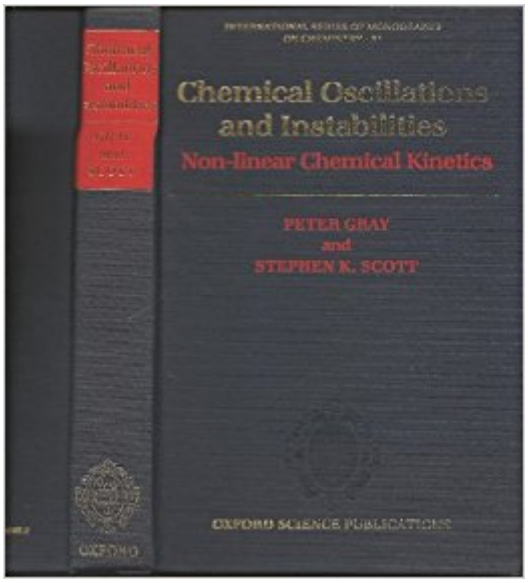
Chemical Oscillations And Instabilities: Non-linear Chemical Kinetics (International Series Of Monographs On Chemistry)



Synopsis

Today, scientists in many fields are expressing considerable interest in non-linearity and the ideas of oscillations and chaos. Chemical reactions provide perfect examples of these phenomena. This book is an excellent introduction to the area of nonlinear phenomena in chemical kinetics that involve chemical feedback such as chain branching, autocatalysis, and self-heating. The emphasis is on physical and pictorial representation, and on identifying those gross features which are essential. The experimental conditions under which such behavior will occur can be predicted using simple mathematical recipes, and these are also included. Readers will find full discussions of long-lived oscillations for autocatalytic or exothermic reactions in closed vessels and stationary states, bistability, and oscillations in continuous flow reactors and diffusion cells. Other topics considered include chemical wave propagation, pattern selection and formation, heterogeneous reactions, complex oscillations, quasiperiodicity, and chemical chaos, both forced and spontaneous. The second part of the book describes actual experimental systems, such as the Belousov-Zhabotinskii reaction, and include discussion of the behavior of important gas-phase reactions. This volume is an ideal sourcebook of applied problems for graduate courses in dynamical systems, advanced chemical kinetics, and chemical reactor engineering, as well as for research workers in physical chemistry, and mathematicians, biologists, physicists, and physiologists.

Book Information

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Customer Reviews

"This is a timely and authoritative introduction to the specifically chemical aspects of dynamical instabilities. It complements several recent books that focus on mathematical and physical principles." --Journal of the American Chemical Society --This text refers to the Paperback edition.

Peter Gray is also Visiting Professor, University of Leeds --This text refers to the Paperback edition.

A very good introduction to the subject. Absolutely wonderful. I read this book in my chemistry graduate and I love it.

Chemical Oscillations and Instabilities: Non-linear Chemical Kinetics (International Series of Monographs on Chemistry) An Introduction to Nonlinear Chemical Dynamics: Oscillations, Waves, Patterns, and Chaos (Topics in Physical Chemistry) Kinetics of Chemical Processes: Butterworth-Heinemann Series in Chemical Engineering Chemical Kinetics and Reaction Dynamics (Dover Books on Chemistry) Combustion Instabilities in Liquid Rocket Engines: Testing and Development Practices in Russia (Progress in Astronautics & Aeronautics) (Progress in Astronautics and Aeronautics) Radiochemistry and Nuclear Methods of Analysis (Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications) Handbook of Coal Analysis (Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications) High-Speed Countercurrent Chromatography (Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications) Reaction Kinetics and Reactor Design, Second Edition (Chemical Industries) Chemical Kinetics and Dynamics (2nd Edition) Introduction to Chemical Reaction Engineering and Kinetics Chemical Reaction Kinetics: Concepts, Methods and Case Studies Chemical Kinetics (3rd Edition) The Chemistry of Heterocyclic Compounds, The Pyrazines Supplement I (Chemistry of Heterocyclic Compounds: A Series Of Monographs, Vol. 58) Physics for Scientists and Engineers, Vol. 1, 6th: Mechanics, Oscillations and Waves, Thermodynamics, Transition Metal Oxides: An Introduction to Their Electronic Structure and Properties (The International Series of Monographs on Chemistry) Unimolecular Reaction Dynamics: Theory and Experiments (International Series of Monographs on Chemistry) Density-Functional Theory of Atoms and Molecules (International Series of Monographs on Chemistry) Fundamental Algebraic Geometry (Mathematical Surveys and Monographs) (Mathematical Surveys and Monographs Series (Sep.Title P) Systems of Conservation Laws 2: Geometric Structures, Oscillations, and