高职高专“十一五”规划教材

化学化工基础英语

Fundamental English in Chemistry & Chemical Engineering

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本书由三个部分20个单元构成，每个单元由课文、难点注释、词汇表、课后练习和阅读材料组成。课文主要内容有无机化合物、有机化合物、高分子聚合物的命名和性质，精细化工产品、分析检验仪器设备和化工生产设备的介绍，还包括相关企业和涉及化工产品的品名、性质、储存、包装和危险品等级等内容。书后附有练习答案、课文中文参考译文、总词汇表、化学化工常用构词、常见有机基团、常见有机化合物命名、元素名称及读法和常用化工产品英文缩写与中文名称对照表等可供查阅。

本书内容语言精炼、知识性强、覆盖面广、难度适中，可作为高职高专商务英语专业的补充教材，也可作为高职高专化学化工专业英语教材，还可作为从事化工商贸活动和化工生产、管理、经营、销售等专业人员的参考资料。

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前　言

近年来，高职高专商务英语专业的毕业生进入化工企业工作时，最大的困难是缺乏化学化工知识、化学化工英语词汇、术语等，对仪器和设备的英文表达了解也不多。为了使学生毕业后能尽快胜任化学化工外贸工作，化学化工类高职院校商贸英语专业开设化学化工基础英语课程十分必要，为此化学工业出版社组织编写了本教材。

本书选材来源于原版英文书籍、杂志、英语化学化工网站、国内外知名企业仪器设备样本等资料。由三个部分20个单元构成，每个单元由课文、难点注释、词汇表、课后练习和阅读材料组成。课文主要内容有无机化合物、有机化合物、高分子聚合物的命名和性质，精细化工产品、分析检验仪器设备和化工生产设备的介绍，还包括相关企业和涉及化工产品的品名、性质、储存、包装和危险品等级等内容。书后附有练习答案、课文中文参考译文、总词汇表、化学化工常用构词、常见有机基团、常见有机化合物命名、元素名称及读法、常用化工产品英文缩写与中文名称对照表等可供查阅。

本书内容语言精炼、知识性强、覆盖面广、难度适中，可作为高职高专商务英语专业的补充教材，也可作为高职高专化学化工专业英语教材，还可作为从事化工商贸活动和化工生产、管理、经营、销售等专业人员的参考资料。

本教材由天津渤海职业技术学院刘庆文担任主编，马竟担任副主编，天津渤海化工联合进出口公司肖扬主审。其中第1～6单元由马竟编写，第7～13、15单元由刘庆文编写，第14、16～20单元由湖南化工职业技术学院陈文娟编写，全书由刘庆文统稿。

在本书编写过程中得到了许多同志的鼎力支持和热情帮助，中国远大集团远大海外经济投资发展有限公司副总裁南泉、天津渤海化工集团公司教育培训中心常务副主任杨厚俊同志、天津渤海化工联合进出口公司李锡琴、王艳华和李嘉庆同志对本书的编写都给予了具体的建议和指导，天津渤海职业技术学院的范琳老师帮助录入了许多材料，在此一并表示衷心的感谢。

本书虽然经过多次补充和完善，但限于编者水平，书中不足之处在所难免，恳请广大读者指正。

编者

2007年9月16日

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PART ONE BASIC KNOWLEDGE OF INORGANIC AND ORGANIC CHEMISTRY

Unit 1 Basic Concepts of Inorganic Chemistry

MATTER

Definition of Matter

Matter is defined as anything that occupies space and has mass. Mass is the quantity of matter which a substance possesses and, depending on the gravitational force acting on it, has a unit of weight assigned to it [1]. Although the weight then can vary, the mass of the body is a constant and can be measured by its resistance to a change of position or motion. This property of mass to resist a change of position or motion is called inertia. Since matter does occupy space, we can compare the masses of various substances that occupy a particular unit volume. This relationship of mass to a unit volume is called the density of the substance. It can be shown in a mathematical formula as $D=\frac{m}{V}$. The basic unit of mass (m) in chemistry is the gram (g), and of volume (V) is the cubic centimeter (cm^3) or milliliter (mL).

States of Matter

Matter occurs in three states: solid, liquid, and gas. A solid has both a definite size and shape. A liquid has a definite volume but takes the shape of the container and a gas has neither definite shape nor definite volume. These states of matter can often be changed by the addition of heat energy. An example of this is ice changing to liquid water and finally steam.

Composition of Matter

Matter can be subdivided into two general categories: distinct substances and mixtures. The distinct substances are either elements or compounds. If a substance is made up of only one kind of atom, it is called an element. If, however, it is composed of two or more kinds of atoms joined together in a definite grouping, it is classified as a compound [2]. That a compound then always occurs in a definite composition is called the Law of Definite Composition of Proportion. An example of this is water: it always occurs in two hydrogen atoms to one oxygen atom relationship to form the compound water. Mixtures, however, can vary in their composition.

Chemical and Physical Properties

Physical properties of matter are those properties of matter that can be usually observed with our senses. They include everything about a substance that can be noted when no change is occurring in the type of structure that makes up its smallest component[3]. Some common examples are physical state, color, odor, solubility in water, density, melting point, taste,

boiling point, and hardness.

Chemical properties are those properties which can be observed in regard to whether or not a substance reacts with other substances[4]. Some common examples are: iron rusts in moist air, nitrogen does not burn, gold does not rust, sodium reacts with water, silver does not react with water, and water can be decomposed by an electric current.

Chemical and Physical Changes

The changes matter undergoes are classified as either physical or chemical. In general, a physical change alters physical properties but the composition remains constant. The most often altered properties are form and state. Some examples are: breaking glass, cutting wood, melting ice, and magnetizing a piece of metal. In some cases, the process that causes the change can be easily reversed and we again have the substance in its original form.

Chemical changes are always changes in the composition and structure of a substance. They are always accompanied by energy changes. If the energy released from the formation of a new structure exceeds the chemical energy in the original substances, energy will be given off usually in the form of heat or light or both[5]. This is called an exothermic reaction. If the new structure, however, needs to absorb more energy than is available from the reactants, we have an endothermic reaction[6]. This can be shown graphically.

Conservation of Mass

When ordinary chemical changes occur, the mass of the reactants equals the mass of the products. This can be stated another way; that is, in a chemical change, matter can neither be created nor destroyed, but only changed from one form to another. This is referred to as the Law of Conservation of Matter. This law is contradicted by the Einstein mass-energy relationship, which states that matter and energy are interchangeable.

ENERGY

Definition of Energy

Energy is usually defined as the ability to do work.

Forms of Energy

Energy may appear in a variety of form. Most commonly, energy in reactions is evolved as heat. Some other forms of energy are light, sound, mechanical energy, electrical energy, and chemical energy. Energy can be converted from one form to another. An example of this is the heat from burning fuel being used to vaporize water to steam. The energy of the steam is used to turn the turbine wheels to produce mechanical energy. The turbine turns the generator armature to produce electricity. The electricity is then available in homes for use as light, heat, or the operation of many modern appliances.

Two general classifications of energy are potential energy and kinetic energy. Potential energy is due to position; kinetic energy is energy of motion. The difference can be illustrated by a boulder sitting on the side of a mountain. It has a high potential energy due to its position above the valley floor. If it falls, however, its potential energy is converted to kinetic energy. This illustration is very similar to the situation of electrons cascading to lower energy levels in the atomic model.

Conservation of Energy

Experiments have shown that energy is neither gained nor lost in physical or chemical changes. This principle is known as the Law of Conservation of Energy and is often stated as follows: Energy is neither created nor destroyed in ordinary physical and chemical changes.

CONSERVATION OF MATTER AND ENERGY

With the introduction of atomic theory and a more complete understanding of the nature of both matter and energy, it was found that a relationship exists between these two concepts[7]. Einstein formulated the Law of Conservation of Mass and Energy. This states that matter and energy are interchangeable under special conditions. The conditions have been created in nuclear reactors and accelerators, and the law has been verified. This relationship can be expressed by Einstein's famous equation:

$$E=mc^2$$

$$\text{Energy}=\text{Mass}\times(\text{Velocity of light})^2$$

New Words and Phrases

accompany [ə'kʌmpəni] *vt.* **陪伴，伴奏**
appliance [ə'plaiəns] *n.* **用具，器具**
armature ['ɑ:mətjuə(r)] *n.* **（电动机、发电机的）转子，电枢**
assign [ə'sain] *vt.* **分配，指派**
atomic [ə'tɔmik] *adj.* **原子的，原子能的**
body ['bɔdi] *n.* **身体，人，主要部分，物体**
boulder ['bəuldə] *n.* **大石头，漂石**
cascade [kæs'keid] *n.* **小瀑布，喷流** *vi.* **成瀑布落下**
category ['kætigəri] *n.* **种类，别**
centimeter ['senti,mi:tər] *n.* **厘米**
chemical ['kemikəl] *adj.* **化学的** *n.* **化学制品，化学药品**
chemistry ['kemistri] *n.* **化学**
classification [,klæsifi'keiʃən] *n.* **分类，分级**
component [kəm'pəunənt] *n.* **成分** *adj.* **组成的，构成的**
composition [kɔmpə'ziʃən] *n.* **作文，组成，成分，合成物**
compound ['kɔmpaund] *n.* **混合物，化合物** *adj.* **复合的** *v.* **混合，配合**
conservation [,kɔnsə(:)'veiʃən] *n.* **保存，保持，守恒**
constant ['kɔnstənt] *n.* **常数，恒量** *adj.* **不变的，持续的**
container [kən'teinə] *n.* **容器，集装箱**
convert [kən'və:t] *vt.* **使转变，转换……**
decompose [,di:kəm'pəuz] *v.* **分解，（使）腐烂**
density ['densiti] *n.* **密度**
distinct [dis'tiŋkt] *adj.* **清楚的，明显的，截然不同的，独特的**
element ['eliмənt] *n.* **要素，元素，成分**
endothermic [,endəu'θɔ:mik] *adj.* **吸热（性）的**

exothermic [ˌeksəu'θɔ:mik] *adj*. 发热的，放出热量的
experiment [iks'perimənt] *n*. 实验，试验 *vi*. 进行实验，做试验
formula ['fɔ:mjulə] *n*. 公式，规则
generator ['dʒenəreitə] *n*. 发电机，发生器
graphically ['græfikəl] *adj*. 绘成图画似的，绘画的
gravitational [ˌgrævi'teiʃənl] *adj*. 重力的
grouping ['gru:piŋ] *n*. 分组
hardness ['hɑ:dnis] *n*. 硬，硬度，艰难
hydrogen ['haidrəudʒən] *n*. 氢
inertia [i'nə:ʃjə] *n*. 惯性，惯量
interchangeable [intə'tʃeindʒəb (ə) l] *adj*. 可互换的
iron ['aiən] *n*. 铁，熨斗 *vt*. 烫平，熨
kinetic [kai'netik] *adj*. 动的，动力（学）的
magnetize ['mægnitaiz] *vt*. 使磁化，吸引 *vi*. 受磁
mass [mæs] *n*. 质量，群众 *adj*. 群众的 *vt*. 使集合 *vi*. 聚集
mathematical [ˌmæθi'mætikəl] *adj*. 数学的，精确的
milliliter ['mililiːtə (r)] *n*. 千分之一公升，毫升
mixture ['mikstʃə] *n*. 混合，混合物，混合剂
nitrogen ['naitrədʒən] *n*. 氮
oxygen ['ɔksidʒən] *n*. 氧
physical ['fizikəl] *adj*. 身体的，物质的，自然的，物理的
potential [pə'tenʃ (ə) l] *adj*. 潜在的，可能的，位的 *n*. 潜能，潜力，电压
principle ['prinsəpl] *n*. 法则，原则，原理
product ['prədəkt] *n*. 产品，产物，乘积
property ['prɔpəti] *n*. 财产，性质，特性
reactant [ri:'æktənt] *n*. 反应物
relationship [ri'leiʃənʃip] *n*. 关系，关联
resistance [ri'zistəns] *n*. 反抗，阻力，电阻
reverse [ri'və:s] *n*. 相反，倒退 *adj*. 相反的，颠倒的 *vt*. 颠倒，倒转
sodium ['səudjəm，-diəm] *n*. 钠
solubility [ˌsɔlju'biliti] *n*. 可解决性，可解释性，溶解性
state [steit] *n*. 情形，状态 *adj*. 国家的，州的 *vt*. 声明，陈述，规定
structure ['strʌktʃə] *n*. 结构，构造，建筑物 *vt*. 建筑，构成，组织
subdivide ['sʌbdi'vaid] *v*. 再分，细分
substance ['sʌbstəns] *n*. 物质，实质，主旨
turbine ['tə:bin，-bain] *n*. 涡轮
vaporize ['veipəraiz] *v*. （使）蒸发
assign to 分配
be classified as 分类为
be composed of 由……构成
be converted from one form to another 由一种形式转变为另一种形式
be defined as 定义为

be made up of　**由……组成**
be referred to as　**被称为**
be subdivided into　**被划分为**
boiling point　**沸点**
in/with regard to　**关于**
melting point　**熔点**
the Einstein mass-energy relationship　**爱因斯坦的质量能量关系式**
the Law of Conservation of Mass and Energy　**质量和能量守恒定律**
the Law of Conservation of Matter　**物质守恒定律**
the Law of Definite Composition of Proportion　**定比定组成定律**

Notes

1. Mass is the quantity of matter which a substance possesses and, depending on the gravitational force acting on it, has a unit of weight assigned to it.
   is **和** has **是** Mass **的并列谓语**, which a substance possesses **作定语修饰** quantity, depending on the gravitational force acting on it **是现在分词短语作状语**。
2. If, however, it is composed of two or more kinds of atoms joined together in a definite grouping, it is classified as a compound.
   joined together in a definite grouping **为过去分词短语作定语修饰** atoms。
3. They include everything about a substance that can be noted when no change is occurring in the type of structure that makes up its smallest component.
   that can be noted **作定语修饰** everything, **而** that makes up its smallest component **作状语从句中** structure **的定语, 这是从句也为复合句的结构**。
4. Chemical properties are those properties which can be observed in regard to whether or not a substance reacts with other substances.
   which can be observed in regard to whether or not a substance reacts with other substances **作定语修饰** properties。
5. If the energy released from the formation of a new structure exceeds the chemical energy in the original substances, energy will be given off usually in the form of heat or light or both.
   released from the formation of a new structure **过去分词短语作定语修饰** energy。
6. If the new structure, however, needs to absorb more energy than is available from the reactants, we have an endothermic reaction.
   than is available from the reactants **看作由关系代词引导的定语从句。例如**, You spent more money than was intended to be spent. **你花的钱比想花的钱多**。
7. With the introduction of atomic theory and a more complete understanding of the nature of both matter and energy, it was found that a relationship exists between these two concepts.
   With **引导的介词短语作原因状语。例如**, With such knowledge and experience, he is sure to succeed. **有了这样的知识和经验, 他一定能够取得成功**。

Exercises

Ⅰ. Understanding the text

1. What is matter?

2. How can the mass of a body be measured?

3. What are element, compound and mixture?

4. State the definitions of physical and chemical properties.

5. State the definitions of physical and chemical changes.

6. State the definitions of the Law of Conservation of Mass, the Law of Conservation of Energy and the Law of Conservation of Matter and Energy.

Ⅱ. Translate the following into English

1. **重力**

2. **物体的质量**

3. **数学公式**

4. **物质的状态**

5. **物质的结构和组成**

6. **熔点**

7. **沸点**

8. **质量和能量守恒定律**

9. **化学性质和物理性质**

10. **动能和势能**

Ⅲ. Translate the passage into Chinese

All matter has mass. Chemists are interested in the masses of materials, because they want to know how much material they need to use to prepare a certain amount of a product.

The mass of an object is the quantity that measures its resistance to change in its state of rest or motion.

The mass of an object also determines its weight. The weight of an object is only a measure of the force with which the object is attracted by the earth. This force depends upon the mass of the object, the mass of the earth, and the position of the object on the earth's surface, especially the distance of the object from the center of the earth. Since the earth is slightly flattened at its poles, the distance of its surface at the North Pole or South Pole from its center is less than that at the equator. In consequence the weight of an object as measured by a spring balance, which measures the force, is greater at the North Pole or South Pole than at the equator. For example, if your weight, measured by a spring balance, is 150.0 lbs at the equator, it would be 150.8 lbs at the North Pole, measured on the same spring balance—nearly a pound more. Your mass, however, is the same.

Reading Materials

Tianjin Bohai Chemical Industry Group Corporation

Ranking 131 among the state top 500 enterprises, Tianjin Bohai Chemical Industry Group Corporation is an oversize (**特大型**) Chinese enterprises' group, which keeps an annual marketing amount over RMB ten billion Yuan and annual import and export value over US$ 0.5 billion. Its products involve almost 3000 varieties including such numerous fields as salt manufacture (**制盐**), soda ash (**纯碱**), caustic soda (**烧碱**), organic chemical industry,

inorganic chemical industry, refined chemical industry, rubber and plastic processing industry, bio-chemical industry, etc.

The yield of such products produced by Tianjin Bohai Chemical Industry Group Corporation take the leading position in Chinese chemical industry as polyvinyl chloride (**聚氯乙烯**), caustic soda, crude salt (**原盐**), soda ash, maleic anhydride (**顺酐**), phthalic anhydride (**苯酐**), epoxy propane (**环氧丙烷**), epichlorohydrin (**环氧氯丙烷**), dyestuff, pigment, organic peroxides, carbon black, large off-road tyres (**大型工程轮胎**), radial tires (**子午线轮胎**), sodium metasilicate pentahydrate (**五水偏硅酸钠**), and so on. And lots of its products enjoy a good reputation both at home and abroad.

The chief purpose of improving self-worth rests with having you gain larger success that is our promise to all of our customers.

Tianjin Bohai Chemical Industries Imp. & Exp. Corp.

Tianjin Bohai Chemical Industries Import & Export Corporation (TBCIIEC), one of the earliest-founded corporation combing industry and trade since the reform and opening to the outside in China, was established on Jan. 1st, 1986. With the opening policy, TBCIIEC has become a member of the close enterprises subordinate to the Bohai Chemical Industry Group Corporation. Serving as a window to the outside, TBCIIEC engages in import and export business as well as projects of economic and technology cooperation for Bohai Group. Based on the principle of equality, mutual benefit, exchange of needed goods and collaboration, TBCIIEC will make full use of its advantages of industy-trade combination and technology-trade combination so as to enlarge foreign trade business scope by means of developing import and export, counter trade (**对销贸易**), barter trade (**易货贸易**), compensation trade (**补偿贸易**), processing with supplied materials, assembling with supplied spareparts, import and export of technology, export of complete sets of chemical industry equipments, labor service (**劳务服务**), and contracted projects abroad (**国外工程承包**), etc.

Bohai Chemical will be always ready to provide customers with various kinds of high-quality chemical products, complete set of equipment and technology for chloro-alkali (**氯碱**) industry and chemical industry.

Export business scope: Soda Ash, Caustic Soda, Liquid Caustic Soda, Sodium Bicarbonate (**小苏打**), Agricultural Ammonium Chloride (**农用氯化铵**), Industrial Ammonium Chloride (**工业用氯化铵**), Barium Chloride, Sodium Bicarbonate (**碳酸氢钠**), Agricultural DDT, Polyvinyl Chloride Resin (**聚氯乙烯树脂**), Methionine (**蛋氨酸**), Oxalic Acid (**草酸**), Lindane (**林丹**), Sodium Pentachlorophenate (**五氯酚钠**), Monochlorobenzene, Formic Acid, Dichlorobenzene, Trichlorobenzene, Calcium Hypochlorite (**次氯酸钙**), complete equipment and technology for chloro-alkali industry.

Import business scope: Raw Chemicals, Packing Materials, Materials for Special Uses, Apparatuses, Instruments and Technology.

TBCIIEC is keen to establish business relationship with trade partners abroad and will cooperate with them wholeheartedly.

Unit 2　Acids, Bases and Salts

Acids

There are some characteristic properties by which an acid may be defined[1]. The most important are as follows.

1. Water solutions of acids conduct electricity. This conduction depends on their degree of ionization. A few acids ionize almost completely, while others ionize only to a slight degree. The table below indicates some common acids and their degrees of ionization.

ACIDS		
Completely or Nearly Completely Ionized	Moderately Ionized	Slightly Ionized
Nitric		Hydrofluoric
Hydrochloric	Oxalic	Acetic
Sulfuric	Phosphoric	Carbonic
Hydriodic	Sulfurous	Hydrosulfuric
Hydrobromic		(Most others)

2. Acids will react with metals that are more active than hydrogen ions to liberate hydrogen[2]. (Some acids are also strong oxidizing agents and will not release hydrogen. Somewhat concentrated nitric acid is such an acid)
3. Acids have the ability to change the color of indicators. Some common indicators are litmus and phenolphthalein. Litmus is a dyestuff obtained from plant life. When litmus is added to an acidic solution or paper impregnated with litmus is dipped into an acid, the neutral purple color changes to a pink-red color. The phenolphthalein is red in a basic solution and becomes colorless in a neutral or acid solution.
4. Acids react with bases so that the properties of both are lost to form water and a salt. This is called neutralization. The general equation is: Acid + Base $\longrightarrow$ Salt + Water

   An example is: $Mg(OH)_2 + H_2SO_4 \longrightarrow MgSO_4 + 2H_2O$
5. If an acid is known to be a weak solution, you might taste it and note the sour taste.
6. Acids react with carbonates to release carbon dioxide. An example is:

$$CaCO_3 + 2HCl \longrightarrow CaCl_2 + H_2CO_3 \text{ (unstable and decomposes)} \longrightarrow H_2O + CO_2$$

The most common theory used in first-year chemistry is the Arhennius Theory, which states that an acid is a substance that yields hydrogen ions in an aqueous solution[3]. Although we speak of these hydrogen ions in the solution, they are really not separate ions but become attached to the oxygen of the polar water molecule to form the H_3O^+ ion (the hydronium ion). So it is really this hydronium ion we are concerned with in an acid solution[4].

Bases

Bases may also be defined by some operational definitions that are based on experimental observations. Some of the important ones are as follows.

BASES	
Completely or Nearly Completely Ionized	Slightly Ionized
Potassium hydroxide Sodium hydroxide Barium hydroxide Strontium hydroxide Calcium hydroxide	Ammonium Hydroxide (All others)

1. Bases are conductors of electricity in an aqueous solution. Their degree of conduction depends on their degree of ionization. See the table of the common bases above and their degrees of ionization.
2. Bases cause a color change in indicators. Litums changes from red to blue in a basic solution and phenolphthalein becomes a pink color from its colorless state.
3. Bases react with acids to neutralize each other and form a salt and water.
4. Bases react with fats to form a class of compounds called soaps. The earlier generations used this method to make their own soap.
5. Aqueous solutions of bases feel slippery and the stronger bases are very caustic to the skin.

SALTS

A salt is an ionic compound containing positive ions other than hydrogen, and negative ions other than hydroxide ions[5]. The usual method of preparing a particular salt is by neutralizing the appropriate acid and base to form the salt and water.

Acid Concentration Expressed as pH

Frequently, acid and base concentrations are expressed in a system called the pH system. The pH can be defined as $-\lg [H^+]$, where $[H^+]$ is the concentration of hydrogen ions expressed in moles per liter. The logarithm is the exponent of 10 when the number is written in the base 10.

An example of a pH problem is:

Find the pH of a 0.1 molar solution of HCl.

1st step: Since HCl ionizes almost completely into H^+ and Cl^-, the $[H^+]=0.1$ mole/liter.

2nd step: By definition $pH=-\lg[H^+]$

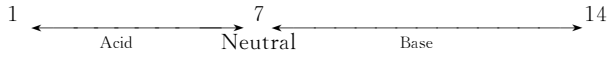
$pH=-\lg 10^{-1}$

3rd step: The logarithm of 10^{-1} is -1

So pH=−(−1)

4th step: The pH then is=1.

Since water has a normal H^+ concentration of 10^{-7} mole/liter because of the slight ionization of water molecules, the water pH is 7 when it is neither acid nor base. The normal pH range is from 1 to 14.



New words and Phrases

acetic [ə'si:tik] *adj.* 醋的，乙酸的
acidic [ə'sidik] *adj.* 酸的，酸性的
agents ['eidʒənt] *n.* 手段，工具，剂
ammonium [ə'məunjəm] *n.* 铵
aqueous ['eikwiəs] *adj.* 水的，水成的
barium ['bɛəriəm] *n.* 钡
base [beis] *n.* 底部，基础，底数，碱
basic ['beisik] *adj.* 基本的，碱性的
calcium ['kælsiəm] *n.* 钙
carbon ['kɑ:bən] *n.* 碳，（一张）复写纸
carbonate ['kɑ:bəneit] *n.* 碳酸盐 *vt.* 使变成碳酸盐，使充满二氧化碳
carbonic [kɑ:'bənik] *adj.* 碳的，由碳得到的
caustic ['kɔ:stik] *adj.* 腐蚀性的，刻薄的
conduct ['kəndʌkt，-dəkt] *n.* 行为，操行 *v.* 引导，管理，传导
conduction [kən'dʌkʃən] *n.* 传导
dioxide [dai'ɔksaid] *n.* 二氧化物
dyestuff ['daistʌf] *n.* 染料
exponent [eks'pəunənt] *n.* 说明者，代表者，典型，指数
hydriodic [ˌhaidri'ɔdik] *adj.* 氢碘酸的
hydrobromic ['haidrəu'brəumik] *adj.* 氢溴酸的，溴化氢的
hydrochloric [ˌhaidrəu'klɔ:rik] *adj.* 氯化氢的，盐酸的
hydrofluoric ['haidrəflu (:) 'ɔrik] *adj.* 含氢和氟的，含氟化氢的，氢氟酸的
hydronium [hai'drəuniəm] *n.* 水合氢，离子
hydrosulfuric [hai'drəusʌl'fjuərik] *adj.* 含氢及硫的
hydroxide [hai'drɔksaid，-sid] *n.* 氢氧化物，羟化物
impregnate ['impregneit] *vt.* 使怀孕，使充满 *adj.* 怀孕的，充满的
indicator ['indikeitə] *n.* 指示器，指示剂
ion ['aiən] *n.* 离子
ionization [ˌaiənai'zeiʃən] *n.* 电离，离子化（作用）
ionize ['aiənaiz] *vt.* 使离子化 *vi.* 电离电离，离子化
litmus ['litməs] *n.* 石蕊
logarithm ['lɔgəriθm] *n.* 对数
molar ['məulə] *adj.* 质量的，摩尔的 *n.* 臼齿，磨牙

neutral ['nju:trəl] *n.* **中立者，中立国** *adj.* **中立的，中立国的，中性的**
neutralization [ˌnju:trəlai'zeiʃən] *n.* **中立化，中立状态，中和**
nitric ['naitrik] *adj.* **氮的，含氮的，硝石的**
operational [ˌɔpə'reiʃənl] *adj.* **操作的，运作的**
oxalic [ɔk'sælik] *adj.* **草酸的，乙二酸的**
oxidizing ['ɔksiˌdaiz] *v.* **（使）氧化**
phenolphthalein [ˌfinəl'fθæli:n] *n.* **酚酞**
phosphoric [fɔs'fɔrik] *adj.* **磷的（尤指含五价磷的），含磷的**
polar ['pəulə] *adj.* **两极的，极性的** *n.* **极线，极面**
potassium [pə'tæsjəm] *n.* **钾**
purple ['pə:pl] *adj.* **紫色的** *n.* **紫色**
solutions [sə'lju:ʃən] *n.* **解答，溶解，溶液**
somewhat ['sʌm（h）wɔt] *adv.* **稍微，有点，有些**
strontium ['strɔnʃiəm] *n.* **锶**
sulfuric [sʌl'fjuərik] *adj.* **硫的，正硫的**
sulfurous ['sʌlfərəs] *adj.* **硫的，含硫的，亚硫的**
table ['teibl] *n.* **桌子，石板，表格**
attached to **附着**
be concerned with **关心……**
dip into **把……浸入（液体）中**

Notes

1. There are some characteristic properties by which an acid may be defined.
by which an acid may be defined **作定语从句修饰** properties，**例如**，This is the house in which Lu Xun once lived. **这是鲁迅曾经住过的房子**。
2. that are more active than hydrogen ions **作定语修饰** metals，to liberate hydrogen **作状语表示结果**。
3. which states that an acid is a substance that yields hydrogen ions in an aqueous solution **作定语从句修饰** theory，**而其中的定语从句** that yields hydrogen ions in an aqueous solution **修饰** substance。
4. So it is really this hydronium ion we are concerned with in an acid solution. it **是形式主语**，we are concerned with in an acid solution **是真正的主语**。
5. A salt is an ionic compound containing positive ions other than hydrogen，and negative ions other than hydroxide ions. **句中** other than **表示“除……以外”**。**例如**：There's nobody here other than me. **除了我这里没别人**。

Exercises

Ⅰ. Understanding the text
1. What main properties do acids have?
2. What properties do bases possess?
Ⅱ. Translate the following expressions into English
1. **水溶液**

2. **电离程度**
3. **硝酸、盐酸、硫酸和磷酸**
4. **氧化剂**
5. **改变指示剂的颜色**
6. **石蕊和酚酞指示剂**
7. **碱性溶液、酸性溶液和中性溶液**
8. **酸碱中和**
9. **氢氧化钾、氢氧化钠和氨水**
10. **用** pH **表示酸的浓度**

Ⅲ. Translate the passage into Chinese

Acids have the following general properties: They taste sour, change blue litmus paper to red, act with active metals, liberating hydrogen, act with carbonates, liberating carbon dioxide, and neutralize bases. These properties are those of hydrogen ions (H^+) in water solutions of acids.

A base has the properties of the hydroxyl ion in solution. It can neutralize an acid. A substance with marked basic properties is an alkali.

Salts may be prepared by neutralization; by metal plus acid; by metal oxide plus acid; by metal carbonate plus acid; and by special methods. The solubilities of salts are summarized in solubility rules.

Some reactions are reversible. In reversible reactions, an equilibrium of two opposite chemical reactions is set up, under a given set of conditions of concentration, temperature, and pressure.

The rate of a chemical reaction is influenced by temperature; by pressure, if a gas is among the reaction substances or products; by the presence of a catalyst; and by the concentration.

The principle of mass action is: A reversible equilibrium reaction can be made to approach a nearly complete reaction by increasing the concentration of one of the reacting substances or by decreasing the concentration of a product.

Reading Materials

Chemical Industry Area of Leuna

Chemistry for a Whole Century

The smart and forward-thinking (**前瞻性**) plans of the world-renowned chemist Carl Bosch (**卡尔．博施** 1874—1940, **德国化学家，曾获** 1931 **年诺贝尔化学奖**) quickly put Leuna (**罗伊纳，德国的一个化工区**。) on the international map.

After the introduction of commercial ammonia (**氨**) synthesis, methanol (**甲醇**) soon followed in 1923 on a world-scale facilitated (**推动**) by the high-pressure process.

At the end of the 1920's Leuna became a production site for the mineral oil industry when Matthias Pier developed a brown coal hydrogenation process for the manufacture of synthetic fuels.

The year 1938 became a milestone (**里程碑**) in history. Women around the world had a

reason to celebrate: in that year the synthesis of caprolactam (**己内酰胺**) leading to Perlon (**贝纶或聚酰胺纤维**) succeeded in Leuna.

The series of successes from the introduction of large-scale industrial processes knew no end (**没有止境**). Until the Second World War this stronghold (**要塞**) of technology evolved into the biggest company of the German chemical industry. A fine example of one of these successes is the world's first production plant for the manufacturing of synthetic surfactants (**表面活性剂**) which was commissioned (**投产**) in 1942.

Even after the war Leuna remained a synonym for "chemistry".

Today's investors on-site (**厂区内**) are still benefiting from production initiated under the East German flag. The excellent raw material supply network includes crude oil (**原油**) and natural gas (**天然气**) from Russia and ethylene (**乙烯**) from the Czech Republic.

Since German reunification (**再统一**) in 1990, a new chapter in the history of the chemical site Leuna began. Company partnerships, established during the Grunderzeit [1871～1895 The Founding Epoch (**时代**)] period, once again reestablished themselves here to mutual advantage (**共同的利益**). Linde AG is an example of one of the many companies. In 1916, Linde already constructed the first air separation unit.

Chemistry for the New Millenium (**一千年**)

The development of the chemical site Leuna is a barometer (**晴雨表**) for the overall growth of the state of Saxony-Anhalt (**萨克森．安哈尔特州**).

Public investment grants have played a considerable role in supporting the establishment of new facilities by potential investors. Here, state-of-the-art (**艺术级的**) infrastructure is available at sustainable and favourable conditions with the support of policy-makers and authorities. Working in the investors' favour-environment permits approval for new plants which are usually very short in comparison to European standards.

As a consequence of its chemical tradition, the region has an extensive potential of highly-qualified experts. At present, approximately 9000 people work at the Leuna site. Tomorrow's specialists are being educated at international standards at the renowned universities and colleges in Leipzig (**莱比锡**), Halle (**哈勒**) and Merseburg (**马格堡**). Together with experienced, skilled employees they ensure the innovation potential of their companies.

This is not the only aspect that guarantees the "Dynamic in chemistry" ... the neighbouring city Leipzig is well-known for its cosmopolitanism (**世界主义**).