



Molecular Reaction Dynamics and Chemical Reactivity

By Raphael D. Levine, Richard B. Bernstein



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Focusing on one of the most productive areas of modern chemical research, this text describes the molecular-level mechanisms of elementary chemical reactions and presents the contributions of molecular beam and laser techniques. The authors assume a basic familiarity with physical chemistry as they guide the reader from well-known principles to state-of-the-art research results. The goal is an understanding of chemical reactivity and physical rate processes, from the fundamental, microscopic point of view, with emphasis on phenomena and their conceptual interpretation rather than the details of experimental techniques or theories. The authors have collaborated over many years and are the co-authors of the precursor volume *Molecular Reaction Dynamics* (Oxford University Press, 1974). This completely new work discusses the following topics: dynamics of molecular collisions; intermolecular potentials and potential energy surfaces; molecular and ion beam scattering; "direct" versus "complex" modes of reaction; reagent state selection and product analysis; energy partitioning and surprisal analysis; photofragmentation and multiphoton dissociation; electronic, vibrational, and rotational energy transfer; chemical lasers and laser chemistry; Van der Waals molecules and clusters; and stereospecific dynamics. An appropriate text for advanced courses in kinetics, physical chemistry or chemical physics, and also a timely reference source, *Molecular Reaction Dynamics and Chemical Reactivity* presents both fundamental principles and the latest developments in this rapidly advancing field.



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