



中等专业学校教材

化工机械专业英语

常州化工学校 张黎明 主编

English Readings for C.M.E.



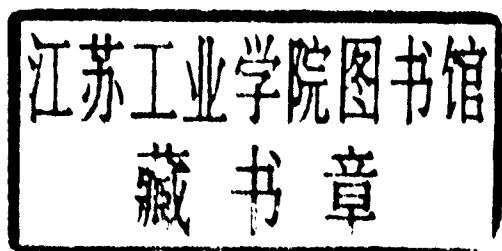
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前 言

《化工机械专业英语》是根据 1995 年 12 月全国化工中专教学指导委员会审定的专业教学计划编写的化工机械专业选修课教材,并可用于机械、电气化、计算机应用、仪表及自动化、制冷与空调专业,或供相近专业的工程技术人员作为英语阅读参考书。

外语水平是学生毕业后就业、继续深造和转移工作领域时的一种特长和能力。基础英语在听、说、读、写方面解决学生掌握英语的入门问题。而专业英语的教学目的是扩大专业词汇,提高查阅英汉技术词典的速度与能力,掌握科技英语的句法特点与翻译技巧,提高阅读专业英语资料的水平。本书根据专业的特点精选了三十个单元,包括机械及设备、电气化、计算机应用、仪表及自动化、制冷与空调等内容。每一单元由一篇课文、单词及词组、课文注释、两篇与课文内容相近的阅读材料及练习组成。对专业英语的语法特点及专业英语翻译概论在附录中集中作了介绍,并在书后附有专业词汇总表。

本书由常州化校张黎明主编,并编写第一章、第五章及专业英语的语法特点和专业英语翻译概论;刘福新编写第三章;陆建国编写第二章;顾绵洪编写第六章;李志平编写第四章;刘振华负责文稿的录入与编排及专业词汇总表排序工作。南京化校谢同炎主审,参加审稿的还有淮南化学工程学校伍广、上海化校蔡炳鉴。

美国俄克拉荷马州大学楼继栋博士,华东理工大学颜惠庚博士提供了大量资料并校核了译文,徐州化校杜存臣、贵州化校罗洪、安徽化校罗爱华对原校际交流讲义《化工机械专业英语阅读》提出了许多建议,在此一并表示感谢。

由于编者学识水平浅薄,教学经验不足,难免错误和不妥之处,诚恳欢迎读者批评指正。

编者

1996 年 1 月

内 容 提 要

本书共分6个部分,30个单元。每一单元由一篇课文、单词及词组、课文注释,两篇与课文内容相近的阅读材料及练习组成。课文内容涉及到机械材料、加工过程及机械零件;电子、电路技术,电功率、变压器等;计算机软、硬件,程序管理器,数据库等应用知识;各种测量仪表和自控调节系统;泵和压缩机、分离机械、压力容器、塔器、反应器、换热器;热力学定律,传热、制冷、空调及空气分离等。对专业英语的语法特点及专业英语翻译技巧在附录中集中做了介绍,并在书后附专业词汇总表。

本书除作为化工机械专业外语教材外,还适用于机械专业、工业企业电气化专业、计算机应用专业、仪表及自动化控制专业、制冷与空调专业的中专学生,也可供相近专业的工程技术人员作为英语阅读参考书使用。

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SECTION 1 Mechanical Engineering

UNIT 1

Text

Materials

We live in a world of man-made materials. Steel, aluminum, plastics, ceramics, copper, glass, and all the others are the concrete substance of our ideas, our designs, our product plans and blueprints.

Of course, materials have always been vital to human civilization. Three of humanity's earliest eras are called the Stone Age, the Bronze Age, and the Iron Age, because the civilization of each was almost entirely dependent on the material after which the era was named. But now, in the twentieth century, materials—not just one, but many—have become a most important factor on which the advance of technology and industry depends. Our progress in space, in electronics, and in atomic energy is directly linked to the solution of crucial materials problems. Even in many of the less glamorous manufacturing fields, materials are of major importance in the planning, design, and manufacture of products. Whether it is a rocket nose cone that must withstand the tremendous heat of reentry into the atmosphere, or a washing machine, the use of proper materials is indispensable to the success of the product.

Until the beginning of this century, the world of materials was relatively small. It was composed of only the few common materials with which we all are familiar: iron, copper, lead, wood, glass, ceramics, and rubber. But then steel and aluminum were produced commercially,

and the first commercial plastics were developed. In the last 50 years, the number of new metals, alloys, plastics, rubbers, and ceramics has increased exponentially. Today there are several hundred times as many different materials as in 1900, and it is estimated that there are between 50,000 and 70,000 different compositions and grades available now. For example, in 1900, less than 100 different materials were used in automobiles. Today's car has at least 4,000 different materials in it.

Despite the amazing variety of modern-day materials, the search still goes on for better materials to meet new and critical service requirements, not only in an advanced technology area such as aerospace, but in the manufacture of industrial and consumer products as well. Also, better materials are needed to meet higher quality and reliability standards. Finally, the search goes on constantly for new and better materials to lower costs.

New Words

1. aluminum [ə'lu:mi:nəm] n. 铝
2. ceramic [si'ræmik] n. ; a. 陶瓷; 陶瓷的
3. copper ['kɒpə] n. 铜
4. concrete(～ly) ['kɒkri:t] a. ; n. ; ad. 具体的; 混凝土; 实际上
5. blueprint ['blu:print] n. ; v. (晒) 蓝图; 设计图
6. vital(～ly) ['vaɪtəl] a. ; ad. 必需的; 真正地
7. civilization [sɪvɪlaɪ'zeɪʃən] n. 文明, 文化
8. humanity [hju(:)'mænɪti] n. 人类
9. era ['iərə] n. 时代, 年代
10. bronze [brɒnz] n. 青铜
11. entire(～ly) [ɪn'taɪə] a. ; ad. 完全的, 整个的; 完全地, 彻底地
12. dependent [di'pendənt] a. 依赖的, 从属的, 相关的

13. factor ['fæktə] n. 因素; 系数
14. progress ['prəʊgres] n. 进展; 进步
15. crucial ['kru:ʃəl] a. 决定性的, 关系重大的, 关键的
16. glamorous ['glæməərəs] a. 吸引人的
17. nose [nəʊz] n. 头部, 突出部
18. cone [kəʊn] n. 圆锥形, (锥形) 头部
19. tremendous [tri'mendəs] a. 极大的, 非常的, 惊人的
20. reentry ['ri:'entri] n. 再进入, 重返
21. wash [wɒʃ] v. 洗, 冲
22. indispensable [indis'pensəbl] a. 不可缺少的, 必需的
23. success [sək'ses] n. 成功, 成就
24. lead [led] n. 铅
25. rubber ['rʌbə] n. 橡胶, 橡皮
26. commercial(～ly) [kə'mə:ʃəl] a. ; ad. 商业的; 大批地
27. alloy ['æli] n. 合金
28. exponential(～ly) [eks'pəʊ'nensjəl] a. ; ad.
指数的; 按指数规律地
29. estimate ['estimeit] v. 估计
30. grade [greɪd] n. 级, 等级
31. automobile ['ɔ:təməbi:l] n. 汽车, 车辆
32. despite [dis'paɪt] prep. 尽管,
33. amazing [ə'meɪzɪŋ] a. 惊人的
34. search [sə:tʃ] v. ; n. 探索, 研究, 寻找
35. critical ['kritikəl] a. 临界的, 关键性的
36. requirement [ri'kwaɪəmənt] n. 需要, 要求
37. aerospace ['ɛərəʊspeɪs] n. 航空和航天, 宇宙空间
38. consumer [kən'sju:mə] n. 消费者, 用户
39. reliability [rɪlaɪə'bɪlɪti] n. 可靠性, 安全性
40. standard ['stændəd] a. ; n. 标准的; 标准, 规格
41. lower ['ləʊə] v. 降低, 减少

Phrases and Expressions

1. vital to 对……所必需的; 对……极端重要
2. dependent on (upon) 视……而定; 依赖于
3. name……after 以……名字为……取名, 命名……为
4. nose cone (火箭的) 前锥体
5. washing machine 洗衣机
6. indispensable to 对……不可缺少的; 对……必需的
7. familiar with 与……熟悉
8. less than 少于; 小于
9. consumer product 消费品
10. as well 同样, 也

Notes

1. Three of humanity's earliest eras are called the stone Age, the Bronze Age, and the Iron Age, because the civilization of each was almost entirely dependent on the material after which the era was named.

译文: 在人类社会的早期有三个时代, 分别称之为石器时代、青铜器时代和铁器时代, 就是因为每个时代的文明几乎完全依赖于以之命名的材料。

本句为主从复合句。because 引导的是原因状语从句, after which 引导的定语从句修饰 material。

2. 最后一段内容由三个句子组成。第一句中 the search still goes on for better materials, 第二句中 better materials are needed, 第三句中 the search goes on constantly for new and better materials, 所表达的意思基本相同, 这三句所表达的内容重点在每句中的 to+v. 的动语短语上。三个 to+v. 短语都用来表示目的。这一段中的 also 和 finally 都是承接语 (Logical Connecters of Sentences), 用来使三个句子一层进一层的意思更加明确。这一段内容可简单地写成。Despite the amazing variety of modern-day materials, the search still goes on for new and better ma-

terials (1) to meet new and critical service requirements, not only in an advanced technology area such as aerospace, but in the manufacture of industrial and consumer products as well, (2) to meet higher quality and reliability standards, (3) to lower costs.

Reading Material

1. Iron and Steel

The earth contains a large number of metals which are useful to man. One of the most important of these is iron. Modern industry needs considerable quantities of this metal, either in the form of iron or in the form of steel. A certain number of non-ferrous metals, including aluminum and zinc, are also important, but even today the majority of our engineering products are of iron or steel. Moreover, iron possesses magnetic properties, which have made the development of electrical power possible.

The iron ore which we find in the earth is not pure. It contains some impurities which we must remove by smelting. The process of smelting consists of heating the ore in a blast furnace with coke and limestone, and reducing it to metal. Blasts of hot air enter the furnace from the bottom and provide the oxygen which is necessary for the reduction of the ore. The ore becomes molten, and its oxides combine with carbon from the coke. The non-metallic constituents of the ore combine with the limestone to form a liquid slag. This floats on top of the molten iron, and passes out of the furnace through a tap. The metal which remains is pig-iron.

We can melt this down again in another furnace—a cupola—with more coke and limestone, and tap it out into a ladle or directly into moulds. This is cast-iron. Cast-iron does not have the strength of steel. It is brittle and may fracture under tension. But it possesses certain prop-

erties which make it very useful in the manufacture of machinery. In the molten state it is very fluid, and therefore it is easy to cast it into complicated shapes. Also it is easy to machine it. Cast-iron contains small proportions of other substances. These non-metallic constituents of cast-iron include carbon, silicon and sulphur, and the presence of these substances affects the behaviour of the metal. Iron which contains a small quantity of carbon, for example wrought-iron, behaves differently from iron which contains a lot of carbon.

The carbon in cast-iron is present partly as free graphite and partly as a chemical combination of iron and carbon which we call cementite. This is a very hard substance, and it makes the iron hard too. However, iron can only hold about 1.5% of cementite. Any carbon content above that percentage is present in the form of free graphite. Steel contains no free graphite, and its carbon content ranges from almost nothing to 1.5%. We make wire and tubing from mild steel with a very low carbon content, and drills and cutting tools from high carbon steel.

2. The Nature of Materials Science

During the last generation we have witnessed and benefited from the development of numerous new technological systems, such as nuclear power plants, satellites, computers, lasers, etc. Each of these has been advanced by the development of materials with new and exotic properties.

The properties of materials have dictated nearly every design and every useful application that the engineer could devise. But with the present sophistication of our engineering science, it is no longer simply a question of being satisfied to design with existing materials. We are now requiring new materials with new properties to fit our designs. This is true in all fields of engineering, whether it be the mechanical engineer trying to design high-strength, lightweight casings for rocket hulls, the