

**Vibrationally Mediated Photodissociation.** By Salman (Zamik) Rosenwaks (Ben-Gurion University of the Negev, Beer Sheva, Israel). Royal Society of Chemistry: Cambridge. 2009. xvi + 204 pp. \$139.00. ISBN 978-0-85404-155-8.

Vibrationally mediated photodissociation (VMP) is a double-resonance technique in which molecules are excited to a specific vibrational state from which they are selectively photodissociated. The advantage over one-photon dissociation is that vibrationally excited molecules may reach regions of the excited-state potential energy surface that are inaccessible from the ground state due to symmetry or to a large change in geometry. An additional motivation for using VMP is to achieve bond-selective dissociation, using the vibrational excitation to control the products of dissociation. In addition, VMP provides a sensitive tool to measure vibrational action spectra, which is particularly useful in measuring vibrational overtones of molecules in molecular beams.

This book provides a comprehensive review of vibrationally mediated photodissociation studies of neutral molecules in the gas phase. After a brief introduction, the author discusses theoretical aspects of VMP. Because this involves several processes that have been extensively studied, e.g., vibrational excitation and coupling in the ground electronic state, as well as dynamics in the excited state, only a brief outline of each topic is presented, along with appropriate references to books and reviews. Experimental techniques used to prepare vibrationally excited—often highly excited—molecules are then presented, along with methods that are used to characterize the identity and quantum states of products of dissociation, as well as the kinetic energy release and anisotropy. The heart of the book is a detailed description of VMP studies, sorted by size of molecule. Diatomic molecules are discussed briefly, whereas triatomics are covered extensively. An entire chapter is devoted to water and its isotopomers. This is appropriate, considering the large array of studies that explore how the initial vibrational state affects bond-selective dissociation of HOD and product quantum states and correlations in H<sub>2</sub>O, HOD, and D<sub>2</sub>O. Among tetra-atomics, studies of acetylene, ammonia, hydrogen peroxide, and isocyanic acid are discussed in detail. A final chapter presents results on larger molecules, particularly methylamine,

ethane, and haloalkanes. The coverage of studies on each molecule is comprehensive, and the author reviews and synthesizes results, with good coverage of recent work. In a final section, he notes recent applications of VMP to measure vibrational spectra of ions and clusters and includes a list of very recent references added in proof.

This is an excellent reference for practitioners in the field. It is also a good supplementary text for graduate or advanced undergraduate classes in photodissociation dynamics or dynamics of vibrationally excited molecules, in conjunction with a text that provides more extensive theoretical treatment.

**Ricardo B. Metz**, *University of Massachusetts Amherst*

JA9093296

10.1021/ja9093296

**Macromolecules, Volume 4: Applications of Polymers.** By Hans-Georg Elias (Michigan Molecular Institute, Midland). WILEY-VCH Verlag GmbH & Co. KGaA: Weinheim. 2009. xxxiv + 694 pp. \$290. ISBN 978-3-527-31175-0.

This fourth and final book of the series *Macromolecules* is preceded by Volume 1 on chemical structures and the principles of macromolecular synthesis (2005), Volume 2 on industrial polymers and their syntheses (2007), and Volume 3 on the physical structures and properties of single macromolecules and polymers (2008). The present volume covers the “applications of polymers as plastics, fibers, elastomers, thickeners, adhesives, coatings, dielectrics, etc.” and is organized into four parts covering introductory material; fundamentals of polymeric materials, adjuvants, processing, and testing; basic applications of polymers; and special applications of polymers. The book concludes with an Appendix that includes tables on SI quantities and units and conversions of units, as well as lists of definitions, abbreviations, and acronyms for fibers, rubbers, and plastics. An extensive subject index completes the book.

JA909401B

10.1021/ja909401b