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Disciplina	536.7
Soggetti	Thermodynamics Chemistry, Physical and theoretical Heat engineering Heat - Transmission Mass transfer Low temperatures Phase transformations (Statistical physics) Computational complexity Physical Chemistry Engineering Thermodynamics, Heat and Mass Transfer Low Temperature Physics Phase Transitions and Multiphase Systems Complexity
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Nota di contenuto	I. FUNDAMENTAL PRINCIPLES -- 1. The macroscopic observer -- 2. The concept of empirical temperature -- 3. The first Principle of Thermodynamics -- 4. The second Principle of Thermodynamics -- 5. Efficiency of thermal engines -- 6. The Fundamental Relation and the thermodynamic potentials -- 7. Maxwell Relations -- II. APPLICATIONS -- 8. One component Systems -- 9. van der Waals equation -- 10. Phase transitions -- 11.Surface Systems -- 12.Electrostatic Fields -- 13.Magnetic Fields -- 4.Thermodynamics of radiation -- 15.Osmotic phenomena and complex fluids -- 16.Low temperatures -- III.

IRREVERSIBLE PROCESSES -- 17.Irreversible processes -- 18. Thermodynamics of continua -- IV. BIBLIOGRAPHY -- Bibliography -- V. ANALYTICAL LIST -- VI. APPENDIXES -- A. Appendix 1. Two useful mathematical relations -- B. Appendix 2. The pressure exerted by a particle gas -- C. Appendix 3. M. Planck and the problem of black-body radiation -- D. Appendix 4. Thermodynamics and Information.

Sommario/riassunto

This book offers a comprehensive overview of thermodynamics. It is divided into four parts, the first of which equips readers with a deeper understanding of the fundamental principles of thermodynamics of equilibrium states and of their evolution. The second part applies these principles to a series of generalized situations, presenting applications that are of interest both in their own right and in terms of demonstrating how thermodynamics, as a theory of principle, relates to different fields. In turn, the third part focuses on non-equilibrium configurations and the dynamics of natural processes. It discusses both discontinuous and continuous systems, highlighting the interference among non-equilibrium processes, and the nature of stationary states and of fluctuations in isolated systems. Lastly, part four introduces the relation between physics and information theory, which constitutes a new frontier in fundamental research. The book includes step-by-step exercises, with solutions, to help readers to gain a fuller understanding of the subjects, and also features a series of appendices providing useful mathematical formulae. Reflecting the content of modern university courses on thermodynamics, it is a valuable resource for students and young scientists in the fields of physics, chemistry, and engineering.