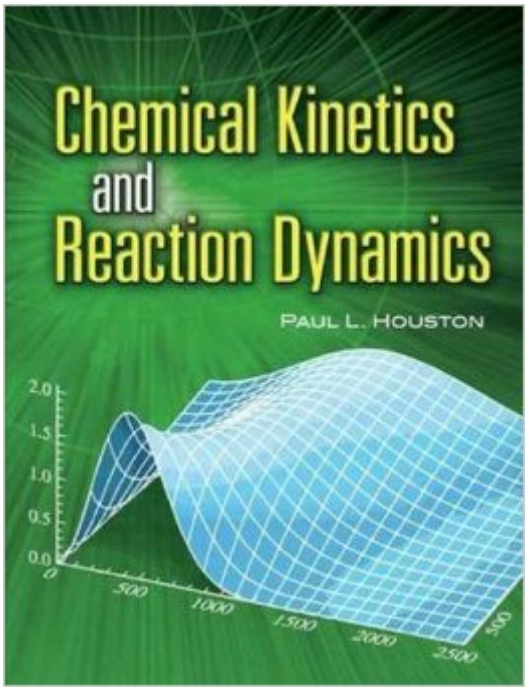
Chemical Kinetics And Reaction Dynamics (Dover Books On Chemistry)



Synopsis

This text teaches the principles underlying modern chemical kinetics in a clear, direct fashion, using several examples to enhance basic understanding. It features solutions to selected problems, with separate sections and appendices that cover more technical applications.Each chapter is self-contained and features an introduction that identifies its basic goals, their significance, and a general plan for their achievement. This text’s important aims are to demonstrate that the basic kinetic principles are essential to the solution of modern chemical problems, and to show how the underlying question — "How do chemical reactions occur?" — leads to exciting, vibrant fields of modern research. The first aim is achieved by using relevant examples in presenting the basic material, and the second is attained by inclusion of chapters on surface processes, photochemistry, and reaction dynamics.

Book Information

Series: Dover Books on Chemistry

Paperback: 348 pages

Publisher: Dover Publications (November 17, 2006)

Language: English

ISBN-10: 0486453340

ISBN-13: 978-0486453347

Product Dimensions: 8.3 x 0.7 x 11 inches

Shipping Weight: 1.5 pounds (View shipping rates and policies)

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Customer Reviews

Chemical kinetics and reaction dynamics are not easy subjects, demanding quite a lot of physics in some complicated settings. Thus, it is all the more impressive that Paul Houston has managed to write this extraordinarily clear and concise text that is accessible to an advanced undergraduate.Do not get me wrong; the prerequisites for this book are extensive. A good grasp of basic newtonian mechanics, quantum mechanics, spectroscopy, and statistical thermodynamics are musts. But nothing is needed beyond what can be expected from a good, stiff one-year course in physical

chemistry.From the first chapter on the kinetic theory of gases, Houston's focus on the physics - on keeping derivations short and clear, on connecting formulae with sound physical intuition - is striking. It does not lag as the book goes on. Houston continues with a clean exposition of empirical chemical kinetics and how to integrate and/or simplify the resulting differential equations. The grungy business of theoretical kinetics - how to kludge your way to a theoretical gas-phase reaction rate constant - is well treated after that. In the third chapter, Houston delivers an elegant and unified flux-driven treatment of transport phenomena. He gets the basic equations correct up to a numerical factor with a minimum of effort. This is beautiful; I wish chemical engineers would read this before beginning their own transport travails! There are then several chapters on the chemistry of more complicated systems, like solution-phase, solid surface-phase, and photochemical reactions. While I haven't read these, I am sure they are wonderful. The high point, in my opinion, is the final chapter on reaction dynamics. Its ongoing tacit motivation is the question, "How does a hydrogen fluoride laser work?

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