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By S. R. De Groot, P. Mazur, Physics

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The study of thermodynamics is especially timely today, as its concepts are being applied to problems in biology, biochemistry, electrochemistry, and engineering. This book treats irreversible processes and phenomena — non-equilibrium thermodynamics.

S. R. de Groot and P. Mazur, Professors of Theoretical Physics, present a comprehensive and insightful survey of the foundations of the field, providing the only complete discussion of the fluctuating linear theory of irreversible thermodynamics. The application covers a wide range of topics: the theory of diffusion and heat conduction, fluid dynamics, relaxation phenomena, acoustical relaxation, and the behavior of systems in an electromagnetic field.

The statistical foundations of non-equilibrium thermodynamics are treated in detail, and there are special sections on fluctuation theory, the theory of stochastic processes, the kinetic theory of gases, and the derivation of the Onsager reciprocal relations. The implications of causality conditions and of dispersion relations are analyzed in depth.

Advanced students will find a great number of challenging problems, with hints for their solutions. Chemists will be especially interested in the applications to electrochemistry and the theory of chemical reactions. Physicists, teachers, scholars, biologists, and anyone interested in the principle and modern applications of non-equilibrium thermodynamics will find this classic monograph an invaluable reference.

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