加了发光聚合物和物质的毫微技术的新内容。

接下来几章讨论了影响化学反应的速度和范围的因素:化学动力学(第14章)、化学均衡(第15~17章)、化学热力学(第19章)、电化学(第20章)。

第18章为环境化学,讨论大气层和地球水面。

最后几章关于核化学(第21章)、非金属、金属、有机化学和生物化学(第22~25章),可以不按顺序、有选择地教授。

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内容概要

《化学：中心科学（英文版·原书第10版）》已经再版9次，4位作者都曾经多次获得过不同层次的教学奖。

它为学生设计了一个学习系统，这个系统从构建概念框架（Building a Conceptual Framework）、解题（Problem Solving）、可视化（Visualization）、应用（Applications）四个方面构建。

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对于老师也有很好的参考价值。

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书籍目录

出版说明iv

序v

Preface xxiii

A Student ' S Guide to Using this Text xxxi

About the Authors xxxii

1 Introduction : Matter and Measurement

2 Atoms , Molecules , and Ions

3 Stoichiometry : Calculations with Chemical Formulas and Equations

4 Aqueous Reactions and Solution Stoichiometry

5 Thermochemistry

6 Electronic Structure of Atoms

7 Periodic Properties of the Elements

8 Basic Concepts of Chemical Bonding

9 Molecular Geometry and Bonding Theories

10 Gases

11 Intermolecular Forces , Liquids , and Solids

12 Modern Materials

13 Properties of Solutions

14 Chemical Kinetics

15 Chemical Equilibrium

16 Acid—Base Equilibria

17 Additional Aspects of Aqueous Equilibria

18 Chemistry of the Environment

19 Chemical Thermodynamics

20 Electrochemistry

21 Nuclear Chemistry

22 Chemistry of the Nonmetals

23 Metals and Metallurgy

24 Chemistry of Coordination Compounds

25 The Chemistry of Life : Organic and Biological Chemistry

Appendices

A Mathematical Operations

B Properties of Water

C Thermodynamic Quantities for Selected Substances at 298.15

K (25)

D Aqueous Equilibrium Constants

E Standard Reduction Potentials at 25

教辅材料说明

教辅材料申请表

章节摘录

版权页：插图： Introduction and Section 1.1 Chemistry is the study of the composition, structure, properties, and changes of matter. The composition of matter relates to the kinds of elements it contains. The structure of matter relates to the ways the atoms of these elements are arranged. A property is any characteristic that gives a sample of matter its unique identity. A molecule is an entity composed of two or more atoms with the atoms attached to one another in a specific way. Section 1.2 Matter exists in three physical states, gas, liquid, and solid, which are known as the states of matter. There are two kinds of pure substances: elements and compounds. Each element has a single kind of atom and is represented by a chemical symbol consisting of one or two letters, with the first letter capitalized. Compounds are composed of two or more elements joined chemically. The law of constant composition, also called the law of definite proportions, states that the elemental composition of a pure compound is always the same. Most matter consists of a mixture of substances. Mixtures have variable compositions and can be either homogeneous or heterogeneous; homogeneous mixtures are called solutions. Section 1.3 Each substance has a unique set of physical properties and chemical properties that can be used to identify it. During a physical change, matter does not change its composition. Changes of state are physical changes. In a chemical change (chemical reaction) a substance is transformed into a chemically different substance. Intensive properties are independent of the amount of matter examined and are used to identify substances. Extensive properties relate to the amount of substance present. Differences in physical and chemical properties are used to separate substances. The scientific method is a dynamic process used to answer questions about our physical world. Observations and experiments lead to scientific laws, general rules that summarize how nature behaves. Observations also lead to tentative explanations or hypotheses. As a hypothesis is tested and refined, a theory may be developed. Section 1.4 Measurements in chemistry are made using the metric system. Special emphasis is placed on a particular set of metric units called SI units, which are based on the meter, the kilogram, and the second as the basic units of length, mass, and time, respectively. The metric system employs a set of prefixes to indicate decimal fractions or multiples of the base units. The SI temperature scale is the Kelvin scale, although the Celsius scale is frequently used as well. Density is an important property that equals mass divided by volume.

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