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# ISOTOPE EFFECTS

## IN CHEMISTRY AND BIOLOGY

Edited by

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University of Iowa, Iowa City, USA



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Freie Universität Berlin, Germany

### FEATURES

- Introduces biological and environmental applications such as examination of enzyme mechanisms and hydrogen tunneling
- Addresses equilibrium isotope effects, isotope effects on hydrogen bond structure and dynamics, and isotopes in polymers and biopolymers
- Examines isotope effects in chemical dynamics, hydrogen isotope effects in organic reactions, and atmospheric, geologic, and extraterrestrial studies

### Anticipated Volume Highlights Multi-Disciplinary Nature of its Subject

The field of isotope effects has expanded exponentially in the last decade, and researchers are finding isotopes increasingly useful in their studies. Bringing literature on the subject up to date, **Isotope Effects in Chemistry and Biology** covers current principles, methods, and a broad range of applications of isotope effects in the physical, biological, and environmental sciences.

The authors first explain how kinetic, equilibrium, and anharmonic isotope effects are used to measure the ratio of reaction rates, the ratio between isotopes in thermodynamic equilibrium, and the geometric changes between molecules. The volume describes basic theories, including gas phase, simple condensed phase, small molecule studies, and applications of the Bigeleisen-Mayer theory before covering how isotopes affect molecular geometries, chemical bond breaking, formation and chemical dynamics, and hydrogen transfer. It explores novel, mass-independent isotope effects and problems encountered in hydrogen transfer, tunneling, and exchange. Authors also discuss isotope effects in organic and organometallic reactions and complex enzyme reactions and a unique chapter explores water isotope effects under pressure.

Written by internationally recognized researchers from 13 countries, some chapters summarize the perspective of a well-established subject while others review recent findings and on-going research that occasionally present controversial viewpoints using clear scientific arguments and discussion presented by all relevant authors. **Isotope Effects in Chemistry and Biology** brings together a wide scope of different perspectives and practical developments and applications into a comprehensive reference of isotope effects that reflect the most current state of the art.

### Contents

- Editorial  
Biography  
Theoretical Basis of Isotope Effects from an Autobiographical Perspective; *J. Bigeleisen*  
Enrichment of Isotopes; *T. Ishida and Y. Fujii*  
Comments on Selected Topics in Isotope Theoretical Chemistry; *M. Wolfsberg*  
Condensed Matter Isotope Effects; *W.A. Van Hook*  
Anharmonicities, Isotopes, and IR and NMR Properties of Hydrogen-Bonded Complexes; *J.E. Del Bene*  
Isotope Effects on Hydrogen-Bond Symmetrization in Ice and Strong Acids at High Pressure; *K. Aoki*  
Hydrogen Bond Isotope Effects Studied by NMR; *H-H. Limbach, G.S. Denisov and N.S. Golubev*  
Isotope Effects and Symmetry of Hydrogen Bonds in Solution: Single- and Double-Well Potential; *J.S. Lau and C.L. Perrin*  
NMR Studies of Isotope Effects of Compounds with Intramolecular Hydrogen Bonds; *P.E. Hansen*  
Vibrational Isotope Effects in Hydrogen Bonds; *Z. Mielke and L. Sobczyk*  
Isotope Selective Infrared Spectroscopy and Intramolecular Dynamics; *M. Hippler and M. Quack*  
Nonmass-Dependent Isotope Effects; *R.E. Weston, Jr.*  
Isotope Effects in the Atmosphere; *E. Roth, R. Létolle, C. M. Stevens, and F. Robert*  
Isotope Effects for Exotic Nuclei; *O. Matsson*  
Muonium — An Ultra-Light Isotope of Hydrogen; *E. Roduner*  
The Kinetic Isotope Effect in the Photo-Dissociation Reaction of Excited-State Acids in Aqueous Solutions; *E. Pines*  
The Role of an Internal-Return Mechanism on Measured Isotope Effects; *H.F. Koch*  
Vibrationally Enhanced Tunneling and Kinetic Isotope Effects in Enzymatic Reactions; *S.D. Schwartz*

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Kinetic Isotope Effects for Proton-Coupled Electron Transfer Reactions; *S. Hammes-Schiffer*

Kinetic Isotope Effects in Multiple Proton Transfer; *Z. Smedarchina, W. Siebrand, and A. Fernández-Ramos*

Interpretation of Primary Kinetic Isotope Effects for Adiabatic and Nonadiabatic Proton-Transfer Reactions in a Polar Environment; *P.M. Kiefer and J.T. Hynes*

Variational Transition-State Theory and Multidimensional Tunneling for Simple and Complex Reactions in the Gas Phase, Solids, Liquids, and Enzymes; *D.G. Truhlar*

Computer Simulations of Isotope Effects in Enzyme Catalysis; *A. Warshel, Mats H. M. Olsson, and J. Villà-Freixa*

Chapter 24 Oxygen-18 Isotope Effects as a Probe of Enzymatic Activation of Molecular Oxygen; *Justine P. Roth and Judith P. Klinman*

Chapter 25 Solution and Computational Studies of Kinetic Isotope Effects in Flavoprotein and Quinoprotein Catalyzed Substrate Oxidations as Probes of Enzymic Hydrogen

Tunneling and Mechanism; *J. Basran, L. Masgrau, M.J. Sutcliffe, and N.S. Scrutton*

Proton Transfer and Proton Conductivity in Condensed Matter Environment; *A.M. Kuznetsov and J. Ulstrup*

Mechanisms of CH-Bond Cleavage Catalyzed by Enzymes; *W. Siebrand and Z. Smedarchina*

Kinetic Isotope Effects as Probes for Hydrogen Tunneling in Enzyme Catalysis; *A. Kohen*

Hydrogen Bonds, Transition-State Stabilization, and Enzyme Catalysis; *R.L. Schowen*

Substrate and pH Dependence of Isotope Effects in Enzyme Catalyzed Reactions; *W.E. Karsten and P.F. Cook*

Catalysis by Alcohol Dehydrogenases; *B.V. Plapp*

Effects of High Hydrostatic Pressure on Isotope Effects; *D.B. Northrop*

Solvent Hydrogen Isotope Effects in Catalysis by Carbonic Anhydrase: Proton Transfer through Intervening Water Molecules; *D.N. Silverman and I. Elder*

Isotope Effects from Partitioning of Intermediates in Enzyme-Catalyzed Hydroxylation Reactions; *Paul F. Fitzpatrick*

Chlorine Kinetic Isotope Effects on Biological Systems; *P. Paneth*

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Enzyme Mechanisms from Isotope Effects; *W. W. Cleland*

Catalysis and Regulation in the Soluble Methane Monooxygenase System: Applications of Isotopes and Isotope Effects; *J.D. Lipscomb*

Secondary Isotope Effects; *A.C. Hengge*

Isotope Effects in the Characterization of Low Barrier Hydrogen Bonds; *P.A. Frey*

Theory and Practice of Solvent Isotope Effects; *D.M. Quinn*

Enzymatic Binding Isotope Effects and the Interaction of Glucose with Hexokinase; *B.E. Lewis and V.L. Schramm*

Index

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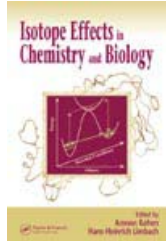
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