职业技术教育“十二五”课程改革规划教材
光电技术（信息）类

光电子技术专业英语

GUANG DIANZI JISHU ZHUANYE YINGYU

主　编　王凌波　王九程
副主编　周　利　吴天慧
　　宋露露

華中科技大學出版社
http://www.hustp.com

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http://www.hustp.com
中国·武汉

内 容 简 介

本书是光电子技术方面的专业英语教材，主要涉及电学、光学、激光基础、光电探测技术、光纤通信和激光加工技术方面的内容。全书共6个单元，每个单元包括4篇课文和2篇拓展阅读材料，以及听说训练和翻译训练。每课包括课文、词汇、练习。题材广泛，内容丰富。

本书可作为高等职业院校、高等专科院校、成人高校、民办高校、本科院校的二级职业技术学院和中等职业院校的光电子技术专业的教学用书，也可作为相关工程技术人员和社会从业人士的参考书和培训用书。

图书在版编目(CIP)数据

光电子技术专业英语/王凌波　王九程　主编. —武汉：华中科技大学出版社，2012.2
ISBN 978-7-5609-7600-6

Ⅰ. 光…　Ⅱ. ①王…　②王…　Ⅲ. 光电子技术-英语-职业教育-教材　Ⅳ. H31

中国版本图书馆CIP数据核字(2011)第271251号

光电子技术专业英语　　王凌波　王九程　主编

策划编辑：王红梅　刘万飞
责任编辑：田　密　刘万飞
封面设计：秦　茹
责任校对：何　欢
责任监印：周治超
出版发行：华中科技大学出版社(中国·武汉)
武昌喻家山　邮编：430074　电话：(027)87557437
录　　排：武汉兴明图文信息有限公司
印　　刷：武汉科利德印务有限公司
开　　本：787mm×1092mm　1/16
印　　张：12.5
字　　数：350千字
版　　次：2012年2月第1版第1次印刷
定　　价：25.80元

序

作为新兴的行业、产业，我国光电技术的发展一日千里，光电产业对我国经济社会的巨大作用日益凸显。我国光电与激光市场十几年来始终保持两位数的高速增长，2010 年我国光电与激光产业的市场规模已经突破千亿。随着信息技术、激光加工技术、激光医疗与光子生物学、激光全息、光电传感、显示技术及太阳能利用等技术的快速发展，我国光电与激光产业市场规模将进一步加大。

随着光电发业的不断产展，对光电技术人才的需求越来越大，高等职业院校光电技术方面的专业建设也会越来越受到重视。作为其中的重要部分，光电专业教材建设目前虽然取得了一定的成果，但还无法满足产业发展对人才培养的需求，尤其是面向职业教育的专业教材更是屈指可数，很多学校都只能使用自编的校本教材。值此国家“十二五”规划实行之际，编写和出版职业院校使用的光电专业教材既迫在眉睫，又意义重大。

华中科技大学出版社充分依托“武汉·中国光谷”的区域优势，在相继开发分别面向全国 211 重点大学和普通本科大学光电专业教材的基础上，又倾力打造了这套面向全国职业院校的光电技术专业系列教材。在组织过程中，华科大社邀请了全国所有开设有光电专业的职业院校的专家、学者，同时与国内知名的光电企业合作，在国家光电专业教指委专家的指导下，齐心协力、求同存异、取长补短，共同编写了这套应用范围最广的光电专业系列教材。参与本套教材建设的院校大多是国家示范院校或国家骨干院校，他们在光电专业建设上取得了良好的成绩。参与本套教材编写的教师，基本上是相关国家示范院校或国家骨干院校光电专业的带头人和长期在一线教学的教师，非常了解光电专业职业教育的发展现状，具有丰富的教学经验，在全国光电专业职业教育领域中也有着广泛的影响力。此外，本套教材编写还吸收了大量有丰富实践经验的企业高级工程技术人员，参考了企业技术创新资料，把教学和生产实际有效地结合在一起。

本套教材的编写基本符合当前教育部对职业教育改革规划的精神和要求，在坚持工作过程系统化的基础上，重点突出职业院校学生职业竞争力的培养和锻炼，以光电行业对人才需求的标准为原则，密切联系企业生产实际需求，对当前的光电专业职业教育应该具有很好的指导作用。

本套教材具有以下鲜明的特点。

课程齐全。本套教材基本上包括了光电专业职业教育的专业基础课和光电子、光器件、

光学加工、激光加工、光纤制造与通信等各个领域的主要专业课，门类齐全，是对光电专业职业教育一次有效、有益的整理总结。

内容新颖。本套教材密切联系当前光电技术的最新发展，在介绍基本原理、知识的基础上，注重吸收光电专业的新技术、新理念、新知识，并重点介绍了它们在生产实践中的应用，如《平板显示器的制造与测试》、《LED 封装与测试》。

针对性强。本套教材结合职业教育和职业院校的实际教学现状，非常注重知识的“可用、够用、实用”，如《工程光学基础教程》、《激光原理与技术》。

原创性强。本套教材是在相关国家示范院校或国家骨干院校长期使用的自编校本教材的基础上形成的，既经过了教学实践的检验，又进行了总结、提高和创新，如《光纤光学基础》、《光电检测技术》。其中的一些教材，在光电专业职业教育中更是首创，如《光电子技术英语》、《光学加工工艺》。

实践性强。本套教材非常注重实验、实践、实训的“易实施、可操作、能拓展”。不少书中的实验、实训基本上都是企业实践中的生产任务，有的甚至是整套生产线上的任务实施，如《激光加工设备与工艺》、《光有源无源器件制造》。

我十分高兴能为本套教材写序，并乐意向各位读者推荐，相信读者在阅读这套教材后会和我一样获得深刻印象。同时，我十分有幸认识本套教材的很多主编，如武汉职业技术学院的吴晓红、武汉软件工程职业学院的王中林、南京信息职业技术学院的金鸿、苏州工业园区职业技术学院的吴文明、福建信息职业技术学院的林火养等老师，知道他们在光电专业职业教育中的造诣、成绩及影响；也和华中科技大学出版社有过合作，了解他们在工科教材出版尤其是在光电技术（信息）方面教材出版上的成绩和成效。我相信由他们一起编写、出版本套教材，一定会相得益彰。

本套教材不仅能用于指导当前光电专业职业教育的教学，也可以用于指导光电行业企业员工培训或社会职业教育的培训。

中国光学学会激光加工专业委员会主任

2011 年 8 月 24 日

前言

专业英语是通过阅读英文专业文献来获取专业信息的一门课程，所涉及的专业文献一般是学生已经了解和掌握的知识。从20世纪60年代初期起，人们在有关英语教学的文献上就经常可以看到“特殊目的的英语”(ESP, English for specific purposes)这一字眼，它意指英语教学是为了一个特殊的、实用的目的而进行的。

随着社会和经济的发展，人们对人才素质的要求也越来越高，这给现代的教育带来了巨大的挑战。21世纪要求人才应该具有综合素质好、专业精通、外语基础扎实、听说读写综合技能过硬、适应性强等能力。

《光电子技术专业英语》属专业用途英语，其鲜明特性是“职业性”，即应为光电专业学生将来从事光电行业提供必要的英语能力支撑(包括英文科技资料的阅读能力、一般语言交流能力等)。教材涉及电学、光学、激光基础、光电探测技术、光纤通信和激光加工技术六个方面的内容。

全书共六个单元，每个单元包括专业技术性文章和拓展阅读，以及听说训练和翻译训练，即INTENSIVE READING, WRITING, CAREER SPEAKING, EXTENSIVE READING, TRANSLATION。

1)INTENSIVE READING与EXTENSIVE READING前后呼应，旨在逐步提高学生的专业英语阅读能力。

2)WRITING和CAREER SPEAKING两部分对应职场，内容紧扣学生求职就业、职业发展需求，凸显语言学习的实用性。

3)TRANSLATION注重将翻译技巧浅显化，便于学生掌握、运用。

4)UNIQUE ENGLISH和Warm-Up Activity尝试提高专业英语教学的趣味性，在INTENSIVE READING每篇课文前安排形式不一的Warm-Up Activity。

为了方便教学，各单元每一部分均注有生词和短语，书末还配有总生词表。另外本书还配有电子教案和练习题参考答案，向采纳本书作为教材的教师免费提供。

其中，INTENSIVE READING, EXTENSIVE READING, UNIT 1由武汉职业技术学院王凌波编写，UNIT 2由王凌波、武汉大学周利编写，UNIT 3由武汉软件工程职业学院王九程编写，UNIT 4由王凌波、汉口学院王琛编写，UNIT 5由武汉市仪表电子学校刘晓竹、武汉职业技术学院宋露露编写，UNIT 6由武汉软件工程职业学院颜红梅编写；WRITING, CAREER SPEAKING, TRANSLATION由武汉软件工程职业学院吴天慧编写；UNIQUE

ENGLISH 及词汇总表由王九程编写。本书由王凌波、王九程二人共同完成设计、统稿和编排。

由于编者水平有限，疏漏和不妥之处在所难免，恳请读者不吝指正。

反馈意见、电子教案及参考答案的获取请发至邮箱 wlb0125@163.com。

编　者

2011 年 10 月

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TRANSLATION

Features of English for Science and Technology

UNIQUE ENGLISH

Brain Teaser

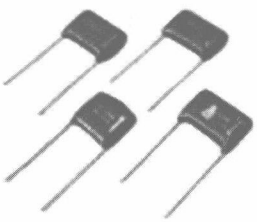
INTENSIVE READING

1.1 Basic Circuit Concepts

Warm-Up Activity

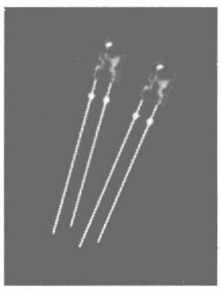
Do you know the names of the components below?

Picture 1



Picture 2

Picture 3



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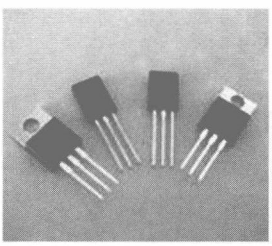


Picture 5

Text

Fig. 1.1 shows the basic type of electrical **circuit** in the form of a **block diagram**. It consists of a source of electrical energy, some sort of **load** to make use of that energy, and electrical conductors connecting the source and the load.

The electrical source has two **terminals**, **designated** positive (+) and negative (−). **As long as** there is an unbroken connection from source to load and back again as shown here, **electrons** will be pushed from the negative terminal of the source, through the load, and then

circuit *n.* 电路
block diagram 结构图，方块图，简图
load *n.* 负载
terminal *n.* 终端，接线端
designate *v.* 指定，指派

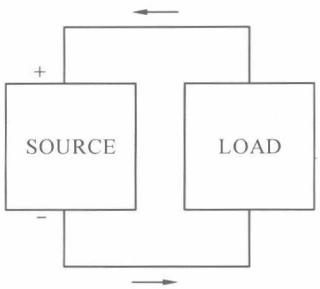


Fig. 1.1 A basic DC circuit

back to the positive terminal of the source. The arrows show the direction that electron current flow through this circuit. Because the electrons are always moving in the same direction through the circuit, their **motion** is known as a direct current (DC).

The source can be any source of electrical energy. In practice, there are three general possibilities: it can be a battery, an electrical generator, or some sort of electronic power supply.

The load is any device or circuit powered by **electricity**. It can be as simple as a light bulb or as complex as a modern high-speed computer.

The electricity provided by the source has two basic characteristics, called **voltage** and **current**. These are **defined** as follows.

Voltage

The electrical "pressure" that causes free electrons to travel through an electrical circuit, also known as **electromotive force (emf)**. It is measured in volts.

Current

The amount of electrical charge (the number of free electrons) moving past a given point in an electrical circuit per unit of time. Current is measured in amperes.

The load, in turn, has a characteristic called resistance. By definition:

Resistance

That characteristic of a medium which opposes the flow of electrical current through itself. Resistance is measured in ohms.

The relationship between voltage, current, and resistance in an electrical circuit is fundamental to the operation of any circuit or device. **Verbally**, the amount of current flowing through a circuit is directly proportional to the applied voltage and inversely proportional

as long as
只要，在……的时候
electron *n.* 电子

motion *n.* 运动，动作

electricity *n.* 电流，电，电学

voltage *n.* [电工]电压
current *n.* 电流
define *vt.* 定义
electromotive force
电动势

verbally *adv.* 用言辞地，口头地

to the circuit resistance. By explicit definition, one volt of electrical pressure can push one ampere of current through one ohm of resistance. Two volts can either push one ampere through a resistance of two ohms, or push two amperes through a resistance of one ohm. Mathematically,

$$E=IR$$

where E=the applied voltage, or EMF;

I=the circuit current;

R=the resistance in the circuit.

Get To Work

Ⅰ. Understanding Checking

Directions: Mark Y (for YES) if the statement agrees with the information given in the text; N (for NO) if the statement contradicts the information given in the text; NG (for NOT GIVEN) if the information is not given in the text.

( )1. One kilovolt equals one thousand volts.

( )2. The flow of electrons through a conductor is called resistance.

( )3. Current flow is represented by the letter symbol *I*.

( )4. The opposition to current is called electrical resistance.

( )5. The relationship between voltage, current, and resistance in an electrical circuit is fundamental to the operation of any circuit or device.

Ⅱ. Matching

Directions: Match the following terms to appropriate definition or expression.

1. current	A. electromotive force
2. amp	B. the flow of electrons
3. voltage	C. the unit of resistance
4. ohm	D. the unit in which current is measured
5. DC	E. the direction of current is constant

Ⅲ. Passage Completion

Directions: Fill in each of the blanks with one of the words or expressions in the box, making changes if necessary.

constant	cycle	change	negative	repeat

To have a better understanding of alternating current and voltage, it is desirable to begin with a consideration of the general situation. A function of time is called alternating when after a time interval or period, it repeats a previous succession of positive and __1__ values. In other words, such an action __2__ itself exactly over equal intervals of time. So

an alternating current is a rate of electricity which does not have a __3__ value in time but grows to a maximum value, decreases, __4__ its direction reaches a maximum value in the new direction, returns to its original value and then repeats this __5__ at an indefinite number of times.

Ⅳ. Translation

Directions: Complete the sentences by translating into English according to the Chinese given in brackets.

1. Modern advances in the fields of computer, control system communication _____ _____ (与电子工业密切相关).

2. When it is desirable to express a magnitude of current _____ _____ (比安培小), the milliampere and microampere units are used.

3. _____ (电流、电压和电阻的关系) in an electrical circuit is fundamental to the operation of any circuit or device.

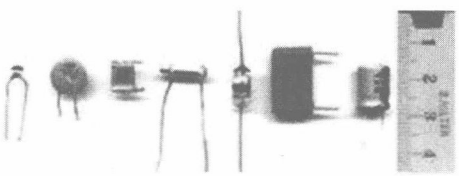
4. There are _____ (大量的符号) which represent an equally large range of electronic components.

5. The _____ (电流的单位) is the ampere.

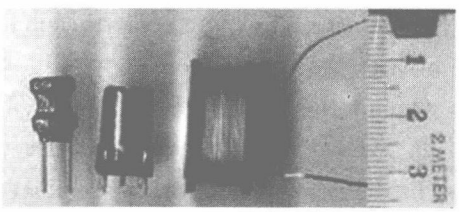
1.2 Capacitance and Inductance

Warm-Up Activity

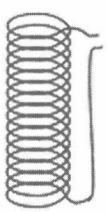
Do you know the names of the components below?

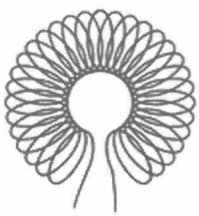


Picture 1



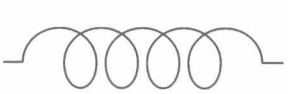
Picture 2





Picture 3

Picture 4



Picture 5

Text

Capacitance

Electrical energy can be stored in an **electric** field. The **device** capable of doing this is called a **capacitor** or a **condenser.**

A simple condenser consists of two metallic plants separated by a **dielectric.** If a condenser is connected to a battery, the electrons will flow out of the negative terminal of the battery and accumulate on the condenser plate connected to that side. At the same time, the electrons will leave the plate connected to the positive terminal and flow into the battery to make the potential difference just the same as that of the battery. Thus the condenser is said to be **charged.**

The capacitance is directly **proportional** to the dielectric constant of the material and to the area of the plates and inversely to the distance of the plates. It is measured in **farads.** When a change of one volt per second across it causes the current of one ampere to flow, the condenser is said to have the capacitance of one farad. However, farad is too large a unit to be used in radio calculation, so microfarad (one millionth of a farad) and the picofarad (10^{-12} farad) are generally used.

The amount of the stored energy of a charged condenser is proportional to the applied voltage and its capacitance. The capacitance of a condenser is determined by three important factors, namely the area of the plate surface, the space between them and dielectric material. The larger the plate area, the smaller the space between plates, the greater the capacitance.

One of the condensers used in radio receiver is a variable condenser, whose capacitance can be varied by turning the plates. It is used in the receiver for turning and varying capacitance in the circuit so as to pick up the desired signals of different wavelengths.

electrical *adj.* 电的，有关电的
electric *adj.* 电动的，电气的，以电为动力的
device *n.* 装置，设备
capacitor *n.* 电容器
condenser *n.* 电容器
dielectric *n.* 电介质，绝缘体
charge *n.* 负荷，电荷 *v.* 充电
proportional *adj.* 比例的，成比例的
farad *n.* [电]法拉(电容单位)

Inductance

Any current will create a **magnetic** field, so in fact every current carrying wire in a circuit acts as an inductor! However, this type of **stray** inductance is typically **negligible**, just as we can usually ignore the stray resistance of our wires and only take into account the actual resistors. To store any appreciable amount of magnetic energy, one usually uses **a coil of** wire designed specifically to be an inductor. All

magnetic *adj.* 磁的，有磁性的
stray *adj.* 偶遇的，零散的
negligible *adj.* 可以忽略的
a coil of 一卷，一圈