国家级质量工程项目——“E+”双专业一体化
复合型人才培养模式创新实验区出版资助项目

化工英语阅读教程

张媛媛　杨昌炎■主编

English for Chemistry and Chemical Engineering

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·北京·

本书主要介绍了能源化工、分析化学、反应工程、基础化学（基本概念、有机物命名等）、工业催化、石油化工和单元操作、环境化工、无机化工、材料化工等内容。每课除正文外，还配有词汇、词组和练习题等。本书选材范围广，词汇较全面，难度适中，循序渐进。

本书适合于化工和相关专业大专院校师生及工程技术人员阅读参考。

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前　言

《化工英语阅读教程》包括五大部分，共 18 个单元。五个部分分别是化学基础（Chemistry）、化学工程（Chemical Engineering）、材料和精细化工（Materials and Fine Chemicals）、能源和环境保护（Energy Sources and Enviornment Protection）、食品和生物化工（Food and Biochemistry）。其目的是学生通过学习，可以较为系统地、概要地了解有关化学化工的基础原理和知识、历史和发展，接触掌握化工领域的专业词汇，了解学科领域的前沿信息等，为后续的专业学习打好基础。

本教程选材的原则是知识性、系统性、时代性和前沿性，其中的阅读材料均选自当代英美国家化工相关网站、报刊杂志以及一些英文原版教材、专著和期刊文章，内容新颖、涉及面广。为了兼顾趣味性和课堂使用的可操作性，每一篇阅读材料后附生词表和课后练习（词汇练习，化工词汇和短语表达；阅读理解练习；翻译练习），方便教师参考使用。

本教程是国家级质量工程项目——武汉工程大学“E+”双专业一体化复合型人才培养模式创新实验区的阶段性建设成果。该实验区于 2009 年获批成立，按照“通识教育基础上的专业教育”的理念，整合校内外优质教育教学资源，大力实施“英语＋其他专业”一体化复合型人才培养模式（“E+”模式），全面推进人才培养模式的综合改革，探索教学理念、培养模式和管理机制的全方位创新，培养一批英语扎实，专业过硬，英语和专业都是强项的高素质复合型国际化人才。本教程是为了适应“英语＋化学工程与工艺”双专业的人才培养目标，即培养能在化工及相关领域从事工程设计、技术开发、生产管理和科学研究等工作的国际化工程技术人才而开发的。同时，也可供化工和相关专业大专院校师生参考，亦可用作非化工专业高校学生后续英语课程使用。

由于时间仓促，水平有限，疏漏和错误之处在所难免，欢迎批评指正。

化工英语阅读教程编写组

2011 年 6 月　武汉

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Part One Chemistry

Before you read

1. *Do you like the subject of chemistry? Why or why not?*

2. *Work in groups and discuss the significance of chemistry. What roles has chemistry played in our life?*

Unit 1 Chemistry and Chemists

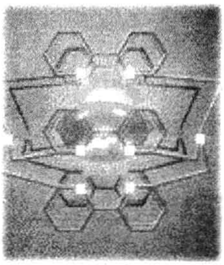
Reading 1

Chemistry and Chemists

What is Chemistry? Chemistry is defined as the study of matter and its properties. Matter is defined as everything that has mass and occupies space. Although these definitions are acceptable, they do not explain why one needs to know chemistry. The answer to that query is that the world in which we live is a chemical world. Your own body is a complex chemical factory that uses chemical processes to change the food you eat and the air you breathe into bones, muscle, blood, and tissue and even into the energy that you use in your daily living. When illness prevents some part of these processes from functioning correctly, the doctor may prescribe as a medicine a chemical compound, either isolated from nature or prepared in a chemical laboratory by a chemist. Without chemistry our lives would be unrecognizable, for chemistry is at work all around us. Think what life would be like without chemistry-there would be no plastics, no electricity and no protective paints for our homes. There would be no synthetic fibers to clothe us and no fertilizers to help us produce enough food. We wouldn't be able to travel because

there would be no metal, rubber or fuel for cars, ships and aeroplane. Our lives would be changed considerably without telephones, radio, television or computers, all of which depend on chemistry for the manufacture of their parts. Life expectancy would be much lower, too, as there would be no drugs to fight disease.

Chemistry is at the forefront of scientific adventure, and you could make your own contribution to the rapidly expanding technology we are enjoying. Take some of the recent academic research: computer graphics allow us to predict whether small molecules will fit into or react with larger ones—this could lead to a whole new generation of drugs to control disease; chemists are also studying the use of chemicals to trap the sun's energy and to purify sea water; they are also investigating the possibility of using new ceramic materials to replace metals which can corrode.



Biotechnology is helping us to develop new sources of food and new ways of producing fuel, as well as producing new remedies for the sick. As the computer helps us to predict and interpret results from the test tube, the speed, accuracy and quality of results is rapidly increasing-all to the benefit of product development.

It is the job of chemists to provide us with new materials to take us into the next century, and by pursuing the subject, you could make your positive contribution to society.

Here are some good reasons for choosing chemistry as a career.

Firstly, if you have an interest in the chemical sciences, you can probably imagine taking some responsibility for the development of new technology. New ideas and materials are constantly being used in technology to improve the society in which we live. You could work in a field where research and innovation are of primary importance to standards of living, so you could see the practical results of your work in every day use.

Secondly, chemistry offers many career opportunities, whether working in a public service such as a water treatment plant, or high level research and development in industry. *Your chemistry-based skills and experience can* *be used, not only in many different areas within the chemical industry, but also as the basis for a more general career in business.* As a qualification, chemistry is highly regarded as a sound basis for employment.

You should remember that, as the society we live in becomes more technically advanced, the need for suitably qualified chemists will increase. Although chemistry stands as a subject in its own right, it acts as the bond between physics and biology. Thus, by entering the world of chemistry you will be equipping yourself to play a leading role in the complex world of tomorrow.

Chemistry gives you an excellent training for many jobs, both scientific and non-scientific. To be successful in the subject you need to be able to think logically, and be creative, numerate, and analytical. These skills are much sought after in many walks of life, and would enable you to pursue a career in, say, computing and finance, as well as careers which use your chemistry directly.

Here is a brief outline of some of the fields chemists work in:

Many are employed in the wealth-creating manufacturing industries-not just oil, chemical and mining companies, but also in ceramics, electronics and fibers. Many others are in consumer based industries such as food, paper and brewing; or in service industries such as transport, health and water treatment.

In manufacturing and service industries, chemists work in Research and Development to improve and develop new products, or in Quality Control, where they make sure that the public receives products of a consistently high standard.

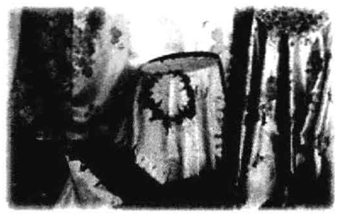
Chemists in the public sector deal with matters of public concern such as food preservation, pollution control, defence, and nuclear energy. The National Health Service also needs chemists, as do the teaching profession and the Government's research and advisory establishments.

Nowadays, chemists are also found in such diverse areas as finance, law and politics, retailing, computing and purchasing. Chemists make good managers, and they can put their specialist knowledge to work as consultants or technical au-

thors. Agricultural scientist, conservationist, doctor, geologist, meteorologist, pharmacist, vet… the list of jobs where a qualification in chemistry is considered essential is endless. So even if you are unsure about what career you want to follow eventually, you can still study chemistry and know that you're keeping your options open.

What Do Chemistry Graduates Do?

Demand for chemists is high, and over the last decade opportunities for chemistry graduates have been increasing. This is a trend that is likely to continue. Chemistry graduates are increasingly sought after to work in pharmaceutical, oil, chemical, engineering, textile and metal companies, but the range of opportunities also spans the food industry, nuclear fuels, glass and ceramics, optical and photographic industries, hospitals and the automotive industry. Many graduates begin in scientific research, development and design, but over the years, about half change, into fields such as sales, quality control, management, or consultancy. Within the commercial world it is recognized that, because of the general training implicit in a chemistry course, chemistry graduates are particularly adaptable and analytical—making them attractive to a very broad spectrum of employers. There has been a growth of opportunity for good chemistry graduates to move into the financial world, particularly in accountancy, retail stores, and computer software houses.



New words and expressions

1. ceramic [si'ræmik, sə'ræmik] adj. / n. 陶器的，陶瓷制品
2. fertilizer ['fəːtilaizə, 'fəːtlˌaizə] n. 肥料，化肥
3. fiber ['faibə] n. 纤维
4. implicit [im'plisit] adj. 暗示的，含蓄的
5. pharmaceutical [fɑːmə'sjuːtikl, ˌfɑːmə'sjuːtikəl] adj. 制药的，药品的

6. spectrum ['spektrəm] n. 光谱，声谱，波谱，频谱，范围，系列

Understanding the text

1. Why do people choose chemistry as a career?
2. What are fields where chemists work?
3. How do you think of chemistry after reading this passage?

Translation

1. As the computer helps us to predict and interpret results from the test tube, the speed, accuracy and quality of results is rapidly increasing-all to the benefit of product development.

2. Nowadays, chemists are also found in such diverse areas as finance, law and politics, retailing, computing and purchasing.

3. Within the commercial world it is recognized that, because of the general training implicit in a chemistry course, chemistry graduates are particularly adaptable and analytical—making them attractive to a very broad spectrum of employers.

Before you read

1. *Can you make a list of the famous chemists?*
2. *Tell us a story about a chemist you know well.*

Reading 2

Paul D. Boyer

Paul Delos Boyer (born July 31, 1918) is an American biochemist and analytical chemist. He shared the 1997 Nobel Prize in Chemistry for research on the "enzymatic mechanism underlying the biosynthesis of adenosine triphosphate (ATP)" (ATP synthase) with John E. Walker; the remainder of the Prize in that year was awarded to Danish chemist Jens Christian Skou for his discovery of the Na^+/K^+-ATPase.

Birth and Education

Boyer was born in Provo, Utah. He grew up in a nonpracticing Mormon

family. He attended Provo High School, where he was active in student government and the debating team. He received a B. S. in chemistry from Brigham Young University in 1939 and obtained a Wisconsin Alumni Research Foundation Scholarship for graduate studies. Five days before leaving for Wisconsin, Paul married Lyda Whicker. They remain married and have three children and eight grandchildren.

Academic Career

After Boyer received his Ph. D. degree in biochemistry from the University of Wisconsin-Madison in 1943, he spent years at Stanford University on a war-related research project dedicated to stabilization of serum albumin for transfusions. He began his independent research career at the University of Minnesota and introduced kinetic, isotopic, and chemical methods for investigating enzyme mechanisms. In 1955, he received a Guggenheim Fellowship and worked with Professor Hugo Theorell on the mechanism of alcohol dehydrogenase. In 1956, he accepted a Hill Foundation Professorship and moved to the medical campus of the University of Minnesota. In 1959-1960, he served as Chairman of the Biochemistry Section of the American Chemical Society (ACS) and in 1969-1970 as President of the American Society of Biological Chemists.

Since 1963, he has been a Professor in the Department of Chemistry and Biochemistry at University of California, Los Angeles. In 1965, he became the Founding Director of the Molecular Biology Institute and spearheaded the construction of the building and the organization of an interdepartmental Ph. D. program. This institutional service did not diminish the creativity and originality of his research program, which led to three postulates for the binding mechanism for ATP synthesis—that energy input was not used primarily to form ATP but to promote the binding of phosphate and mostly the release of tightly bound ATP; that three identical catalytic sites went through compulsory, sequential binding changes; and that the binding changes of the catalytic subunites, circularly arranged on the periphery of the enzyme, were driven by the rotation of a smaller internal subunit.

Paul Boyer was Editor or Associate Editor of the Annual Review of Biochemistry from 1963-1989. He was Editor of the classic series, "The Enzymes". In 1981, he was Faculty Research Lecturer at UCLA. In that same year, he was awarded the prestigious Tolman Medal by the Southern California Section of the American Chemical Society.

New words and expressions

1. albumin [æl'bju:min] n. 蛋白质，蛋白素
2. biosynthesis [ˌbaiəu'sinθisis] n. 生物合成
3. catalytic [ˌkætə'litik] adj. 催化的，接触反应的
4. enzyme ['enzaim] n. 酶
5. Faculty Research Lecturer 大学的一种研究职位
6. fellowship ['feləuʃip, 'feləuˌʃip] n. 友谊，团体，会员资格，奖学金
7. isotopic [aisəu'tɔpik] adj. 同位素的，合痕的
8. kinetic [kai'netik, ki'netik] adj. 运动的，动力学的
9. postulate ['pɔstjuleit, 'pɔstʃəˌleit] vt. 要求，假定 n. 假定，基本条件
10. serum ['siərəm, 'sirəm] n. 浆液，血清，乳浆
11. transfusion [træns'fju:ʒən] n. 输液，输血，转移

Understanding the text

What are Paul D. Boyer's main achievements?

Translation

1. After Boyer received his Ph. D. degree in biochemistry from the University of Wisconsin-Madison in 1943, he spent years at Stanford University

on a war-related research project dedicated to stabilization of serum albumin for transfusions.

2. This institutional service did not diminish the creativity and originality of his research program, which led to three postulates for the binding mechanism for ATP synthesis—that energy input was not used primarily to form ATP but to promote the binding of phosphate and mostly the release of tightly bound ATP; that three identical catalytic sites went through compulsory, sequential binding changes; and that the binding changes of the catalytic subunites, circularly arranged on the periphery of the enzyme, were driven by the rotation of a smaller internal subunit.

Reading 3

The Founder of Chemical Industry—Hou Debang

Hou Debang (1890-1974), born in Fuzhou City of Fujian Province, was a famous chemical expert and the founder of China's modern chemical industry. He was famous at an early age for his diligence, intelligence and hard study. Graduated from Tsinghua University in 1912, he was recommended to study in Massachusetts Institute of Technology one year later and got the doctor degree of Colombia University in the United States.

In the 1920s, China solely depended on importation for all pure alkali consumption. To establish the national pure alkali industry, Hou Debang came back to China. With his guidance, Tianjin Alkali Plant, then the biggest one in Asia, was established at the coast of Bohai Sea in Tanggu District, Tianjin City, and developed the Red Triangle brand pure alkali. In

1926, Red Triangle won the highest honor, Gold Prize, at the International Exhibition in Philadelphia, USA. Instead of selling his patent for huge profits, Hou Debang wrote a book titled *Production of Pure Alkali*, introducing the techniques of pure alkali production to the world, and shared his knowledge with professionals in the circle of the international chemical industry.

In 1937, Hou Debang helped establish the Nanjing Ammonium Sulphate Factory under Yongli Chemical Industrial Company, which was up to the world level in terms of technology, ushering in a new era for China's chemical fertilizer industry. In 1943, he initiated the unique production technologies of pure alkali and ammonium chloride, which was called the *Hou Pure Alkali Production Method*. This method established new ways for pure alkali production in the world and drew much attention from the international academic circle. Since then, China's pure alkali production industry has entered a new stage.

Hou Debang was once Vice Minister of Chemical Industry, vice chairman of China Association for Science and Technology, president of China Chemistry Academy and the Chemical Industry and Engineering Society of China. He became a member of the Chinese Academy of Sciences in 1955.

New words and expressions

1. alkali [ˈælkəlai, ˈælkəˌlai] n. 碱
2. ammonium [əˈməuniəm] n. 氨盐基
3. chloride [ˈklɔːraid, ˈklɔraid] n. 氯化物
4. sulphate [ˈsʌlfeit] n. 硫酸盐