

## <<现代热力学>>

### 图书基本信息

书名：<<现代热力学>>

13位ISBN编号：9787030255655

10位ISBN编号：7030255658

出版时间：2009-9

出版时间：科学出版社

作者：Ji-Tao WANG

页数：278

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

## <<现代热力学>>

### 内容概要

This book can be used as a textbook in universities and colleges for the modernization of the thermodynamics discipline. There are not too much mathematical deductions in this book, so it is also suitable for readers to read and learn by themselves. Based on the author's experiences, the modernization of the thermodynamics discipline is not easy, so the book is written in three levels. The first level is about 800 words in Preface; the second level is an outline of about 8 000 words in Chapter 1, which was originally a reply in 2006 to a reviewer, a person described in his own words as being "through my personal journey through the realm of equilibrium thermodynamics and nonequilibrium thermodynamics and through my own work therein over decades"; and the third level is the detailed discussions in other parts of the whole book.

# <<现代热力学>>

## 书籍目录

1 An Outline of Modern Thermodynamics 1.1 Challenges to the Second Law of Thermodynamics Coming from Two Sides 1.2 Root of Puzzlement: Carnot Theorem 1.3 Uncertainty or Incompleteness of Clausius Inequality 1.4 Classification of Thermodynamics in the Current 21 st Century 1.5 A Typical Case of Nondissipative Thermodynamics: Nonequilibrium Phase Diagrams 1.6 A Typical Case of Dissipative Thermodynamics: Spiral Reactions 1.7 Out-of-Thermodynamics for Reciprocal Relations 1.8 Out-of-Thermodynamics Model for Dissipative Structures 1.9 Dissipation Decrease Theorem 1.10 Some Fundamental Concepts and Definitions 1.11 Conclusion of this Outline References2 Brief Histories of Thermodynamics 2.1 Ancient Knowledge on Heat 2.2 Carnot Theorem 2.3 The Nature of Heat 2.4 The First Law of Thermodynamics 2.5 Absolute Scale of Temperature 2.6 The Second Law of Thermodynamics 2.7 Entropy and Entropy Increase Principle 2.8 Macroscopic Rules for Collective Motion of a Large Amount of Particles 2.9 Development and Limitation of Classical Thermodynamics 2.10 Exploration of Modern Thermodynamics in the 20 th Century References3 Fundamentals of Classical Thermodynamics 3.1 Some Fundamental Concepts in Classical Thermodynamics 3.1.1 System and Surroundings 3.1.2 Equilibrium State and Nonequilibrium State 3.1.3 State Variables and State Functions 3.1.4 Reversible, Irreversible and Quasistatic Processes 3.1.5 Spontaneous and Nonspontaneous Processes 3.2 Mathematical Expressions of Basic Laws of Thermodynamics 3.2.1 Expression of the First Law of Thermodynamics 3.2.2 Expression of the Second Law of Thermodynamics 3.3 Classical Equilibrium Thermodynamics 3.4 Classical Nonequilibrium Thermodynamics 3.5 Criterion of Equilibrium 3.6 Calculation of Entropy Changes 3.7 Relationship between Gibbs Free Energy and T or p 3.8 Relationship between Chemical Potential and T or p 3.9 Gibbs Free Energy Changes of Chemical Reactions References4 Fundamentals of Modern Thermodynamics 4.1 Introduction 4.2 General Mathematical Expressions of Basic Laws 4.3 Local Equilibrium Approximation 4.4 Calculations of Entropy Productions 4.4.1 For Heat Conduction 4.4.2 For Heat Conduction together with Matter Transport 4.4.3 General Expressions for Entropy Production Calculations 4.5 Thermodynamic Coupling of Modern Thermodynamics 4.6 Schrödinger's "Negative Entropy" Conjecture 4.7 Chemiosmotic Coupling Theory for ATP Biosynthesis 4.8 Classical and Traditional Classifications of Thermodynamics 4.8.1 Classical Classifications of Thermodynamics 4.8.2 Traditional Classifications of Thermodynamics 4.9 Modern Classification of Thermodynamics 4.10 Extended Carnot Theorem 4.11 Dissipation (or Entropy Production) Decrease Theorem References5 Dissipative Thermodynamics 5.1 Dissipative Thermodynamics 5.2 Linear Dissipative Thermodynamics and Onsager Reciprocal Relations 5.3 Cyclical Reactions 5.4 Entropy Production Minimization Principle 5.5 Approximation of Onsager Reciprocal Relations 5.6 Nonlinear Dissipative Thermodynamics and Prigogine Dissipative Structures 5.7 Bernard Pattern 5.8 Laser Emission 5.9 Chemical Oscillation and "Brusselator" 5.10 Turing Structures and Propagating Waves 5.11 Prigogine's Carelessness on Thermodynamic Coupling 5.12 Thermodynamic Coupling Model of Spiral Reactions References6 Thermodynamics Coupling Model for Activated Low-Pressure Diamond Growth 6.1 High-Pressure Diamond Syntheses 6.2 Activated Low-Pressure Diamond Growth from the Vapor Phase 6.3 Preferential Etching Kinetic Model of SAH 6.4 Some Thermodynamic Models of the 1980s 6.4.1 Quasiequilibrium Model 6.4.2 Surface Reaction Thermodynamics Model 6.4.3 Defect-Induced Stabilization Model 6.5 Thermodynamic Coupling Model 6.6 Mechanism of Thermodynamic Coupling in Low-Pressure Diamond Growth 6.7 Other Thermodynamic Models in 1990s for Low-Pressure Diamond Growth 6.7.1 Unified Barrier Model 6.7.2 Charged Cluster Model 6.7.3 Under-Saturated Crystal Growth Model 6.8 "Nanothermodynamics" Model in 2005 References7 Nondissipative Thermodynamics and Binary Nonequilibrium Phase Diagrams 7.1 An ABC in Mathematics 7.2 The Nature of CALPHAD 7.3 Nondissipative Thermodynamics and Nonequilibrium Phase Diagrams 7.4 Thermodynamic Data of Activated Graphite 7.4.1 Gibbs Free Energy Method 7.4.2 Equilibrium Constant Method 7.5 Calculation Principle of Nonequilibrium Phase Diagrams 7.6 Calculation Method of Nonequilibrium Phase Diagrams 7.6.1 Detailed Calculation Steps 7.6.2 Different Kinds of Phase Lines 7.7 T - X Nonequilibrium Phase Diagrams for C-H System 7.8 T - p - X

# <<现代热力学>>

Nonequilibrium Phase Diagrams for C-H and C-O Systems 7.9 T - X Nonequilibrium Phase Diagrams for C-(H+O) Systems 7.10 Gas Composition Nonequilibrium Phase Diagrams for C-H Systems 7.11 Influences of Gas Composition on Orientation of Crystal Growth References8 Nondissipative Thermodynamics and Ternary Nonequilibrium Phase Diagrams 8.1 Bachmann's Empirical Phase Diagram 8.2 Projective Nonequilibrium Phase Diagrams for C-H-O Systems 8.3 Influences of T and p on Projective Phase Diagrams for C-H-O Systems 8.4 Marinelli's Critical Experimental Phase Diagram 8.5 Cross-Section Nonequilibrium Phase Diagrams for C-H-O Systems 8.6 Nonequilibrium Phase Diagrams for C-H-X Systems 8.7 Nonequilibrium Phase Diagrams for Low-Pressure cBN Syntheses 8.8 Evaluations and Brief Summary on Nonequilibrium Phase Diagrams References9 Carat-Size Low-Pressure Diamonds and Other Thermodynamic Issues 9.1 Carat-Size Gem-Quality Low-Pressure Diamond Growth 9.2 Fluctuation of Equilibrium States and Stationary Nonequilibrium States 9.3 Some Discussions on Classification of Thermodynamics 9.4 What is "Thermodynamics" and What is "the Second Law of Thermodynamics" 9.5 Thermodynamic Weakness of Physicists--Complex Systems 9.6 About "Nonequilibrium Thermodynamics of Small Systems" 9.7 Conclusion of this Book ReferencesIndex

## <<现代热力学>>

### 版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>