化学专业英语文选

南京大学外文系公共英语教研室编

商务印书馆

化学专业英语文选

南京大学外文系公共英语教研室编

商 务 印 书 馆 出 版

（北京王府井大街 36 号）

新华书店北京发行所发行

北京第二新华印刷厂印刷

统一书号：9017·1325

1983 年 12 月第 1 版　　开本 787×1092 1/32

1983 年 12 月北京第 1 次印刷　　字数 189 千

印数 20,800 册　　印张 $7\frac{3}{4}$

定价：0.83 元

前　言

在实现科学技术现代化的伟大事业中，外语是广大群众迫切需要掌握的工具之一，本书就是为了适应这种形势，帮助有关人员提高阅读化学专业英语书刊的能力而编写的。

本书的对象是具有一定英语基础知识的大学化学专业学生和从事化学、化工工作的科技人员。

全书分两个部分，各有二十课。第一部分以无机化学基础知识为主，第二部分以有机化学专业知识为主，另包括一些高分子化学、分析化学、生物化学等方面的知识。每课除正文外，附有词汇、词组和注释，以便读者自学。此外，每一部分之后附有参考译文，供读者在理解上遇到困难时查阅。

本书材料选自美、英较新出版的大学化学专业教科书和参考书，选材范围较广，词汇比较全面，文体也比较多样。

本书由吴翔林、邹品珍、曾绍基合编。在编写过程中，我校化学系曾成副教授帮助审阅部分译稿，以后又承汪玛莉同志校订全部译稿，特在此表示衷心感谢。

由于编者的专业知识和语言水平的限制，本书难免有不少缺点和错误，希望读者提出宝贵的批评和改进意见。

南京大学外文系公共英语教研室

本书所用语法术语略语表

a.	adjective	形容词
ad.	adverb	副词
conj.	conjunction	连接词
n.	noun	名词
pl.	plural	复数
sing.	singular	单数
num.	numeral	数词
prep.	preposition	介词
pron.	pronoun	代词
v.i.	verb intransitive	不及物动词
v.t.	verb transitive	及物动词

CONTENTS

PART II

PART I

1. MATTER

The universe is composed of **matter** *and* **radiant energy.**

The chemist is primarily interested in matter, but he must also study radiant energy — light, X rays, radio waves — in its interaction with substances. For example, he may be interested in the color of substances, which is produced by their absorption of light.

Matter consists of all of the materials around us — gases, liquids, solids.

Mass and Weight

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.①

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.② 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 equa-

tor.③ 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.

The mass of an object remains the same at the North Pole as at the equator, and it can easily be determined, at any place on the earth's surface, by comparison with a standard set of masses. For small objects a *chemical balance* is used. Since the weights of two bodies of equal mass are the same at any place on the earth's surface, these bodies will balance one another when placed on the two pans of a balance with arms of equal length.

It is common practice to refer to the masses of objects as their weights.④ It might be thought that confusion would arise from the practice of using the word weight to refer both to the mass of an object and to the force with which the object is attracted by the earth.⑤ In general it does not, but if there is danger of confusion you should use the word mass.

词　汇

universe ['ju:nivə:s] *n.* 宇宙
radiant ['reidiənt] *a.* 辐射的
primarily ['praimərili] *ad.* 首先；最初；主要地
ray [rei] *n.* 光线，射线
wave [weiv] *n.* 波
interaction [ˌintər'ækʃən] *n.* 相互作用
absorption [əb'sɔ:pʃən] *n.* 吸收
liquid ['likwid] *n.* 液体
solid ['sɔlid] *n.* 固体
mass [mæs] *n.* 质量
quantity ['kwɔntiti] *n.* 数量
measure ['meʒə] *v.t.* (测)量
resistance [ri'zistəns] *n.* 阻力；电阻
state [steit] *n.* 状态
motion ['məuʃən] *n.* 运动
attract [ə'trækt] *v.t.* 吸引

depend [di'pend] *v.i.* 依靠
slightly ['slaitli] *ad.* 轻微地
flatten ['flætn] *v.t.* 使变平
pole [pəul] *n.* 极
equator [i'kweitə] *n.* 赤道
spring [spriŋ] *n.* 弹簧
balance ['bæləns] *n.* 天平
lb = pound [paund] *n.* 磅
standard ['stændəd] *n.* 标准；规格
equal ['i:kwəl] *a.* 相等的 *v.t.* 等于
pan [pæn] *n.* 盘
length [leŋθ] *n.* 长度
confusion [kən'fju:ʒən] *n.* 混乱；混淆
arise [ə'raiz] (arose [ə'rəuz], arisen [ə'rizn]) *v.i.* 引起；出现；发生
danger ['deindʒə] *n.* 危险

词　组

be composed of 由...组成
be interested in 对...感兴趣
(to) consist of 由...组成
to depend on (upon) 依赖；取决于...
in consequence 因此
the same ... as 象...一样
by comparison with 与...相比较
a set of 一套
one another 互相
(to) refer to ... as ... 把...认为是...
arise from 起因于
(to) refer to 提到；指的是
in general 一般地；大体上

注　释

① ... because they want to know how much material they need to use to prepare a certain amount of a product.

句中 how much ... product 是 to know 的宾语从句，其中 how much material 又是 to use 的宾语；to prepare ... product 则是 to use 的目的状语。

② The weight of an object is only a measure of the force with which the object is attracted by the earth.

句中 with which ... the earth 是一个带介词的定语从句，关系代词 which 指 force，with which 在定语从句中作状语。

③ 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.

句中 that 代替 the distance of its surface，这种为避免重复而用的例子是常见的，表示单数事物用 that，复数事物用 those。

④ It is common practice to refer to the masses of objects as their

weights.

it 是先行词作形式主语，真正的主语是不定式短语 to refer to the masses ... weights。

⑤ It might be thought that confusion would arise from the practice of using the word weight to refer both to the mass of an object and to the force with which the object is attracted by the earth.

it 是先行词，作句子的形式主语，真正的主语是 that 引导的主语从句，it might be thought that ... 可译为"人们可能会认为..." 或"据认为..."；不定式短语 to refer both ... force 作 using 的目的状语。

2. THE PHYSICAL PROPERTIES OF SUBSTANCES

The study of the properties of substances constitutes an important part of chemistry, because their properties determine the uses to which they can be put.①

The **properties** *of substances are their characteristic qualities.*

The **physical properties** *are those properties of a substance that can be observed without changing the substance into other substances.*

Let us again use sodium chloride, common salt, as an example of a substance. We have all seen this substance in what appear to be different forms — table salt, in fine grains;② salt in the form of crystals a quarter of an inch in diameter, for use with ice for freezing ice cream; and natural crystals of rock salt an inch or more across. Despite their obvious difference, all of these samples of salt have the same fundamental properties. In each case the crystals, small or large, are naturally bounded by square or rectangular *crystal faces* of different sizes, but with each face always at right angles to each adjacent face. The *cleavage* of the different crystals of salt is the same: when crushed, the crystals always break (cleave) along planes parallel to the original faces, producing smaller crystals similar to the larger ones.③ The different samples, dissolved in water, have the same salty *taste*. Their *solubility* is the same: at room temperature 36 g of salt can be dissolved in 100 g of water. The *density* of the salt is the same, 2.16 g cm^{-3}. The density of a substance is the mass (weight) of a unit volume

(1 cubic centimeter) of the substance.

There are other properties besides density and solubility that can be measured precisely and expressed in numbers.④ Such another property is the *melting point*, the temperature at which a solid substance melts to form a liquid.⑤ On the other hand, there are also interesting physical properties of a substance that are not so simple in nature. One such property is the *malleability* of a substance — the ease with which a substance can be hammered out into thin sheets.⑥ A related property is the *ductility* — the ease with which the substance can be drawn into a wire. *Hardness* is a similar property: we say that one substance is less hard than the second substance when it is scratched by the second substance. The *color* of a substance is an important physical property.

It is customary to say that under the same external conditions all specimens of a particular substance have the same physical properties⑦ (density, hardness, color, melting point, crystalline form, etc.). Sometimes, however, the word substance is used in referring to a material without regard to its state. For example, ice, liquid water, and water vapor may be referred to as the same substance. Moreover, a specimen containing crystals of rock salt and crystals of table salt may be called a mixture, even though the specimen may consist entirely of one substance, sodium chloride. This lack of definiteness in usage seems to cause no confusion in practice.

词　汇

property ['prɔpəti] *n.* 性质；特性
constitute ['kɔnstitju:t] *v.t.* 构成；组成
characteristic [ˌkæriktə'ristik] *a.* 特有的 *n.* 特性
quality ['kwɔliti] *n.* 质量；品质
observe [əb'zə:v] *v.t.* 观察
sodium ['səudjəm] *n.* 钠

chloride ['klɔ:raid] *n.* 氯化物
sodium ~ 氯化钠
salt [sɔ:lt] *n.* 盐
appear [ə'piə] *v.i.* 出现；看来(好象)
fine [fain] *a.* 细的
grain [grein] *n.* 颗粒
crystal ['kristl] *n.* 结晶；晶体
diameter [dai'æmitə] *n.* 直径
freeze [fri:z] **(froze** [frəuz], **frozen** ['frəuzn]) *v.i.* 凝结；冻结
across [ə'krɔs] *ad.* 横过；宽
despite [dis'pait] *prep.* 不管；尽管
obvious ['ɔbviəs] *a.* 明显的
sample ['sɑ:mpl] *n.* 样品；实例
fundamental [ˌfʌndə'mentl] *a.* 基本的
bound [baund] *v.t.* 邻接 *n.* [常用复]界限
square [skwɛə] *n.* 正方形
rectangular [rek'tæŋgjulə] *a.* 矩形的
size [saiz] *n.* 大小；尺寸
angle ['æŋgl] *n.* 角；角度
right ~ 直角
adjacent [ə'dʒeisənt] *a.* 邻近的
cleavage ['kli:vidʒ] *n.* 分裂；解理
crush [krʌʃ] *v.t.* 压碎；压扁
cleave [kli:v] *v.t.* 劈开；解理
plane [plein] *n.* 平面
parallel ['pærəlel] *a.* 平行的
original [ə'ridʒənl] *a.* 原来的
dissolve [di'zɔlv] *v.i.* 溶解
taste [teist] *v.t.* 尝味道 *n.* 滋味
solubility [ˌsɔlju'biliti] *n.* 溶解度
density ['densiti] *n.* 密度
volume ['vɔljum] *n.* 体积
cubic ['kju:bik] *a.* 立方(体)的
precisely [pri'saisli] *a.* 精确地
melt [melt] *v.t.* & *v.i.* 熔化，熔解
~ing point 熔点
malleability [ˌmæliə'biliti] *n.* 可锻性；展性
sheet [ʃi:t] *n.* 薄片
related [ri'leitid] *a.* 有联系的；相关的
ductility [dʌk'tiliti] *n.* 延性；延度
draw [drɔ:] **(drew** [dru:], **drawn** [drɔ:n]) *v.t.* 拉
wire [waiə] *n.* 金属线
scratch [skrætʃ] *v.t.* 搔，抓 *n.* 刮痕
customary ['kʌstəməri] *a.* 通常的；惯常的
external [eks'tə:nl] *a.* 外部的；外界的
specimen ['spesimin] *n.* 样品；品种
particular [pə'tikjulə] *a.* 特别的
crystalline ['kristəlain] *a.* 结晶的
vapor ['veipə] *n.* (蒸)汽
moreover [mɔ:'rəuvə] *ad.* 再者；此外
contain [kən'tein] *v.t.* 含有；包含
entirely [in'taiəli] *ad.* 完全地
definiteness ['definitnis] *n.* 明确
usage ['ju:zidʒ] *n.* 用法
cause [kɔ:z] *v.t.* 引起 *n.* 原因

词 组

(to) put to use 使用
(to) change ... into ... 把...改变成...
in the form of 以...形式
a quarter of 四分之一
in each case 在每一种情况下

be bounded by 被…限制；与…相邻接
parallel to 与…平行的
similar to 与…相似的
on the other hand 另一方面
without regard to 不考虑；不顾到
even though 即使

注　释

① … because their properties determine the uses to which they can be put.

句中 to which they can be put 是定语从句，修饰 uses.

② We have all seen this substance in what appear to be different forms — table salt, in fine grains:

句中 what appear to be different forms = the things which appear to be different forms. 又如：This is what (= the thing which) we call salt. 这就是我们称为盐的东西。

③ … the crystals always break (cleave) along planes parallel to the original faces, producing smaller crystals similar to the larger ones.

句中 parallel to the original faces 是形容词短语作定语，要放在被修饰的名词后面，这里修饰 planes；producing smaller crystals 为分词短语作结果状语；similar to the larger ones 又是形容词短语，修饰 crystals，ones 在这里代表 crystals，是为了避免重复（单数用 one，复数用 ones）。

④ There are other properties besides density and solubility that can be measured precisely and expressed in numbers.

there 引导的句子，结构是倒装的，动词 are 在前，主语 other properties 在后，'there + be + 主语＋状语'的句型表示"某处存在某物（或某人，某事）"；that 引导的是定语从句，修饰 other properties.

⑤ Such another property is the melting point, the temperature at which a solid substance melts to form a liquid.

句中 the temperature … liquid 是 the melting point 的同位语。

⑥… the ease with which a substance can be hammered out into thin sheets.

with ease 是短语，意为"容易地"；which 的先行词是 ease.

⑦ It is customary to say that under the same external conditions all specimens of a particular substance have the same physical properties.

it 是先行词作形式主语，真正的主语是不定式 to say；that 引导的从句是 to say 的宾语。

3. THE CHEMICAL PROPERTIES OF SUBSTANCES

The **chemical properties** *of a substance are those properties that relate to its participation in chemical reactions.*

Chemical reactions *are the processes that convert substances into other substances.*

Thus sodium chloride has the property of changing into a soft metal, sodium, and a greenish-yellow gas, chlorine, when it is decomposed by passage of an electric current through it. It also has the property, when it is dissolved in water, of producing a white precipitate when a solution of silver nitrate is added to it;① and it has many other chemical properties.

Iron has the property of combining readily with the oxygen in moist air to form iron rust; whereas an alloy of iron with chromium and nickel (stainless steel) is found to resist this process of rusting.② It is evident from this example that the chemical properties of materials are important in engineering.

Many chemical reactions take place in the kitchen. When biscuits are made with use of sour milk and baking soda there is a chemical reaction between the baking soda and a substance in the sour milk, lactic acid, to produce the gas carbon dioxide, which leavens the dough by forming small bubbles in it. And, of course, a great many chemical reactions take place in the human body. Foods that we eat are digested in the stomach and intestines. Oxygen in the inhaled air combines with a substance, hemoglobin, in the red cells of the blood, and then is released in the tissues, where it takes part in many different

reactions.③ Many biochemists and physiologists are engaged in the study of the chemical reactions that take place in the human body.

Most substances have the power to enter into many chemical reactions.④ The study of these reactions constitutes a large part of the study of chemistry. Chemistry may be defined as *the science of substances — their structure, their properties, and the reactions that change them into other substances.*

Example. Which of the following processes would you class as chemical reactions?

(*a*) The boiling of water.

(*b*) The burning of paper.

(*c*) The preparation of sugar syrup by adding sugar to hot water.

(*d*) The formation of rust on iron.

(*e*) The manufacture of salt by evaporation of sea water.

Solution. The burning of paper and the formation of rust on iron are chemical reactions. The boiling of water, the preparation of sugar syrup, and the manufacture of salt by evaporation of sea water are changes of state that are not classed as chemical reactions.⑤

词　汇

participation [pɑ:ˌtisi'peiʃən] *n.* 参与
reaction [ri'ækʃən] *n.* 反应
process ['prəuses] *n.* 过程
convert [kən'və:t] *v.t.* 转换；转化
greenish-yellow ['gri:niʃ-'jeləu] *a.* 黄绿色的
chlorine ['klɔ:ri:n] *n.* 氯(气)
decompose [ˌdi:kəm'pəuz] *v.t.* & *v.i.* 分解；分析
passage ['pæsidʒ] *n.* 通过
current ['kʌrənt] *n.* 电流
precipitate [pri'sipiteit] *v.t.* & *v.i.* (使)沉淀 *n.* [pri'sipitit] 沉淀物
solution [sə'lu:ʃən] *n.* 溶液
silver ['silvə] *n.* 银 *a.* 银(白)色的
nitrate ['naitreit] *n.* 硝酸盐
silver ～ 硝酸银