

<<材料科学与工程基础>>

图书基本信息

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前言

随着我国国际交流与合作不断深入，双语教学也逐渐受到各大学的重视并率先在部分基础课和专业基础课中进行了尝试，取得了良好的效果。

双语教学与外语教学不同，它是通过外文载体传授学科知识，使学生通过外文而不是中文去理解和掌握专业知识和理论，为学生奠定一个良好的外语环境。

工程材料是我校最早被选定作为双语教学的课程之一，在教学内容选择、教学方法研讨、教学理念更新上进行了有益的探索。

但是，教材问题长期困扰课程建设，影响该课程教学效果的进一步提高。

国外原版教材虽然具有内容先进、信息量大、数据翔实、图表案例丰富、语言纯正、印刷美观等特点，但它存在着教材结构、体系、标准与国内不同的问题，而且有些原版教材篇幅过大，内容与我国现行教学基本要求不太一致。

为此，解决工程材料课程的教材问题成为双语教学课程建设的瓶颈。

本书是在参考国外权威教材的基础上，编写的涉及材料科学与工程的发展前沿、内容难易程度适中、概念阐述与具体实例紧密结合、便于学生学习与理解学科知识的工程材料英文教材。

全书共分7章，分别阐述了晶体结构与晶体缺陷、金属机械性能、二元合金相图、铁碳合金相图、钢的热处理、碳钢及合金钢、有色金属及合金等机械类专业基础内容。

系统地介绍了金属的化学成分、组织结构、机械性能和应用特点方面的基本概念及基础知识。

本书具有如下特点：（1）为了使能够顺畅地与外国专家进行学术交流，同时还能熟练地与国内的工程技术人员进行技术探讨，我们在编写钢的热处理、碳钢及合金钢、有色金属及合金等章节时，详细地叙述了国内外金属材料分类标准、牌号的使用等。

（2）专业学科知识里出现的英文词汇往往具有音节多、出现频度少、常附有前后缀等特点，为便于学生阅读连贯，对关键词、基本概念、基本定义加上汉语注释。

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内容概要

本书共分7章，分别阐述了晶体结构与晶体缺陷、金属机械性能、二元合金相图、铁碳合金相图、钢的热处理、碳钢及合金钢、有色金属及合金等机械类专业基础内容。

系统地介绍了金属的化学成分、组织结构、机械性能和应用特点方面的基本概念及基础知识。

本书可作为高等工科院校机械类及近机类专业的重要技术基础课程用书，同时可供从事材料研究与应用的工程技术人员作为了解专业知识，提高专业英语水平的阅读材料。

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章节摘录

Electronic Materials Electronic materials are not a major type of material by volume but are an extremely important type of material for advanced engineering technology. The most important electronic material is pure silicon that is modified in various ways to change its electrical characteristics. A multitude of complex electronic circuits can be miniaturized on a silicon chip that is about $3/4$ in. square (1.90 cm square). Microelectronic devices have made possible such new products as communication satellites, advanced computers, handheld calculators, digital watches, and welding robots. The properties of these various classes of materials are usually rather distinct. For instance, metals are opaque to light, and reflective. They are usually ductile, meaning that they can be bent before they break. They are electrically and thermally conducting. On the other hand, ceramics and glasses are usually brittle, can be transparent to light, and are good insulators. They are particularly useful at high temperatures or in corrosive environments, since they retain their properties. Most polymers, on the other hand, cannot withstand high temperatures. Most of them are insulators, and many are highly deformable which is the real meaning of the word "plastic", and some have unique elastic properties (rubber bands). Semiconductors, of course, are distinguished by their electrical behavior. All of these property characteristics, and the reasons they exist, are discussed in some detail in the chapters that follow.

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