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COURSES IN ENGLISH

丛书主编 查有梁
主 编 邓开龙

中学学科英语丛书

中学化学英语读本

A Chemistry English

Reader for High School Students



Chemistry

升学 留学
必读

四川人民出版社
SICHUAN PEOPLE'S PUBLISHING HOUSE

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查有梁 主编

ZHONGXUE HUAXUE YINGYU DUBEN
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蒋跃梅
魏晓舸
戴雨虹

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序



查有梁

I

汉语是世界上使用人口最多的语言，世界上每五个人中，就有一人使用汉语。但从地域看，汉语主要在亚洲的中国使用。英语则在世界六大洲广泛使用。除英国、美国、加拿大、澳大利亚、新西兰、南非等国，将英语作为第一国语使用之外，世界上还有许多国家将英语作为第二语言使用。世界上每七个人中，就有一人以英语作为第一国语或第二语言使用。

英语以功能的灵活性和词汇的开放性为其显著特征。在英语不断增加的词汇中，新词的创造者们不会局限于希腊语和拉丁语，他们将发展一种与俄语、法语、西班牙语等共同使用的未来的国际通用的科技语言。在世界的科技书刊中，英语是主要使用的语言。

使用汉语的中国，是世界上最大的发展中国家；使用英语的美国，是世界上最大的发达国家。我们中国人要同世界各国交往，特别是为了学习外国先进的科学技术，必须学会英语。不仅要学会生活英语、人文英语(人文学科主要包括：文学、艺术、音乐、美术、历史、哲学)，而且要学会科技英语(科技英语包括自然科学、社会科学和工程技术中使用的英语)。当然，生活英语、人文英语、科技英语并不是截然分割的，这三个“集合”应当是“相交”的。

但是，只懂得生活英语、人文英语，不见得就能读懂科技英语，例如读懂：牛顿(Isaac Newton, 1642 ~ 1727)力学原理、

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麦克斯韦 (James Clerk Maxwell, 1831 ~ 1879) 电磁理论、爱因斯坦 (Albert Einstein, 1879 ~ 1955) 相对论、道尔顿 (John Dalton, 1766 ~ 1844) 的原子学说、门捷列夫 (Dmitry Ivanovich Mendeleev, 1834 ~ 1907) 的元素周期律、达尔文 (Charles Robert Darwin, 1809 ~ 1882) 进化论、摩根 (Thomas Hunt Morgan, 1866 ~ 1945) 的基因学说、维纳 (Norbert Wiener, 1894 ~ 1964) 的控制论 (Cybernetics)、图灵 (Alan Mathison Turing, 1912 ~ 1954) 的机器思维, 等等。要读懂科技英语, 既要有语言基础, 又要有专业基础。在 21 世纪, 我们中国人要在科学技术上有所创新, 读懂上述科学技术的经典理论, 仍是十分必要的。

当今, 中国一些大学的某些专业课已直接选用英语原版教材进行教学。而国外的一些重点大学, 如剑桥大学等已决定, 从 2002 年起, 在中国选一批优秀高中毕业生直接升入本科学习。因此, 中学阶段在学好生活英语、人文英语的基础上, 有必要为专业的科技英语的学习打好基础。为此, 我主编了这套“中学学科英语丛书”。这套丛书是使用英语来学习数学、物理、化学、生物、信息技术等中学课程的部分内容。

这套丛书的新意在于: 它属于中学的综合性、中介性、拓展性课程。综合性是指, 它至少是两门学科的综合, 即英语学科与另一门自然学科的综合; 中介性是指, 它作为今后直接用



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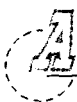
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英语学习专业课程的桥梁，并不是代替自然学科的课本；拓展性是指，它的内容并不全然局限在中学学科范围之内，可以与时俱进，紧跟时代发展。

这套丛书的内容是学科性，形式是供中学生选修或自学。这套丛书有利于中学生深化自然学科的学习，又有利于中学生更好地掌握科技英语。学科内容的深度与现行中国中学教学大纲接近，但不过分强调学科的系统性。每一读本均按学科内容，由浅入深编写。每一学科分为若干板块，每一板块分为若干课。每一课均采用“小课”安排，有[课文]、[例题]、[实验]、[练习]，深浅适度，便于自学。每一课所选[练习]，在书后的[附录 I]都有解答；[附录 II]，按字母顺序附词汇表。

生活英语、人文英语、科技英语内容各有侧重，其学习方法在相同中又有相异。相同的是都要多听、多说、勤读、勤写。相异的是重点有所不同。对于生活英语，应当强调“听说领先，读写同步”；对于人文英语，应当选择“广泛阅读，重在理解”；对于科技英语，应当重视“精读为主，扩大词汇”。生活英语，重在交际，是掌握英语的基础；人文英语，在于了解英语国家的文化背景，便于在真实情景中应用；科技英语，在于逻辑地、准确地理解内容，把握科技内容的表达方式。

显然，学习英语没有什么“捷径”，不可能几天就“速



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成”。请读者想一想，你是怎样掌握汉语的，学习英语之道是一样的。离开了听、说、读、写，是不可能掌握英语的。在学习英语的某一期问，听什么、说什么、读什么、写什么，要同步、要一致、要相对集中。这样，听、说、读、写，相互之间在内容上都得到强化；在一小时的学习课程中，听、说、读、写最好能交替进行，以激发学习兴趣，避免过分疲劳，方能提高效率。在整个“听说读写”过程中，都要伴随着积极地、主动地“思”。这样学英语，坚持数年，必有成效。

愿这套丛书，伴随你愉快地思考！

2002年8月1日

四川峨眉山

（查有梁：四川省社会科学院学术委员会副主任，研究员。全国教育科学规划领导小组教育理论组成员。中央教育科学研究所兼职研究员，北京师范大学等十多所高等院校兼职教授。美国哈佛大学教育学院科学史系、美国加利福尼亚大学圣迭戈分校物理系高级访问学者。发表有专著《控制论、信息论、系统论与教育科学》、《系统科学与教育》、《大教育论》、《教育模式》、《教育建模》、《物理教学论》、《课堂模式论》等十多部）

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Unit 1

The Science of Chemistry



Lesson 1 What Is Chemistry?

You probably think of chemistry as simply another subject that you study in high school. Or you may feel that chemistry is important only to people working in laboratories. But there is much more to chemistry than this. In fact, whether you are aware of it or not, chemistry is an important part of your daily life.

Chemistry deals with the properties of chemicals. What is a chemical? A chemical is any substance with a definite composition. You will learn in this course that chemical reactions are taking place constantly all around you and that chemists are not the only people who work with chemicals. For example, the chef carefully controls the many chemical reactions necessary to produce a delicious meal. And the food in your stomach might cause many chemical reactions. We can say that chemistry plays an important role in your daily life, and this text will tell you the variety of ways.

Some people think of chemical mainly in negative



terms — as the causes of pollution, cancer, and explosions. Many of these people believe that chemicals and chemical additives should be banned. But think for a moment what such a ban would mean — after all, everything around you is a chemical. Imagine going to the supermarket to buy fruits and vegetables grown without the use of any chemicals at all. The produce section would be completely empty! In fact, the entire supermarket would be empty because all foods are made of chemicals.

Without chemicals, you would have nothing to wear, to eat. We would have no ways to produce anything, just like knives, cars, papers, pens, TV sets, and so on.

【Words and Expressions】

substance [ˈsʌbstəns] *n.* 物质

chemical [ˈkemikəl] *n.* 化学药品

chemical reaction 化学反应

negative [ˈnegətɪv] *a.* 负面的, 贬义的

explosion [ɪksˈpləʊʒən] *n.* 爆炸

additive [ˈædɪtɪv] *n.* 添加剂

ban [bæn] *vt.* 禁止

Lesson 2 What Is Matter?

Matter, the stuff all things in the universe are composed of, exists in a dazzling variety of forms. Chemistry

is an ongoing investigation into the nature of matter. Matter is anything that has mass and volume. Even the air you breathe, the water you drink is matter. When inflated, a balloon is bigger and weightier than it does when it is deflated. The increase in the volume and mass of the balloon comes from the volume and the mass of air that you blew into the balloon.

Substances refer to any particular variety of matter always has the same properties and composition, regardless of how and where a specimen is obtained. For example, water is a substance. Under given conditions, any sample of water has the same properties and composition. The properties and composition can be used to identify water. On the other hand, wood is not a substance. Its properties and composition can vary widely. Wood is actually a mixture of many substances.

A sample of any substance is homogenous; that is the properties and composition are the same through out the sample. There are two major kinds of substances:

1. **Elements** – A substance that cannot be decomposed into two or more other substances by means of a chemical change is called an element. An element consists entirely of atoms with the same atomic number. Over one hundred and tentative different elements are known to exist. Most are metals such as mercury, iron, lead, copper, silver and gold. Others are nonmetals such as oxygen, sulfur, iodine and neon. Still others are semimetals (met-



alloids) such as silicon, beryllium and boron.

2. Compounds – A substance that can be decomposed into other substances by a chemical reaction is a compound. Every compound consists of two or more elements chemically combined in definite atomic proportions. For example, carbon dioxide is always two parts oxygen and one part carbon – a ratio of 1:2 of carbon to oxygen. Please note that the properties of compounds are usually VERY different from those of the elements they come from. For example when hydrogen and oxygen, two gaseous elements, are combined in a 2:1 ratio, they form water.

3. Mixtures – Like compounds, the components of a mixture are always composed of two or more elements, but mixtures differ from compounds in that:

(1) The components of a mixture can either be elements or compounds.

(2) The atomic ratio of compounds in a mixture is not fixed.

(3) The properties of a mixture are always intermediate between those of its components.

(4) Some mixtures, such as solutions of salt water or mixtures of gases are homogeneous, but others such as concrete are heterogeneous.

(5) Substances in mixtures are still independent and can be removed from each other without chemical reaction.

[Words and Expressions]

- dazzling ['dæzliŋ] *adj.* 令人眼花缭乱的
- particular [pə'tɪkjʊlə] *adj.* 特殊的
- variety [və'raɪəti] *n.* 种类
- property ['prɒpəti] *n.* 性质
- composition [ˌkəmpə'zɪʃən] *n.* 组成
- mercury ['mɜ:kjuri] *n.* 汞, 水银
- oxygen ['ɒksɪdʒən] *n.* 氧气
- sulfur ['sʌlfə] *n.* 硫, 硫磺
- iodine ['aɪəʊdi:n] *n.* 碘
- neon ['ni:ən] *n.* 氖
- specimen ['spesɪmɪn] *n.* 样本, 标本
- homogenous [ˌhə'mɒdʒənəs] *a.* 均匀的, 同质的
- semimetals(metalloid) [ˌsemi'metəl]([ˌ'metəlɔɪd]) *n.* 准金属
- element ['elɪmənt] *n.* 元素, 单质
- proportion [prəu'pɔ:ʃən] *n.* 比例
- carbon dioxide 二氧化碳
- hydrogen ['haɪdrədʒən] *n.* 氢元素, 氢气
- gaseous ['ɡæsiəs] *a.* 气态的
- intermediate [ˌɪntə'mɪdiət] *a.* 中间的
- heterogeneous [ˌhetərəu'dʒɪnjəs] *a.* 不均匀的
- concrete ['kɒkri:t] *n.* 混凝土



Lesson 3 Mixtures

Elements and compounds are pure substances. Their compositions are always the same, regardless of the source. They also contain a fixed proportion of each composition.

Pure substances are rare though and we usually encounter mixtures of compounds or elements. Unlike elements and compounds, mixtures can have variable compositions. For example, a mixture of sugar and water can have a variable proportion to each other. One can put more sugar or more water.

Mixtures can be classified as homogeneous or heterogeneous. Homogeneous mixtures have the same properties throughout the sample. An example is a thoroughly stirred mixture of salt in water or sugar in water. The air we breathe is also homogeneous mixture. The most common type of homogeneous mixture is solution. Beer, vinegar and tea are examples of solution. Heterogeneous mixtures often have different properties in the sample. A mixture of sand and water is an example of a suspension. They do not settle quickly. The particles of sand are constantly being "bumped" by water molecules and continue to stay in suspension for a while.

A colloid is a mixture in which the dispersed