

1. Record Nr.	UNINA9910810806803321
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Titolo	Classical and geometrical theory of chemical and phase thermodynamics // Frank Weinhold
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, c2009
ISBN	1-282-02793-X 9786612027932 0-470-43506-2 0-470-43505-4
Edizione	[1st ed.]
Descrizione fisica	1 online resource (506 p.)
Classificazione	UG 3800 VE 6000
Disciplina	541.369
Soggetti	Phase rule and equilibrium Thermodynamics Thermodynamics - Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	CLASSICAL AND GEOMETRICAL THEORY OF CHEMICAL AND PHASE THERMODYNAMICS; CONTENTS; PREFACE; PART I INDUCTIVE FOUNDATIONS OF CLASSICAL THERMODYNAMICS; 1. Mathematical Preliminaries: Functions and Differentials; 1.1 Physical Conception of Mathematical Functions and Differentials; 1.2 Four Useful Identities; 1.3 Exact and Inexact Differentials; 1.4 Taylor Series; 2. Thermodynamic Description of Simple Fluids; 2.1 The Logic of Thermodynamics; 2.2 Mechanical and Thermal Properties of Gases: Equations of State; 2.3 Thermometry and the Temperature Concept; 2.4 Real and Ideal Gases 2.4.1 Compressibility Factor and Ideal Gas Deviations 2.4.2 Van der Waals and Other Model Equations of State; 2.4.3 The Virial Equation of State; 2.5 Condensation and the Gas-Liquid Critical Point; 2.6 Van der Waals Model of Condensation and Critical Behavior; 2.7 The Principle of Corresponding States; 2.8 Newtonian Dynamics in the Absence of Frictional Forces; 2.9 Mechanical Energy and the Conservation Principle; 2.10 Fundamental Definitions: System, Property, Macroscopic, State; 2.10.1 System; 2.10.2 Property; 2.10.3 Macroscopic; 2.10.4 State; 2.11

## The Nature of the Equilibrium Limit

3. General Energy Concept and the First Law  
3.1 Historical Background of the First Law; 3.2 Reversible and Irreversible Work; 3.3 General Forms of Work; 3.3.1 Pressure-Volume Work; 3.3.2 Surface Tension Work; 3.3.3 Elastic Work; 3.3.4 Electrical (emf) Work; 3.3.5 Electric Polarization Work; 3.3.6 Magnetic Polarization Work; 3.3.7 Overview of General Work Forms; 3.4 Characterization and Measurement of Heat; 3.5 General Statements of the First Law; 3.6 Thermochemical Consequences of the First Law; 3.6.1 Heat Capacity and the Enthalpy Function; 3.6.2 Joule's Experiment  
3.6.3 Joule-Thomson Porous Plug Experiment  
3.6.4 Ideal Gas Thermodynamics; 3.6.5 Thermochemistry: Enthalpies of Chemical Reactions; 3.6.6 Temperature Dependence of Reaction Enthalpies; 3.6.7 Heats of Solution; 3.6.8 Other Aspects of Enthalpy Decompositions; 4. Engine Efficiency, Entropy, and the Second Law; 4.1 Introduction: Heat Flow, Spontaneity, and Irreversibility; 4.2 Heat Engines: Conversion of Heat to Work; 4.3 Carnot's Analysis of Optimal Heat-Engine Efficiency; 4.4 Theoretical Limits on Perpetual Motion: Kelvin's and Clausius' Principles; 4.5 Kelvin's Temperature Scale  
4.6 Carnot's Theorem and the Entropy of Clausius  
4.7 Clausius' Formulation of the Second Law; 4.8 Summary of the Inductive Basis of Thermodynamics; PART II GIBBSIAN THERMODYNAMICS OF CHEMICAL AND PHASE EQUILIBRIA; 5. Analytical Criteria for Thermodynamic Equilibrium; 5.1 The Gibbs Perspective; 5.2 Analytical Formulation of the Gibbs Criterion for a System in Equilibrium; 5.3 Alternative Expressions of the Gibbs Criterion; 5.4 Duality of Fundamental Equations: Entropy Maximization versus Energy Minimization; 5.5 Other Thermodynamic Potentials: Gibbs and Helmholtz Free Energy  
5.6 Maxwell Relations

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### Sommario/riassunto

Because it is grounded in math, chemical thermodynamics is often perceived as a difficult subject and many students are never fully comfortable with it. The first authoritative textbook presentation of equilibrium chemical and phase thermodynamics in a reformulated geometrical framework, *Chemical and Phase Thermodynamics* shows how this famously difficult subject can be accurately expressed with only elementary high-school geometry concepts. Featuring numerous suggestions for research-level extensions, this simplified alternative to standard calculus-based thermodynamics expositions is perfect

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