



中等专业学校 规划教材
工科电子类

机械专业

伍忠杰 编

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## 内 容 简 介

本书为大学和中专工科机械专业的专业英语课程用教材。

本书课文涉及主要内容有:工程材料、材料性能、机床、刀具、非传统加工工艺、切削与腐蚀加工的发展趋势、冷冲模、注塑模、数控、加工中心、全面质量管理、技术测量、机械原理、机械零件、计算机集成生产系统、柔性生产系统等。每一单元的结构为:机械专业类英文篇章(课文)、对篇章中较为集中的语言现象的概要分析、针对课文中的语言难点、要点及重要词汇、词组的理解练习。

本书侧重于阅读理解能力的训练。所选材料既覆盖了当今机械行业的大多数领域,又反映了其发展趋势。本书除用作教材外,还可供有一定英文基础的工程技术人员参考使用。

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## 出 版 说 明

根据国务院关于高等学校教材工作的规定,我部承担了全国高等学校和中等专业学校工科电子类专业教材的编审、出版的组织工作。由于各有关院校及参与编审工作的广大教师的共同努力,有关出版社的紧密配合,从1978~1990年,已编审、出版了三个轮次教材,及时供给高等学校和中等专业学校教学使用。

为了使工科电子类专业教材能更好地适应“三个面向”的需要,贯彻国家教委《高等教育“八五”期间教材建设规划纲要》的精神,以“全面提高教材质量水平为中心,保证重点教材,保持教材相对稳定,适当扩大教材品种,逐步完善教材配套”,作为“八五”期间工科电子类专业教材建设的指导思想,组织我部所属的八个高等学校教材编审委员会和四个中等专业学校专业教学指导委员会,在总结前三轮教材工作的基础上,根据教育形势的发展和教学改革的需要,制定了1991~1995年的“八五”(第四轮)教材编审出版规划。列入规划的,以主要专业主干课程教材及其辅助教材为主的教材约300余种。这批教材的评选推荐和编审工作,由各编委会或教学指导委员会组织进行。

这批教材的书稿,其一是从通过教学实践、师生反应较好的讲义中经院校推荐,由编审委员会(小组)评选择优产生出来的,其二是在认真遴选主编人的条件下进行约编的,其三是经过质量检查在前几轮组织编写出版的教材中修编的。广大编审者、各编审委员会(小组)、教学指导委员会和有关出版社,为保证教材的出版和提高教材的质量,作出了不懈的努力。

限于水平和经验,这批教材的编审、出版工作还可能有缺点和不足之处,希望使用教材的单位,广大教师和同学积极提出批评和建议,共同为不断提高工科电子类专业教材的质量而努力。

中国电子工业部教材办公室

# 前 言

本教材系按中国电子工业部的工科电子类专业教材1991~1995年编审出版规划,由电子工业部中等专业学校教材编审委员会工模具专业编审小组征稿,并推荐出版。责任编辑丁振明。

本教材由成都电子机械高等专科学校(原成都无线电机械学校)伍忠杰担任主编,辽宁电子工业学校张宪立参编;辽宁电子工业学校华璧担任主审。

本教材适用于为工科机械专业的大学生和中专生开设的专业英语课,参考教学时数约为34学时。学生在基础英语阶段应已接受过读、听、写、译、说等语言技能的初步训练,并经过机械专业基本技能实习,对机械加工、工程材料、加工工具、机床等有一定的感性认识。

本教材在材料选择及编写的过程中力求重点突出,有所创新,具体表现在:

1. 侧重阅读理解能力的训练;
2. 着重课文中的语言难点、要点的理解及练习;
3. 对英文科技文章中较为集中的语言现象作专题分析;
4. 全书突出机械专业英语的特点,所选材料既覆盖了当今机械行业的大多数领域,又反映了其发展趋势。

本教材由伍忠杰编写第1、2、3、5、6、7、8单元,张宪立编写第4单元。在编写的过程中,丁振明、许晓阳、刘瑛提出了许多宝贵的意见,在此表示诚挚的感谢。限于编者的水平和经验,书中难免有一些缺陷和不足,殷切希望广大读者批评指正。

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# Unit One

## Passage A

### Engineering Materials

[1] All products that come out of industry consist of at least one — and often many — types of materials. The most obvious example is the automobile. A car contains a wide variety of materials, ranging from glass to steel to rubber, plus numerous other metals and plastics.

[2] The number of materials which are available to the engineer in industry is almost infinite. The various compositions of steel alone run into the thousands. It has been said that there are more than 10,000 varieties of glass, and the numbers of plastics are equally great. In addition, several hundred new varieties of materials appear on the market each month. This means that individual engineers and technicians cannot hope to be familiar with all the properties of all types of materials in their numerous forms. All he can do is try to learn some principles to guide him in the selection

and processing of materials.

[3] The properties of a material originates from the internal structure of that material. This is analogous to saying that the operation of a TV set depends on the components and circuits within that set. The internal structures of materials involve atoms, and the way atoms are associated with their neighbors into crystals, molecules, and microstructures.

[4] It is convenient to divide materials into three main types: (1) metals, (2) plastics or polymers and (3) ceramics.

[5] Characteristically, metals are opaque, ductile, and good conductors of heat and electricity. Plastics (or polymers), which usually contain light elements, and therefore have relatively low density, are generally insulators, and are flexible and formable at relatively low temperatures. Ceramics, which contain compounds of both metallic and non-metallic elements, are usually relatively resistant to severe mechanical, thermal, and chemical conditions.

[6] Metals are divided into ferrous and non-ferrous metals. The former contain iron and the latter do not contain

iron. Certain elements can improve the properties of steel and are therefore added to it. For example, chromium may be included to resist corrosion and tungsten to increase hardness. Aluminum, copper, and the alloys, bronze and brass, are common non-ferrous metals.

[7] Plastics and ceramics are non-metals; however, plastics may be machined like metals. Plastics are classified into two types—thermoplastics and thermosets. Thermoplastics can be shaped and reshaped by heat and pressure but thermosets cannot be reshaped because they undergo chemical changes as they harden. Ceramics are often employed by engineers when materials which can withstand high temperatures are needed.

### Vocabulary

variety *n.* a different form; kinds; sort

infinite *adj.* very many; without limits

composition *n.* a mixture of substances 合成(物)

property *n.* the main characteristics of a substance 性能

principle *n.* a basic rule, explaining how things act

originate *vi.* come into being; arise

internal *adj.* coming from within the thing itself

analogous *adj.* alike

component *n.* a part

crystal *n.* 晶体, 石英

molecule *n.* 分子, 微小颗粒

microstructure *n.* the structure seen under a microscope  
微结构

convenient *adj.* easy; handy

polymer *n.* a substance consisting of two or more poly-  
meric compounds 聚合物

ceramics *n.* pottery, earthenware, porcelain, etc. 陶瓷

characteristically *adv.* in a way that shows the special  
characters

opaque *adj.* not allowing light to pass through

ductile *adj.* (of metals) that can be stretched,  
drawn, or hammered thin without breaking  
有韧性的

conductor *n.* a substance which passes on heat,  
sound, or electricity 导体

insulator *n.* a substance which prevents the passage of  
heat, sound or electricity 绝缘体

flexible *adj.* that can be easily bent

formable *adj.* that can be easily made into a shape 易成  
型的

compound *n.* a substance formed by the chemical  
combination of two or more substances 化  
合物

metallic *adj.* of like, or containing a metal or metals

- thermal *adj.* having to do with heat 热(性)的  
ferrous *adj.* containing iron  
chromium *n.* 铬  
corrosion *n.* the process of wearing away the surface of a solid by rusting 腐蚀  
tungsten *n.* 钨  
aluminum *n.* 铝  
thermo- [构词成分] heat

### Phrases and Expressions

- consist of 由……组成  
range from ... to [范围]从……至  
run into 多达  
associate with 与……相关  
the former ..., the latter ... 前者……, 后者……

### ANALYSES

#### A. Vocabulary Study

##### 1. 名词定义与动词定义的比较

###### 1) machine

- n.* 机器; 机械  
*v.* 机械加工  
e. g. Plastics may be *machined* like metals.

###### 2) shape

- n.* 形状; 外形

*v.* 使成形; 刨削

e. g. Thermoplastics can be *shaped* and reshaped by heat and pressure.

## 2. 普遍词义与专业词义的比较

### 1) **composition** *n.*

普通词义: 作文; 作曲

专业词义: 合成(物)

e. g. Every student is required to write a short *composition* (作文) within 30 minutes in the test.

The various *compositions* (合成) of steel a-long run into the thousands.

### 2) **conductor** *n.*

普通词义: (公共汽车)售票员; (乐队)指挥; (影/剧院)领座员; 列车员

专业词义: 导体

e. g. There is no *conductor* (售票员) on the bus. The driver sells tickets.

Metals are good *conductors* (导体) of heat and electricity.

3) **flexible** *adj.*

普通词义: 灵活的

专业词义: 易弯曲的; 柔性的

e. g. Some companies have adopted *flexible* (灵活的) work time so that their employees do not have to go to work during the rush hour.

Plastics are *flexible* (易弯的; 柔软的) and formable at relatively low temperatures.

**B. Structural Study**

**Read and study the sentences below from the text. Pay attention to the underlined parts:**

1. The number of materials which are available to the engineer in industry is almost infinite. (Para. 2)
2. All he can do is try to learn some principles to guide him in the selection and processing of materials. (Para. 2)
3. Plastics (or polymers), which usually contain light elements, and therefore have relatively low density, are generally insulators, and are flexible and formable at relatively low temperatures. (Para. 5)

4. Ceramics, which contain compounds of both metallic and nonmetallic elements, are usually relatively resistant to severe mechanical, thermal, and chemical conditions. (Para. 5)
5. Ceramics are often employed by engineers when materials which can withstand high temperatures are needed. (Para. 7)

以上句子的划线部分为定语从句。定语从句主要用来修饰名词,如第1句的 materials,第2句的 all,第3句的 plastics (or polymers),第4句的 ceramics,第5句的 materials 等。定语从句可用 which, that, who, whose, when, where, why, as 等连词引出,有进也可省略。另外,“介词+which”在科技英语中使用较为频繁,例:

The internal structure on which properties of materials are strongly dependent is not constant, but can vary greatly.

## EXERCISES

### A. Comprehension questions.

1. A car serves as an example because \_\_\_\_.
- it used to be made of glass, then of steel, and now is made of rubber
  - it is made of materials other than glass, steel and rubber



ber

c. it is made of many materials including glass, steel and rubber

d. it is obviously made of plastics

2. There are \_\_\_\_\_ varieties of glass and plastics.

a. hundreds of                      b. more than 10,000

c. thousands of                      d. more than 20,000

3. There are about as many varieties of plastics as those of \_\_\_\_\_.

a. steel              b. glass              c. materials              d. rubber

4. Which of the following is not a material?

a. Metal.    b. Plastics.    c. Automobile.    d. Glass.

5. A material has certain properties because of its \_\_\_\_\_.

a. components                      b. circuits

c. neighbors                      d. internal structure

6. According to the passage, materials are divided into three main types of \_\_\_\_\_.

a. ceramics, polymers or plastics, and metals

b. atoms, crystals or molecules, and microstructures

c. metals, plastics or ceramics, and polymers