

中等职业学校规划教材

*Professional English in
Chemistry and Chemical
Technology*

化学化工专业英语

尹德胜 叶蔚君 主编



化学工业出版社

中国翻译学系列教材

China Translation Studies Series

China Translation Studies Series

化学化工专业英语

王健林 孙爱英 主编

① 化学工业出版社

中等职业学校规划教材

**Professional English in
Chemistry and Chemical
Technology**

化学化工专业英语

尹德胜 叶蔚君 主编



化学工业出版社

·北京·

本教材共二十个单元，主要内容包括化学基础知识、化工单元操作、化工设备、石油化工、精细化工和分析化学等。

教材中对课文中出现的生词、化工技术术语、操作用语等都进行了注释。习题部分也强调了学生对化工专业技术术语及操作用语的掌握。阅读理解部分都与化学化工知识和技能密切相关，且具有一定的趣味性，并配有相应的中文翻译，便于学生阅读及理解。

本书内容浅显实用，易于阅读和理解；适用性强，覆盖面宽；突出职业教育特色。可作为中等职业学校化学化工及相关专业专业英语教材，也可供高职院校学生及相关人员参考使用。

图书在版编目 (CIP) 数据

化学化工专业英语/尹德胜, 叶蔚君主编. —北京:
化学工业出版社, 2008. 6
中等职业学校规划教材
ISBN 978-7-122-03027-6

I. 化… II. ①尹…②叶… III. ①化学-英语-专业学校-教材②化学工业-英语-专业学校-教材 IV. H31

中国版本图书馆 CIP 数据核字 (2008) 第 078926 号

责任编辑: 旷英姿
责任校对: 周梦华

装帧设计: 史利平

出版发行: 化学工业出版社 (北京市东城区青年湖南街 13 号 邮政编码 100011)
印 装: 北京云浩印刷有限责任公司
850mm×1168mm 1/32 印张 5 字数 118 千字
2008 年 7 月北京第 1 版第 1 次印刷

购书咨询: 010-64518888 (传真: 010-64519686) 售后服务: 010-64518899
网 址: <http://www.cip.com.cn>
凡购买本书, 如有缺损质量问题, 本社销售中心负责调换。

定 价: 10.00 元

版权所有 违者必究

前 言

随着国家对中等职业技术教育发展力度的加大，社会对化学化工专业技术人才素质要求的提高，那些既能掌握化工专业技能和知识，又能熟练掌握化学化工专业英语的技术人才将受到化工企业尤其是中外合资企业的欢迎。为提高中等职业技术学校化学化工专业学生专业英语水平及综合素质，化学工业出版社组织编写了本书。

考虑到中等职业学校学生的培养目标和学生基础英语的水平，本书编写过程中努力体现以下特点。

(1) 本书所选内容尽量通俗易懂。专业英语的学习，既要求读者具有一定的基础英语水平，又要求其掌握相关的化学化工专业知识与技能。中职学生学习基础英语的时间短，词汇量、专业知识的深度有限，因此，本书在编写过程中尽量使内容浅显，易于理解，突出职业教育特色，更适合中等职业学校学生学习。

(2) 本书所选内容适应性强，覆盖面宽，适合学生阅读科技英语水平的提高和专业技能水平的提高。选材主要内容包括化学基础知识、化工单元操作、化工设备、石油化工、精细化工和分析化学等。

(3) 本书对课文中出现的生词、化工技术术语、操作用语等都进行了注释。习题部分也强调了学生对化工专业技术术语及操作用语的掌握。阅读理解部分的内容都与化学化工知识和技能密切相关，且具有一定的趣味性，同时对生词都给出了注释，便于学生阅读及理解。

(4) 阅读材料都配有相应的中文翻译，目的也是更好地帮助

学生理解阅读内容。

本书由广东省石油化工职业技术学校尹德胜、叶蔚君主编。其中尹德胜编写了 Unit 1~Unit 11、Unit 18~Unit 20 共 14 单元的内容；叶蔚君编写了 Unit 12~Unit 17 共 6 单元的内容；广东石油化工职业技术学校翁婷婷编写词汇表。

本书可作为中等职业学校化学化工及相关专业专业英语教材，也可供高职院校学生及相关人员参考使用。

本书在编写与出版过程中得到了化学工业出版社的大力支持与帮助；编者所在的广东省石油化工职业技术学校的侯丽新副校长、潘斌高级实验师对书稿提出了许多宝贵的意见。在此特向他们表示衷心感谢。

本教材涉及内容广，因编者水平有限，疏漏和不妥之处在所难免，恳请提出宝贵意见，以便完善。

编者

2008 年 4 月

Contents

Unit 1	1
Text: Chemistry	1
Reading Material: Important Ideas about Chemical Change: Making New Substances	6
Unit 2	8
Text: Elements, Compounds and Mixtures	8
Reading Material: Elements, Mixtures, and Compounds	12
Unit 3	14
Text: Nomenclature of Inorganic Compounds	14
Reading Material: Alkanes and Alkenes	22
Unit 4	24
Text: Energy and Chemical Energy	24
Reading Material: Matter and Energy	30
Unit 5	32
Text: Catalysis	32
Reading Material: Factors Affecting Reaction Rates	36
Unit 6	39
Text: Solubility, Solutions and Suspensions	39
Reading Material: Hard Water	42
Unit 7	44
Text: Heat Transfer	44
Reading Material: Heat Transfer and Heat Exchangers	47
Unit 8	50
Text: Chemical Manufacturing Process	50

Reading Material: Process Design	53
Unit 9	56
Text: Reactor Type	56
Reading Material: Process Reactor Design	59
Unit 10	61
Text: New Technologies in Unit Operation	61
Reading Material: Chemicals from Crude Oil	64
Unit 11	67
Text: Crystallization, Precipitation and Filtration	67
Reading Material: Distillation	70
Unit 12	72
Text: the Production of Nitric Acid	72
Reading Material: Hazards in Chemical Engineering Laboratories	75
Unit 13	78
Text: Polymers	78
Reading Material: Classification of Polymers	82
Unit 14	85
Text: Surfactants	85
Reading Material: Surfactants	89
Unit 15	92
Text: Detergents	92
Reading Material: Detergent Ingredients and Its Formulations	96
Unit 16	100
Text: Coatings	100
Reading Material: A Resistant Coating and Lining	102
Unit 17	105
Text: Air Pollutants	105
Reading Material: Environmental Issues	108

Unit 18	111
Text: Titration	111
Reading Material: Acids, Bases and Their Neutralization ...	114
Unit 19	118
Text: the Types of Titration	118
Reading Material: Iodometry—an Indirect Method	121
Unit 20	124
Text: Gas Chromatography	124
Reading Material: Liquid Chromatography	127
Glossary	129
REFERENCES	146

Unit 1

Text: Chemistry

There are different kinds of materials in our universe. Each material has its own characteristics, which is called its properties.

The two sciences, chemistry and physics, are important for the study of materials. Physics is concerned with the general properties, energy and physical changes. By contrast, chemistry is concerned with chemical properties and chemical changes. In chemical changes, materials are transformed into different materials. For example, nitrogen and hydrogen can be combined to ammonia. It is called chemical reactions.

Chemistry is very important in the use of materials. It relates to so many areas of human daily life. Chemists work in different fields of chemistry. Biochemists are interested in chemical processes in living plants and animals. Analytical chemists find ways to separate and identify chemical substances. Organic chemists study substances which contain carbon and hydrogen. Inorganic chemists study most of the other elements.

New Words

chemistry [ˈkɛmɪstri] *n.* 化学

characteristic [ˌkærɪktəˈrɪstɪk] *n.* 特性, 特征

property [ˈprɒpəti] *n.* 性质, 性能

physics [ˈfɪzɪks] *n.* 物理学
transform [trænsˈfɔ:m] *v.* 改变, 转变, 转化
nitrogen [ˈnaɪtrədʒən] *n.* 氮, 氮气
hydrogen [ˈhaɪdrədʒən] *n.* 氢, 氢气
ammonia [ˈæməʊnjə] *n.* 氨
combine [kəmˈbaɪn] *v.* (使) 联合, (使) 结合
living [ˈlɪvɪŋ] *adj.* 活的
analytical [ˌænləˈlɪtɪkəl] *adj.* 分析的, 解析的
separate [ˈsepəreɪt] *adj.* 分开的, 分离的 *v.* 分开, 隔离
identify [aɪˈdentɪfaɪ] *vt.* 识别, 鉴别
organic [ɔ:ˈɡæɪnɪk] *adj.* 器官的, 有机的
inorganic [ˌɪnɔ:ˈɡæɪnɪk] *adj.* 无机的
contain [kənˈteɪn] *vt.* 包含, 容纳
carbon [ˈkɑ:bən] *n.* 碳
element [ˈelɪmənt] *n.* 元素, 要素

Expressions and Technical Terms

be concerned with 与...有关, 涉及到...
physical change 物理变化
chemical property 化学性质
chemical change 化学变化
by contrast 和...比起来, 对照
be transformed into 被转变成...
chemical reaction 化学反应
be combined to 化合成..., 结合成...
relate to 涉及, 与...有关
daily life 日常生活
chemical process 化工过程

Exercises

A. Answer the following questions.

1. What is physics concerned with?
2. What is chemistry concerned with?
3. What are biochemists interested in?
4. What are analytical chemists concerned with?
5. What do organic chemists study?
6. What do inorganic chemists study?

B. Translate the following into English.

1. 物理变化
2. 化学变化
3. 物理性质
4. 化学性质
5. 化学反应
6. 化学过程
7. 有机化学家
8. 无机化学家
9. 分析化学家
10. 生物化学家

C. Reading comprehension. After reading a passage, choose the best answer to each question.

When I was at university I studied very hard. But a lot of my friends did very little work. Jackson was one of them. He spent more time drinking in the students' union, than working in the library.

Once, at the end of term, we had to take an important test in chemistry. The test had a hundred questions. We just had to write 'True' or 'False'. While I was studying in my room the night before the test, Jackson was watching television. Jackson usually worried a lot the night before a test. But on that night he looked perfectly calm. Then he told me of his plan.

"It's very simple. There are a hundred questions and I have to get fifty correct to pass the test. I will take a coin into the ex-

amination room. I haven't studied a chemistry book for months, so I will just toss the coin. That way, I'm sure I will get half the questions right. ”

The next day, Jackson came cheerfully into the examination room. He sat tossing a coin for half an hour as he marked down his answers. Then he left, half an hour before the rest of us.

The next day, he saw the chemistry professor in the corridor. “Oh good,” He said. “have you got the results of the test? What mark did I get?”

The professor looked at him and smiled.

“Ah, it's you Jackson. Just a minute.”

Then he reached into his packet and took out a coin. He threw it into the air, caught it in his hand and looked at it.

“I'm terribly sorry, Jackson.” He said. “you failed.”

New Words and Phases

false [fə:ls] *adj.* 错误的

perfectly [ˈpɜ:fɪktli] *adv.* 很, 完全, 完美地

calm [kɑ:m] *v.* (使) 平静, (使) 镇定, 平息

toss [tɒs] *v.* 投, 掷

mark [mɑ:k] *n.* 标志, 分数, 记号 *vt.* 做标记, 打分数

corridor [ˈkɒrɪdɔ:] *n.* 走廊

students' union 学生会

1. The writer of this story ()

(A) is a university student.

(B) used to be a university student.

(C) does very little work.

2. Before the chemistry test Jackson was () worried.

(A) normally (通常地)

(B) unusually (罕见地)

(C) naturally (自然地)

3. He was going to look at the coin () he answered each question.

(A) after (B) before (C) because

4. Jackson expected to get ()

(A) a good mark. (B) his usual work.

(C) the pass mark.

5. The chemistry professor ()

(A) thought Jackson's method was good.

(B) knew about Jackson's method.

科技英语文体的主要特点

在科技英语文体中，句子的谓语动词常以被动语态的形式出现。如

1. Air and water can be converted into nitric acid. (空气和水能被转变成硝酸。)

2. It is called chemical reactions. (它被称为化学反应。)

虽然主动结构和被动结构意义相近，但被动结构使人一目了然。首先被动句并不提及人，对于一个科学家或科技工作者来说，过多的提及人不但没有必要，而且会引起含糊。其次主语是句子中非常重要的部分，把不提及人的这一部分放在句首，能引起读者的注意。在科技英语文体中谓语动词用被动语态形式可使句子简洁。科技英语中很多常用的被动语态结构在汉语中已有习惯的译法。如

It is considered that... 人们认为…

It is supposed that... 据推测，假定…

It is noticed that... 人们注意到…

It has been shown that... 已经表明…

It is reported that... 据报道…

be known as... 通常为... 叫做...

be considered as... 被说成是...

be described as... 被描述为...

be defined as... 被定义为...

Reading Material

Important Ideas about Chemical 化学变化的重要概念:

Change:

Making New Substances

生成新物质

In a chemical reaction

The starting substances, the reactants, react to give new different substances, the products. The changes which take place in the reaction are usually written as an equation.

在化学反应里

起始物质, 反应物, 反应生成新的不同的物质, 产物。反应中发生的变化通常用反应式表示。

reactants \longrightarrow products

means 'reacts to give' (sometimes the reaction conditions are written over the arrow)

反应物 \longrightarrow 产物

表示“反应生成”(有时候反应条件写在箭头上方)

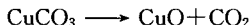
Different kinds of chemical change

不同类型的化学变化

Decomposition

A single substance is broken down into two or more simpler substances.

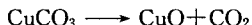
Most metal carbonates decompose to give the oxide and carbon dioxide.



分解反应

一种物质破裂变成两种或两种以上更简单的物质。

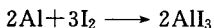
大多数金属碳酸盐分解生成氧化物和二氧化碳。



Combination

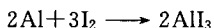
Two substances (usually elements) react together to make a single new compound.

Metal and non-metal; aluminum and iodine react to give aluminum iodide.

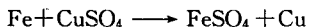
**化合反应**

两种物质(通常是元素)互相反应,生成一种新的化合物。

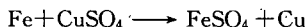
金属和非金属——铝和碘反应生成碘化铝。

**Displacement**

These are reactions in which one element takes the place of another. Both metals and nonmetals can do displacements. e. g. More reactive metals can displace less reactive ones from their solutions.

**置换反应**

反应里一种元素取代另一种元素,金属和非金属都能发生置换反应。如较活泼的金属能把较不活泼的金属从它们的溶液里置换出来。



Unit 2

Text: Elements, Compounds and Mixtures

Most substances can be decomposed into two or more other substances. For example, water can be decomposed into hydrogen and oxygen. Table salt is easily decomposed into sodium and chlorine. However, an element can not be decomposed into simpler substances.

Compounds are composed of two or more elements. So they can be decomposed into simpler substances by chemical changes. A molecule is a small unit of a compound. If we divide a drop of water into smaller and smaller particle, we obtain a water molecule at last. A water molecule is composed of two hydrogen atoms and one oxygen atom. We cannot divide it if we don't destroy the molecule.

What are the characteristics of a mixture? If we mix the two elements sulfur and iron, do we have a compound? No, we have a mixture of the two elements. In fact, the iron and sulfur of the mixture can be separated by a magnet. But if the mixture is heated, the iron and sulfur combine to form iron (II) sulfide (FeS). It contains 63.5 percent Fe and 36.5 percent S by weight. It is not attracted by a magnet.