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Temperature Scale and Thermodynamic Efficiency; 8. Maximum Efficiency; 9. Additional Use of the Reversible Environment; 10. Conversion of Heat into Work; 11. The Principle of Caratheodory; 12. Efficiency in Engineering Problems; 13. The Helmholtz and Gibbs Free Energies; 14. Legendre Transformations and Maxwell Relations; V - Ideal Substances; 1. Equation of State; 2. The Ideal Gas; 3. Internal Energy of the Ideal Gas and Relation between the Kelvin and Thermodynamic Scales; 4. Variation of the Entropy of an Ideal Gas
5. The Entropy of Mixing of Two Ideal Gases6. Ideal Solutions; 7. for a Component of an Ideal Solution and Proof that the Volume of Mixing is Zero; VI - Some Useful Formulas; 1. Compressibility and Expansivity and the Relation between Cu and Cv; 2. Energetics of the Free Expansion of a Gas; 3. The Joule-Thomson Coefficient; 4. Relation of Enthalpy and Entropy to Heat Capacity; 5. Magnetic Substances; VII - Internal Equilibrium and the Extremal Properties of the Entropy; 1. Extremal Condition on the Entropy; 2. A One-Component, Two-Phase System; 3. "Feature" of Equilibrium
4. Internal PotentialsVIII - Thermodynamic Potentials; 1. Concept of the Thermodynamic Potential; 2. An Elementary Method; 3. Sign of the Work Performed by the Variational Constraint; 4. The Sign of -w1rev; 5. Thermodynamic Potentials and Extremal Conditions; 6. Generalized Feature of Equilibrium; 7. Alternative Representations of the Chemical Potential; 8. Proof of the Conditions of Internal Equilibrium using either U, H, A, or G; 9. Generalization to any Number of Phases with any Number of Components; 10. The Phase Rule; 11. Chemical Potential as a Partial Molar Quantity; 12. Open Systems
IX - Phase Equilibria in Simple Systems

Sommario/riassunto

Since there is no shortage of excellent general books on elementary thermodynamics, this book takes a different approach, focusing attention on the problem areas of understanding of concept and especially on the overwhelming but usually hidden role of ""constraints"" in thermodynamics, as well as on the lucid exposition of the significance, construction, and use (in the case of arbitrary systems) of the thermodynamic potential. It will be especially useful as an auxiliary text to be used along with any standard treatment.Unlike some texts, Methods of Thermodynamics does not use statistical m