

## <<材料科学与工程导论>>

### 图书基本信息

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## <<材料科学与工程导论>>

### 内容概要

本教材是材料科学与工程导论的双语教材，以现行“材料科学与工程导论”课程标准为依据，结合中文教材，以国外原版教材做参考并根据国内的教学情况及材料科学的研究的最新进展对教材内容进行适度的整合。

全书共分9章，具体内容包括：绪论，固体材料的结构，常用工程材料（高分子材料、金属材料、陶瓷材料和复合材料）的结构、力学性能、成分、加工工艺以及应用前景，常用工程材料的化学性能（耐腐蚀性能）和物理性能（电、磁、热和光学性能）以及新型材料（生物材料、纳米材料和智能材料）的介绍等内容。

本教材可供大专院校材料科学与工程及相关专业师生使用，也可供从事材料科学与工程研究、开发及管理的人员参考。

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### 书籍目录

#### Chapter 1 Introduction

##### Learning Objectives

- 1.1 Historical Perspective
- 1.2 What is Materials Science and Engineering?
- 1.3 Why Study Materials Science and Engineering?
- 1.4 Classification of Materials
- 1.5 Advanced Materials
- 1.6 Modern Materials' Needs

##### References

#### Chapter 2 The Structure of Crystalline Solids

##### Learning Objectives

- 2.1 Atomic Structure and Interatomic Bonding
  - 2.1.1 Fundamental Concepts
  - 2.1.2 Bonding Forces and Energies
  - 2.1.3 Atomic Bonding in Solids
- 2.2 Crystal Structures
  - 2.2.1 Fundamental Concepts
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  - 2.2.3 Crystallographic Points, Directions, and Planes
  - 2.2.4 Crystalline and Noncrystalline Materials
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  - 2.3.1 Point Defects in Metals
  - 2.3.2 Dislocations—Linear Defects
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- 3.2 Crystallization, Melting and Glass Transition Phenomena in Polymers
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4.4.2 Phase Diagrams

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#### 4.5 Applications and Processing of Metal Alloys

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4.5.2 Types of Metal Alloys

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4.5.4 Thermal Processing of Metals

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## Chapter 5 Ceramic Materials

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5.1.2 Ceramic Structures

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#### 5.2 Application and Processing of Ceramics

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### Chapter 8 Electrical/Thermal/Magnetic/Optical Properties of Materials

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Chapter 9 Biomaterials/Nanomaterials/Smart Materials

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  - 9.1.3 Brief Historical Background
- 9.2 Nanotechnology and Nanomaterials
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