

应用化学化工专业英语

English for Science and
Technology on Applied
Chemistry and Chemical
Engineering



主编 丁慧贤 马晓燕 李成

哈尔滨工程大学出版社

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内 容 简 介

《应用化学化工专业英语》是根据《大学英语教学大纲》(理工科本科用)专业阅读部分的要求编写的,供理工科大学应用化学、化工工艺、环境工程等相关专业或相关专业的学生使用,也可供同等英语程度的相关专业的工程技术人员使用。

本书分六个单元,有化学基础知识(1~13 课)、化学化工技术(14~16 课)、表面活性剂与洗涤剂(17~24 课)、环境工程(25~30 课)、煤炭及综合利用(31~40 课)、科技论文摘要。在编写过程中我们参阅了国内外大量有关资料,在保持原汁原味的基础上对文章中出现的科技术语、英语词组、语言难点及专业性知识都作了较为详细的注解。同时,对文章中出现的较难的句子也进行了翻译。对文章中出现的重要语法现象进行了分析。

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前 言

“衣带渐宽终不悔,为伊消得人憔悴。”经过一年的努力,这本《应用化学化工专业英语》终于和广大读者见面了,本书是继大学基础英语之后为提高化学化工专业高年级学生、研究生和教师阅读化工英语原著的能力而编写的。化学化工英语具有丰富的词汇和句法结构,富有极强的表现力。它以其特有的深度和广度,忠实地反映了波澜壮阔的化工世界及其突飞猛进的前进步伐。随着现代科技的进步与发展,世界化学工业也发生了巨大的变化,在全球范围内,有关化学工业的书籍与杂志层出不穷、浩如烟海,而绝大多数的化学文献是用英语写成的。因此,化工英语既是传播信息的媒介,又是反映化工世界的镜子。“众里寻她千百度,蓦然回首,却在灯火阑珊处”我们编写此书的目的是为读者架设一座通向化工世界的桥梁,以帮助读者进一步提高英语的阅读水平和运用能力。

本书分六个单元,有化学基础知识(1~13课)、化学化工技术(14~16课)、表面活性剂与洗涤剂(17~24课)、环境工程(25~30课)、煤炭及综合利用(31~40课)、科技论文摘要(41课)。在编写过程中我们参阅了大量的国内外有关资料,在保持原汁原味的基础上对文章中出现的科技术语、英语词组、语言难点及专业性知识都作了较为详细的注解。同时,对文章中出现的较难的句子也进行了翻译。对文章中出现的重要语法现象进行了分析。

本书集知识性、趣味性和实用性于一体,既可作为大学应用化

学、化工工艺、环境工程等专业的专业英语教材,又可作为教师参考书目及广大科技人员自修英语、拓宽科学视野的指导性读物。

由于编者水平有限,书中难免会有疏漏之处,诚请广大读者不吝赐教。

编者

2002 年 6 月

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Unit 1 General Knowledge of Chemistry

Lesson 1 History of Chemistry

Primitive man found out by trial and error how to carry out a certain number of simple chemical changes, but under the ancient Egyptian civilization men learned how to work copper, tin, iron and precious metals; knew how to make pottery, glass, soap and colouring agents, and how to bleach and dye textile fabrics. These arts were the beginnings of the chemical industries of today.

The early scientific study of chemistry, known as alchemy, grew up in the first few centuries A. D. at Alexandria in Egypt. There two important things came together: one was the practical knowledge of the Egyptian workers in metals, pottery and dyes; the other was the learning of the earlier Greek philosophers, such as Hippocrates and Aristotle. At the same time alchemy was much influenced by ideas from the East about magic and astrology—foretelling the future from the stars.

Greek Philosophers regarded debate about the nature of matter as superior to experiment⁽¹⁾, and some held that all matter was made up of the same four “elements” — earth, fire, air and water. Many people therefore thought that if these elements could be rearranged, one substance could be changed into another. For instance, a base metal⁽²⁾ could perhaps be turned into gold. The chief aim of the alchemists was to find a way doing this.

Alchemy came under Arab influence when the armies of Islam conquered Egypt during the seventh century. The Arabs carried its

study into western Europe when they advanced into Spain. Many Arabic words are still used in chemistry — “alkali”, “alcohol” and even “alchemy” itself, which means “the art of Egypt”. The greatest Arab alchemist was Jabir ibn Hayyan⁽³⁾, possibly the same person as Geber⁽⁴⁾, author of two important books on alchemy known from the Latin translations of the thirteenth century. Jabir claimed that mercury and sulphur were “elements” like the four Greek ones. He said that all metals were composed of mercury and sulphur in different proportions. To change a base metal into gold required the proportions to be changed by the action of a mysterious substance which came to be called “the philosopher’s stone”⁽⁵⁾. Alchemists searched in vain for this substance for several hundred years.

Alchemy was studied widely in Europe during the twelfth and following centuries, and attracted the attention of many learned men. Though they were doomed to fail in their attempts to make gold, their work led to the growth of a great deal of new chemical knowledge and of methods of making experiments. Many of the later European alchemists, however, were complete frauds who preyed upon trusting people by all sorts of tricks, and the subject fell into disrepute⁽⁶⁾. By the first half of the sixteenth century, the aim of the alchemists had changed from the making of gold to the making of medicines. In particular they sought a fanciful substance called “the elixir of life”, a powerful medicine which was to cure all ills, and which some people thought would turn out to be the same substance as “the philosopher’s stone”. This phase of chemistry lasted till about 1700.

New Words

1. Egyptian [i'dʒɪpʃən] *adj. & n.* 埃及的; 埃及人; 埃及语
2. bleach [bli:tʃ] *vt. & vi.* 漂白, 变白

3. textile ['tekstail] *n. & adj.* 纺织品; 纺织的
4. alchemy ['ælkimi] *n.* 炼金术
5. astrology [ə'strɒlədʒi] *n.* 星相学, 占星术
6. alchemist ['ælkimist] *n.* 炼金术士
7. Islam ['izlɑ:m] *n.* 伊斯兰(教, 国家), 回教
8. disrepute ['disri'pjut] *n.* 坏名声

Notes

(1) ...regarded debate about the nature of matter as superior to experiment:认为对物质本质的辩论胜过实验。

句中 regard ...as ...译为“把... 看作”; “将...认为”。

(2) base metal: 贱金属(一般指铁、铅等)

(3) Jabir ibn Hayyan: (人名)阿拉伯化学之父(大约在 8 世纪)

(4) possibly the same person as Geber: (他)可能就是 Geber.

(5) the philosopher's stone: 点金石(炼金术士所寻求的, 能使其他金属变成金银的一种实际上不存在的东西)。

(6) fell into disrepute : 声名狼藉。

Exercises

1. Put the following into Chinese

be doomed to fail, in vain, came under Arab influence,
colouring agent, the elixir of life

2. Reading Comprehension

(1) Alchemy was originated in _____.

A. the East. B. Spain. C. England. D. Alexandria

(2) The early alchemists thought that _____.

A. stone could be changed into a base metal

B. a base metal could be turned into glass

C. gold could be changed into stone

D. a base metal could be changed into gold

- (3) According to this passage, “the elixir of life” was _____.
A. the philosopher’s stone B. a base metal
C. a cure-all. D. alcohol
- (4) Jabir ibn Hayyan _____.
A. wrote two books on alchemy in the thirteenth century
B. was a translator of alchemy books
C. extended the Greek theories about the “elements”
D. discovered the “philosopher’s stone”
- (5) Before the sixteenth century, alchemy _____.
A. became more important
B. had a bad reputation
C. was successfully carried out
D. was studied by every philosopher.

Lesson 2 Chemistry and Society

For the first two-thirds of the 20th century, chemistry was seen by many as the science of the future. The potential of chemical products for enriching society appeared to be unlimited. Increasingly, however, and especially in the public mind, the negative aspects of chemistry have come to the fore. Disposal of chemical by-products⁽¹⁾ at waste-disposal sites of limited capacity has resulted in environmental and health problems of enormous concern. The legitimate use of drugs for the medically supervised treatment of diseases has been tainted by the growing misuse of mood-altering drugs. The very word chemicals has come to be used all too frequently in a pejorative sense. There is, as a result, a danger that the pursuit and application of chemical knowledge may be seen as bearing risks that outweigh the benefits.

It is easy to underestimate the central role of chemistry in modern society, but chemical products are essential if the world's population is to be clothed, housed, and fed. The world's reserves of fossil fuels (e. g. , oil, natural gas, and coal) will eventually be exhausted, some as soon as the 21st century, and new chemical processes and materials will provide a crucial alternative energy source. The conversion of solar energy to more concentrated, useful forms, for example, will rely heavily on discoveries in chemistry. Long-term, environmentally acceptable solutions to pollution problems are not attainable without chemical knowledge. There is much truth in the aphorism that "chemical problems require chemical solutions". Chemical inquiry will lead to a better understanding of the behaviour of both natural and synthetic materials and to the discovery of new substances that will help future generations better supply their needs and deal with their problems.

Progress in chemistry can no longer be measured only in terms of economics and utility. The discovery and manufacture of new chemical goods must continue to be economically feasible but must be environmentally acceptable as well. The impact of new substances on the environment can now be assessed before large-scale production begins, and environmental compatibility has become a valued property of new materials. For example, compounds consisting of carbon fully bonded chlorine and fluorine, called chlorofluorocarbons (or Freons), were believed to be ideal for their intended use when they were first discovered. They are nontoxic, nonflammable gases and volatile liquids that are very stable. These properties led to their widespread use as solvents, refrigerants, and propellants in aerosol containers. Time has shown, however, that these compounds decompose in the upper regions of the atmosphere and that the decomposition products act to destroy stratospheric ozone. Limits have now been placed on the use of chlorofluorocarbons, but it is impossible to recover the amounts already dispersed into the atmosphere.

The chlorofluorocarbon problem illustrates how difficult it is to anticipate the overall impact that new materials can have on the environment. Chemists are working to develop methods of assessment, and prevailing chemical theory provides the working tools. Once a substance has been identified as hazardous to the existing ecological balance, it is the responsibility of chemists to locate that substance and neutralize it, limiting the damage it can do or removing it from the environment entirely. The last years of the 20th century will see many new, exciting discoveries in the processes and products of chemistry. Inevitably, the harmful effects of some substances will outweigh their benefits, and their use will have to be limited. Yet, the positive impact of chemistry on society as whole seems beyond doubt.

New Words

1. come to the fore 出名;崭露头角
2. underestimate [ˌʌndə'restimeɪt] *vt.* 低估;看轻;*n.* 低估
3. fossil fuel 矿物燃料
4. aphorism ['æfərɪzəm] *n.* 格言,警句,谚语
5. chlorofluorocarbons *n.* 氟利昂
6. nontoxic [nɒn'tɒksɪk] *adj.* 无毒的
7. nonflammable [nɒn'flæməbl] *adj.* 不燃烧的
8. propellant [prə'pelənt] *adj.* 推进的;*n.* 火药;喷气燃料;推进燃料;压缩到瓶中气体
9. aerosol ['eərəsɒl] *n.* 气溶胶;气雾剂;烟雾剂
10. ozone ['əʊzəʊn] *n.* 新鲜的空气;臭氧
11. ecological balance 生态平衡

Notes

(1) by-products 副产品

这是科技英语的一种构词法——合成法。

由两个或更多的词合成一个词叫合成法。有时需加连字符。

如:

副词 + 过去分词	well-known	著名的
名词 + 名词	carbon steel	碳钢
名词 + 过去分词	computer-oriented	研制计算机的
动词 + 副词	check-up	检查
形容词 + 名词	atomic weight	原子量
动词 + 代词 + 副词	pick-me-up	兴奋剂

另外,科技英语中还普遍采用压缩法、混成法、符号法和字母象形法等构词方法。

Exercises

1. Put the following into Chinese

(1)(Shortening);EST EPT TOEFL CEF CAD

(2)(Blending);smog mote positron modem

(3)(Letter Symbolizing);I-bar T-square U-pipe X-ray

I-steel N-region T-beam T-connection

Lesson 3 Chemistry and Chemical Engineering

1. What is Chemistry about

The different kinds of matter that compose the universe are termed materials. Each material has its own distinguishing characteristics, which is termed its properties. These properties enable the material to be recognized or separated from other materials.

The study of materials is the joint concern of chemistry and physics. These two sciences are so closely related that no one can learn very much about either without considerable training in the other. In many of their applications it is hard to tell where the one science leaves off and the other begins.

Roughly stated, physics is concerned with the general properties and energy and with events which results in what are termed physical changes. Physical changes are those in which materials are not so thoroughly altered as to be converted into other materials distinct from those present at the beginning.

Chemistry, by contrast, is chiefly concerned with properties that distinguish materials from one another and with events which result in chemical changes. Chemical changes are those in which materials are transformed into completely different materials. Who but a chemist would ever guess that common salt can be resolved into a greenish gas and silvery metal? Or that two odorless gases, nitrogen and hydrogen, can be combined to form ammonia? Or that ordinary air and water can be converted into nitric acid? Or that coal tar contains ingredients that can be transformed into dyestuffs and perfumes?

Such thoroughgoing transformations, in which all the

properties of a material are altered, so that a completely different material is obtained, are called chemical transformations, chemical changes or chemical reactions.

Chemistry as an art is concerned with identifying, separating and transforming materials, in applying them to definite uses.

Chemistry as a science is a manner of thinking about transformations of materials which helps us to understand, predict and control them. It furnishes directing intelligence in the use of materials.

2. The Scope of Chemistry

Chemistry is sometimes called the “central science” because it relates to so many areas of human endeavor and curiosity, Chemists who develop new materials to improve electronic devices such as solar cells, transistors, and fiber optic cables work at the interfaces of chemistry with physics and engineering. Those who develop new pharmaceuticals for use against cancer or AIDS work at the interfaces of chemistry with pharmacology and medicine.

Many chemists work in more traditional fields of chemistry. Biochemists are interested in chemical processes that occur in living organisms. Physical chemists work with fundamental principles of physics and chemistry in an attempt to answer the basic questions that apply to all of chemistry: Why do some substances react with one another while others do not? How fast will a particular chemical reaction occur? How much useful energy can be extracted from a chemical reaction? Analytical chemists are investigators; they study ways to separate and identify chemical substances. Many of the techniques developed by analytical chemists are used extensively by environmental scientists. Organic chemists focus their attention on substances that contain carbon and hydrogen in combination with a few other elements. The vast majority of substances are organic chemicals. Inorganic chemists focus on most of the elements other