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and Internal Energy; 3.5.3 Heat and Enthalpy; 3.6 Mathematical Interlude II: Partial Derivatives; 3.6.1 Relations Between Partials of Dependent Variables; 3.6.2 Relations Between Partials with Different Subscripts; 3.7 Other Applications of the First Law; 3.7.1 C(P) - C(V); 3.7.2 Isothermal Change, Ideal Gas
3.7.3 Adiabatic Change, Ideal Gas3.7.4 The Joule and the Joule-Thomson Coefficients; 4 THE LAWS OF THERMODYNAMICS II; 4.1 The Second Law-Traditional Approach; 4.2 Engine Efficiency: Absolute Temperature; 4.2.1 Ideal Gas; 4.2.2 Coupled Cycles; 4.3 Generalization: Arbitrary Cycle; 4.4 The Clausius Inequality; 4.5 The Second Law-Axiomatic Approach (Caratheodory); 4.6 Mathematical Interlude III: Pfaffian Differential Forms; 4.7 Pfaffian Expressions in Two Variables; 4.8 Pfaffian Expressions in More Than Two Dimensions; 4.9 Caratheodory's Theorem; 4.10 Entropy-Axiomatic Approach
4.11 Entropy Changes for Nonisolated Systems4.12 Summary; 4.13 Some Applications of the Second Law; 4.13.1 Reversible Processes (PV Work Only); 4.13.2 Irreversible Processes; 5 USEFUL FUNCTIONS: THE FREE ENERGY FUNCTIONS; 5.1 Mathematical Interlude IV: Legendre Transformations; 5.1.1 Application of the Legendre Transformation; 5.2 Maxwell Relations; 5.3 The Gibbs-Helmholtz Equations; 5.4 Relation of DA and DG to Work: Criteria for Spontaneity; 5.4.1 Expansion and Other Types of Work; 5.4.2 Comments; 5.5 Generalization to Open Systems and Systems of Variable Composition
5.5.1 Single Component System5.5.2 Multicomponent Systems; 5.6 The Chemical Potential; 5.7 Mathematical Interlude V: Euler's Theorem; 5.8 Thermodynamic Potentials; 6 THE THIRD LAW OF THERMODYNAMICS; 6.1 Statements of the Third Law; 6.2 Additional Comments and Conclusions; 7 GENERAL CONDITIONS FOR EQUILIBRIUM AND STABILITY; 7.1 Virtual Variations; 7.2 Thermodynamic Potentials-Inequalities; 7.3 Equilibrium Condition From Energy; 7.3.1 Boundary Fully Heat Conducting, Deformable, Permeable (Normal System); 7.3.2 Special Cases: Boundary Semi-Heat Conducting, Semi-Deformable, or Semi-Permeable
7.4 Equilibrium Conditions From Other Potentials

Sommario/riassunto

In this clear and concise introduction to thermodynamics and statistical mechanics the reader, who will have some previous exposure to thermodynamics, will be guided through each of the two disciplines separately initially to provide an in-depth understanding of the area and thereafter the connection between the two is presented and discussed.In addition, mathematical techniques are introduced at appropriate times, highlighting such use as: exact and inexact differentials, partial derivatives, Caratheodory's theorem, Legendre transformation, and combinatory analysis.* Emphasis is place