高等学校试用教材

英　语

第　三　册

（电　类）

天津大学（主编）　西安交通大学
浙　江　大　学　北京航空学院
哈尔滨工业大学

高等教育出版社

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本书是根据1977年"高等学校工科外语教材编写会议"的要求编写的《英语》第三册（电类），可接续大连海运学院，上海交通大学、天津大学分别主编的《英语》（第一、二册）教材中的任何一种。

全书共十四课，每课包括课文、注释、练习、词汇学习、阅读材料等，书后并配有六篇补充阅读材料。文章均选自英、美近年出版的有关电类的书刊，供有关电类专业的学生选用。

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本教材是高等学校工科《英语》第一、二册教材的续编，是根据1977年“高等学校工科外语教材编写会议”通过的“英语教材编写大纲”及1978年“全国外语教育座谈会”精神编写的，供高等工科院校电类各专业使用。

本册教材共有14课(每课有精、泛读课文各一篇)及补充阅读材料6篇。全册约需100学时。

本教材的编写既照顾到与基础阶段(第一、二册)的衔接，又考虑到不同程度学生的需要，因此教材内容略多于大纲的规定。本册教材主要包括：

1. 课文和补充阅读材料：精读和泛读课文是本册教材的必读材料；补充阅读材料可根据具体情况选择使用，或由学生自学。书中材料均选自英、美原著，只在个别地方作了删改。

2. 注释：目的在于：

1) 通过对课文中难句、难点的注释，帮助学生预习和自学课文；

2) 加深和扩大语法知识，并适当介绍英译汉的知识；

3. 词汇：教材中精、泛读课文共有生词1,140个左右，词组270条左右，均分别列在课文之后，以便教学。补充阅读材料中出现的生词和词组均列入词汇总表中，以培养学生查词典的能力。词汇总表中还列入了本册教材中出现的一、二册中的大部分词汇，以便学生查阅。

每课后的词汇学习一项，总结归纳并适当扩大常用词的用法，供学生自学。

4. 练习：根据本教学阶段的特点，练习内容主要有以下三个

方面：

1）帮助学生理解课文内容；

2）复习、巩固已学过的重点语法；

3）复习、巩固课文中出现的常用词汇。

参加本册教材编写工作的有：天津大学的刘壮翀、张中英、杨荣春、赵爱良、陈崇铁、刘希成、向泽森、张同琦；西安交通大学的潘能、陈璇夫；浙江大学的张振中、李增荣；北京航空学院的许汝华；哈尔滨工业大学的吴世珍。担任本教材审阅工作的有华南工学院、重庆大学（以上为主审单位）、西安电讯工程学院、南京工学院和沈阳机电学院等校外语教研室的同志，他们对本教材提出了许多宝贵意见，在此深表谢意。在编写过程中还得到天津大学、西安交通大学和重庆大学电类专业教师的帮助，在此一并致谢。

编者

1979年1月

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Lesson One

Text

What Is Electricity?

Quite a few years ago, scientists had very vague ideas about electricity. Many of them thought of it as a sort of "fluid" that flowed through wires as water flows through pipes, but they could not understand what made it flow. Many of them felt that electricity was made up of tiny particles of some kind, but trying to separate electricity into individual particles baffled them.

Then, the great American scientist Millikan①, in 1909, astounded the scientific world by actually weighing a single particle of electricity and calculating its electric charge. This was probably one of the most delicate weighing jobs ever done by man, for a single electric particle weighs only about half of a millionth of a millionth of a millionth of a millionth of a millionth of a pound②. To make up a pound it would take more of those particles than there are drops of water in the Atlantic Ocean.

They are no strangers to us, these electric particles③, for we know them as electrons. When large numbers of electrons break away from their atoms and move through

a wire, we describe this action by saying that electricity is "flowing" through the wire. Yes, the electrical "fluid" that early scientists talked about is nothing more than electrons flowing along a wire!

But how can individual electrons be made to break away from atoms?

And how can these free electrons be made to move along a wire?

The answer to the first question lies in the structure of the atoms themselves. Some atoms are so constructed that they lose electrons easily. An atom of copper, for example, is continually losing an electron, regaining it (or another electron), and losing it again. A copper atom normally has 29 electrons, arranged in four different orbits about its nucleus. The inside orbit has 2 electrons. The next larger orbit has 8. The third orbit is packed with 18 electrons. And the outside orbit has only one electron. It is this outside electron that the copper atom is continually losing, for it is not very closely tied to the atom. It wanders off, is replaced by another free-roving electron, and then this second electron also wanders away.

Consequently, in a copper wire free electrons are floating around in all directions among the copper atoms. Thus, even though the copper wire looks quite motionless to your ordinary eye, there is a great deal of activity going on inside it.

If the wire were carrying electricity to an electric

light or to some other ectrical device, the electrons would not be moving around at random④. Instead, many of them would be rushing in the same direction — from one end of the wire to the other.

This brings us to the second question. How can free electrons be made to move along a wire? Well, men have found several ways to do that. One way is chemical. Volta⑤'s voltaic pile, or battery, is a chemical device that makes electricity (or electrons) flow in wires. Another way is magnetic. Faraday and Henry⑥ discovered how magnets could be used to make electricity flow in a wire.

New Words

1. vague [veig] *adj.*
   模糊的，不明确的
2. sort [sɔ:t] *n.* 种类
   v. 分类；拣选
3. individual [indi'vidjuəl]
   adj. 个人的；单独的
   n. 个人；独立单位
4. baffle ['bæfl] *v.*
   使挫折；阻碍
5. American [ə'merikən]
   adj. 美国的
   n. 美国人
6. astound [əs'taund] *v.* 使震惊
7. probably ['prɔbəbli] *adv.*
   很可能，大概，或许
8. delicate ['delikit] *adj.*
   精致的；棘手的
9. job [dʒɔb] *n.* 工作；职责；任务
10. Atlantic [ət'læntik] *adj.*
    大西洋的
11. ocean ['əuʃən] *n.* 海洋
12. stranger ['streindʒə] *n.*
    陌生人
13. describe [dis'kraib] *v.*
    描写，叙述
14. electrical [i'lektrikəl] *adj.*
    电的；电气科学的
15. early ['ə:li] *adj.* 早的；早期的
    adv. 早；在初期
16. lie [lai] (lay [lei], lain

[lein], lying [laiiŋ])
v. 躺；位(在)于

17. themselves [ðəm'selvz]
pron. 他们自己；他们本身
18. construct [kən'strʌkt] *v.*
建造；构筑
19. regain [ri'gein] *v.*
收回；复得
20. normally ['nɔ:məli] *adv.*
正常地，正规地
21. arrange [ə'reindʒ] *v.*
安排；整理；分类；排列
22. orbit ['ɔ:bit] *n.* 轨道
v. 沿轨道运行
23. tie [tai] *v.* 束紧；束缚，限制
24. wander ['wɔndə] *v.*
漫游；徘徊
25. rove [rəuv] *v.* 漫游
26. consequently ['kɔnsikwəntli]
adv. 因而，所以
27. float [fləut] *v.* 漂浮，浮动
28. motionless ['məuʃənlis]
adj. 不动的，静止的
29. deal [di:l] *n.* 交易；待遇
30. activity [æk'tiviti] *n.* 活动
31. random ['rændəm] *n.*
偶然的(或随便的)行动
adj. 胡乱的；随便的
32. rush [rʌʃ] *v.* 冲；奔
33. voltaic [vɔl'teiik] *adj.*
伏打(式)的
34. pile [pail] *n.* 堆；电池
v. 堆积

Phrases and Expressions

1. think of ... as ... 把…看作…
2. a sort of ... 一种…
3. make up ... 组成；补偿
4. (be) made up of ... 由…组成
5. the Atlantic Ocean 大西洋
6. break away from ... 脱离…
7. answer to ... *n.* (对…问题的)回答；*v.* 适应…，符合…
8. lie in ... 在于…
9. a great deal of ... 大量…
10. at random 胡乱地；随便地
11. voltaic pile 伏打电堆

Notes to the Text

① Millikan　Robert Andrew Millikan ['rɔbət 'ændru: 'milikən] (1868—1953) 罗伯特·安得鲁·米里坎，美国物理学家。

② about half of a millionth of a millionth of a millionth of a millionth of a millionth of a millionth of a pound. 可译为"大约是一磅的百万百万百万百万百万分之一的一半"。用数字表示，约为 0.5×10^{-30} 磅，0.5×10^{-30} 念作：zero (or nought) point five multiplied by ten to the minus thirtieth.

③ They are no strangers to us, these electric particles, … 句中 these electric particles 是主语 they 的同位语。no 是形容词。no 与名词连用时，比 not 与名词连用时语气要强。not 只单纯否定，而 no 则还带有感情色彩，表示"并非"，"决不是"的意思。试比较下列两句：

They are *not* strangers to us. 他们对于我们来说并不陌生。

They are *no* strangers to us. 他们对于我们来说根本不陌生。

句中 strangers 在翻译时，可译作形容词，使汉语更通顺。

④ If the wire were carrying electricity …, the electrons would not be moving at random. 从句和主句中的谓语都是虚拟语气过去进行时，表示与客观事实相反的假设。

⑤ Volta　Alessandro Volta [ɑ:les'sɑ:ndrə vɔl'tɑ:] (1745—1827) 阿莱斯山得罗·伏特，意大利物理学家。

⑥ Henry　Joseph Henry ['dʒəuzif 'henri] (1797—1878) 约瑟夫·亨利，美国物理学家。

Exercises

I. 从 a, b, c 中选择一项完成下列句子：

1. Quite a few years ago, many scientists thought of electricity ___

a) was a sort of fluid.

b) as a sort of fluid.

c) to be a sort of fluid.

2. How can free electrons be made ___
   a) move along a wire?
   b) moving along a wire?
   c) to move along a wire?
3. The answer ___ lies in the structure of the atoms.
   a) for the first question
   b) about the first question
   c) to the first question
4. Man has found several ways ___
   a) to make electrons move along a wire.
   b) make electrons move along a wire.
   c) making electrons move along a wire.
5. To use a magnet is one of ___ to make electricity flow in a wire.
   a) the best ways
   b) the better way
   c) best ways
6. In a copper wire free electrons are floating around___ among the copper atoms.
   a) to all directions
   b) at all directions
   c) in all directions
7. The little magnet weighs ___
   a) for only half of a pound.
   b) to only half a pound.
   c) only half a pound.
8. How can individual electrons ___ to break away from atoms?
   a) made
   b) have made
   c) be made

9. We describe the motion of electrons through a wire by ____
   a) say that electricity is "flowing" through the wire.
   b) saying that electricity is "flowing" through the wire.
   c) saying electricity to "flow" through the wire.
10. This was probably one of the most delicate weighing jobs ____
   a) have ever done by man.
   b) ever been done by man.
   c) ever done by man.

Ⅱ. 根据课文的意思完成下列各句，并译成汉语：

1. The experiment that Millikan made in 1909 was ____.
2. The electrical "fluid" that early scientists talked about is nothing more than ____.
3. It was easy for scientists to prove that electricity was made up of tiny particles of some kind, but difficult ____.
4. The outside electron of a copper atom is continually losing, because ____.
5. The number of electrons in the inside orbit of a copper atom is ____, while that in the outside orbit is ____.
6. A battery is a chemical device to ____.
7. A copper wire looks quite motionless to our ordinary eye, but ____.
8. To make up a pound it would take more of electric particles than ____.
9. When large numbers of electrons break away from their atoms and move through a wire, we say ____.
10. One way to make electricity flow in a wire is ____.

Ⅲ. 将括号内的动词改为适当的时态形式：

1. The resistance of nearly all substances (vary) as the temperature (change).
2. Several years ago many people (think) that electricity (be)

a fluid.

3. The ancient people (learn) to make use of magnetism in their compasses.
4. Millikan (carry out) a series of experiments before he (succeed) in weighing a single particle of electricity.
5. We (see) that the electric current (be) actually a flow of negative charges.
6. It (be) sufficient to look upon the electric current as something that (flow).
7. Just as water (flow) along a pipe, so electricity (pass) along a copper wire.
8. Two electrons brought together (fly) apart as there (be) a powerful repulsive force between two like electric charges.
9. Faraday (discover) that magnets (can) be used to make electricity flow in a wire.
10. An atom of any metal always (lose), (gain), (lose) again and regain an electron.

IV. 汉译英(注意使用被动语态):

1. 若干年前,一些人认为电是由某种微粒构成的。
2. 科学家已经证明电子带负电,而核子带正电。
3. 电池中的化学能可以变为电能。
4. 很容易被其它原子核吸引走的电子叫自由电子。
5. 联接到电池组两极上的金属线一般都需要绝缘。

Word Study

Make

v. t.

1. 作;制造;建造

   The worker *makes* machine parts of different shapes.

   工人制造形状不同的机器零件。

2. 构成,组成,造成

Oxygen and hydrogen *make* water.

氧和氢构成水。

Copper and aluminium *make* good conductors.

铜和铝是良导体。

3. (和名词连用)作出(某种举动)

The students often *make experiments* in the physics laboratory.

学生们常在物理实验室做实验。

make a speech 演说

make observations (作)观察

make progress 进步

4. (+宾语+补足语) 使…成为

We *made* him our team leader.

我们选他当队长。

5. (+宾语+分词或形容词、动词不定式、介词短语)使

Can you *make* yourself understood in English?

你能用英语表达自己的意思吗?

Electricity *makes* machines run.

电使机器转动。

6. (be made+分词或动词不定式)使

The discovery *has been made* known to all the world.

这项发现已让全世界都知道了。

An electric current *is made* to flow through a wire.

使电流流过导线。

7. 词组

(be) made of 用…制造

(be) made up of 由…组成

make up 组成,补偿

make use of 使用

n. 制造;式样

Is this your own *make*?

这是你们自己制造的吗?

There are automatic machines of various *makes* at the industrial exhibition.

工业展览会上有各种式样的自动化机床。

Extensive Reading

Electric Current

It is hardly an exaggeration to say that the whole second half of the Twentieth Century runs on the flow of electric current! It is therefore essential that you should have as accurate a picture as possible of what electric current is, and how it behaves①.

Recall, for a moment, what you learnt about current flow. You learnt that if you connect a length of ordinary insulated conductor wire across the positive and negative terminals of a source of e.m.f. (say②, a battery), a potential difference is instantly created between the two ends of the wire.

The many millions of "free" electrons which have already been separated from the outer orbits of their respective atoms by, (say,) the heat of room temperature, and which have been wandering aimlessly in all directions through the wire, now come under a common controlling force. They are strongly repelled by the more negative (or less positive) charge which has been set up at one end of the wire, and strongly attracted by the less negative (or more positive) charge which has been set up at