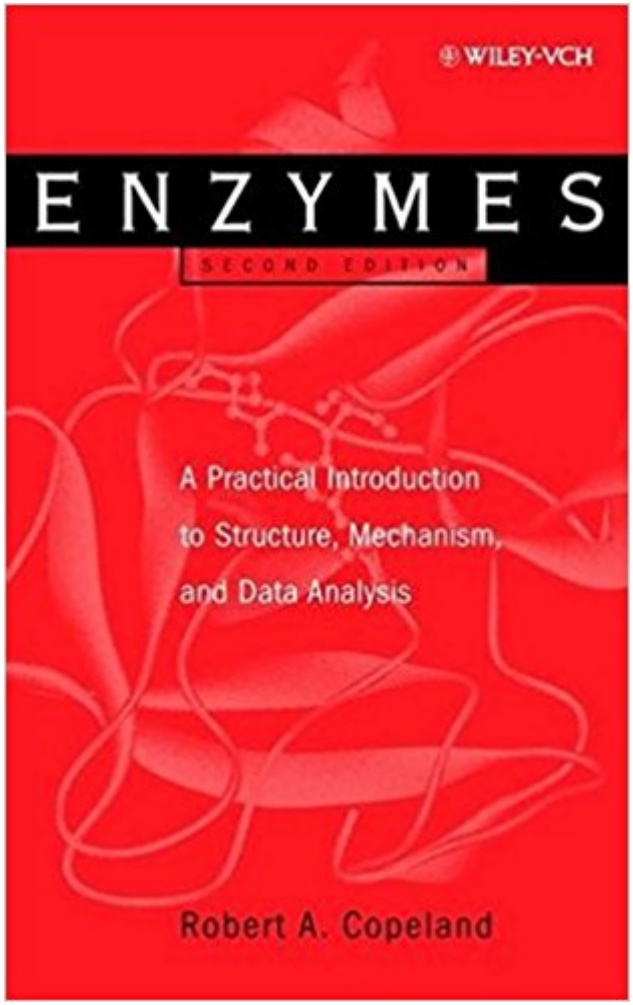
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Enzymes: A Practical Introduction To Structure, Mechanism, And Data Analysis



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Synopsis

Fully updated and expanded-a solid foundation for understanding experimental enzymology. This practical, up-to-date survey is designed for a broad spectrum of biological and chemical scientists who are beginning to delve into modern enzymology. Enzymes, Second Edition explains the structural complexities of proteins and enzymes and the mechanisms by which enzymes perform their catalytic functions. The book provides illustrative examples from the contemporary literature to guide the reader through concepts and data analysis procedures. Clear, well-written descriptions simplify the complex mathematical treatment of enzyme kinetic data, and numerous citations at the end of each chapter enable the reader to access the primary literature and more in-depth treatments of specific topics. This Second Edition of Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis features refined and expanded coverage of many concepts, while retaining the introductory nature of the book. Important new features include: A new chapter on protein-ligand binding equilibria Expanded coverage of chemical mechanisms in enzyme catalysis and experimental measurements of enzyme activity Updated and refined discussions of enzyme inhibitors and multiple substrate reactions Coverage of current practical applications to the study of enzymology Supplemented with appendices providing contact information for suppliers of reagents and equipment for enzyme studies, as well as a survey of useful Internet sites and computer software for enzymatic data analysis, Enzymes, Second Edition is the ultimate practical guide for scientists and students in biochemical, pharmaceutical, biotechnical, medicinal, and agricultural/food-related research.

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"...a welcome volume for any reader concerned with this important class of biological.... The book is interesting, informative, and very readable." (Choice, Vol. 38, No. 7, March 2001) "...an introductory textbook intended for senior undergraduate or graduate students...coverage includes chemical bonds and reactions, structural components of enzymes..." (SciTech Book News, March 2001) "...to describe this text in one word, I would say that it is thorough?a good text for those interested in enzyme mechanisms and kinetics." (Journal of Medicinal Chemistry, Vol. 45, No. 235, 2002)

Fully updated and expandeda solid foundation for understanding experimental enzymology This practical, up-to-date survey is designed for a broad spectrum of biological and chemical scientists who are beginning to delve into modern enzymology. Enzymes, Second Edition explains the structural complexities of proteins and enzymes and the mechanisms by which enzymes perform their catalytic functions. The book provides illustrative examples from the contemporary literature to guide the reader through concepts and data analysis procedures. Clear, well-written descriptions simplify the complex mathematical treatment of enzyme kinetic data, and numerous citations at the end of each chapter enable the reader to access the primary literature and more in-depth treatments of specific topics. This Second Edition of Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis features refined and expanded coverage of many concepts, while retaining the introductory nature of the book. Important new features include: A new chapter on protein-ligand binding equilibria Expanded coverage of chemical mechanisms in enzyme catalysis and experimental measurements of enzyme activity Updated and refined discussions of enzyme inhibitors and multiple substrate reactions Coverage of current practical applications to the study of enzymology Supplemented with appendices providing contact information for suppliers of reagents and equipment for enzyme studies, as well as a survey of useful Internet sites and computer software for enzymatic data analysis, Enzymes, Second Edition is the ultimate practical guide for scientists and students in biochemical, pharmaceutical, biotechnical, medicinal, and agricultural/food-related research.

This is an excellent go to book if you want to understand enzymology and the writing is clear and not overly complex.

The information in this book is a mixture of theory and practical knowledge. As such, it is intended for a person working on the bench. The author connects the dots between what was learned in the classroom and how to apply the knowledge in experiments. The book does not have problem sets and answers at the end of each chapter; it is not that kind of book.Lots of references are provided. When the author mentions something, especially something unusual, there are references. They are salient to the issue discussed.When designing common or uncommon experiments, different approaches to experimental techniques are discussed. It is up to the experimenter to choose which design to use. The author gives a good background of the pros and cons of different techniques, as well as the overall theory behind the technique. This allows an educated decision to be made.Had I read this book some time ago, I would have saved time by choosing the right experimental design.

I really enjoy reading this book and Dr. Copeland’s other book "Evaluation of enzyme Inhibitors". I work in a compound screening lab and his writings are very pertinent to the work we do. My only complaint is that the font size was decreased for the second edition, it makes it very hard to read even for a person with no eyesight problems like myself.

One of the must have entomology texts

.....not many people use steady state intial velocity measurements to gain insight into mechanism of biomolecules particularly enzymes these days. With that said, I do have to confess that I gave 4 stars to this book because1) I think this is the only book (in my opinion) that gives answers to questions like what type of parameters you can get from steady state initial velocity measurements and how far you can take steady-state measurements to.2) Occasionally, enzymes are not available in plenty, i.e., in substrate quantities and you are stuck with doing steady state kinetics and reading this book will be of use in this situation.Here are my thoughts on the book.The book begins with an introduction and a brief account of atoms, how they make bonds, what reactions are and why reactions have to be accelerated (rates). One thing that I found the book introduces nicely is that it clearly states how whether a reaction can occur or not depends on free energy (thermodynamics) but this does not tell us anything about the rates(1st and 2nd chapters).The third chapter discusses aspects of protein structure beginning with amino acids, primary, secondary structures etc., just like any other biochemical text. The only thing that it lacks is a section on RNA enzymes - because proteins are not the only molecules capable of catalyzing reactions and RNAs can be catalytic. There is the very familiar Tetrahymena ribozyme (an RNA that can act as an enzyme) discovered by

Tom Cech (he got the Nobel prize for the same).The fourth chapter focusses on enzyme-ligand binding equilbria. It also introduces the concepts of dissociation and association rate constants and how you can use these in determining the equilibrium binding constants. This is of practical importance because there are systems which take very long time to reach equilibrium and you cannot do equilibrium binding experiments - the only way here is to measure association and dissociation rate constants and get the binding constant from these. the chapter also has a nice table giving values of equilibrium constants and their corresponding free energy. commendable. my ohly concern is that it introduces linearizing of data such as reciprocal and double reciprocal plots which dont make intuitive sense and therefore not many good kineticists use them.the fifth chapter goes into introducing practical concepts such as what is expected to see in reaction plots when you mix substrate and enzymes together. does a good job but there is no mention of how concentrations of both should be taken into account - which determine whether the reaction is single turnover (Enzyme does its thing only once) or multiple turnover (enzyme does its thing more than once). remember, this book is for purely steady state analysis. you cannot get individual rate constants from doing multiple turnover reactions. all you get is kcat and Km.the sixth talks about mechanisms and the seventh about doing practical kinetics - here, it goes into why we see lag and burst in reactions sometimes. It also describes with some depth the effect of pH, why we have to maintain the pH, and destabilization of enzyme during reactions.chapters eight, nine, ten and eleven discuss inhibitor kinetics (reversible and tight binding) and kinetics of enzymes with multiple substrates. All of these deal with measurement of intial velocities, again, remember this is a book with steady-state kinetics. There are a lot of inverse velocity and inverse subtrate plots that I cannot make any intuitive sense out of. The final chapter deals with cooperativity. although it gives a reasonably good introduction on it, the kinetic aspect is dealt with superfically. there arent a lot of kinetic plots but again, this is steady state initial velocity measurements and you can only take it so far.

This book is written by an enzymologist who presented a course on enzymology at a pharmaceutical company, as well as at the University of Pennsylvania. It is a rather well- written book that covers both theoretical and practical aspects of enzyme studies. Black and white drawings and numerous graphs illustrate the concepts. The book begins with a general review of some chemical concepts, including a brief review of thermodynamics, transition states in chemical reactions, acid-base concepts, non-covalent interactions and rates of chemical reactions. The next chapter covers aspects of enzyme (protein) structure. In a departure from other texts, the 4th chapter introduces and develops the concepts of protein-ligand binding equilibria. The derivation of

Kd, along with the Langmuir isotherm to derive measurements at equilibrium is developed, as is treatment of equilibrium ligand binding data. The detour into non-enzymatic ligand-protein interactions is a very welcome treatment of this topic, so important in many drug interactions with receptors. While not strictly speaking enzymology, this chapter serves to introduce concepts that are further developed in the next chapter, which deals with the kinetics of enzymatic catalysis. This chapter nicely develops the basic equations and treatment of enzyme kinetics, and the steady state model is developed using the treatment of Briggs and Haldane. A discussion of the significance of both Km and Kcat is followed by methods to derive these values experimentally. After covering kinetics, the book moves on to chemical mechanisms of enzyme catalysis. The importance of transition state stabilization is discussed, and covalent catalysis and acid-base catalysis are highlighted. Serine proteases as model enzyme mechanisms round out the chapter.Chapters 7 and 8 cover practical aspects of enzymology, such as velocity measurements, continuous versus end point reactions, detection methods for assays, and separation methods for reaction products (e.g., HPLC, TLC). Some pointers on enzyme concentration, temperature, pH and buffer effects on enzyme assays are valuable. The next chapter deals with reversible inhibitors, and describes the derivation of Ki. The distinctions among competitive, non-competitive and uncompetitive inhibition are discussed, and details on how to determine these in a practical sense are illustrated. There is also some discussion around the SAR of inhibitors, and this is tied in with inhibitor and drug design. Tight binding inhibitors get their own brief chapter, and there is a separate chapter on time dependent inhibition and the methodology around measuring this phenomenon. Enzyme reactions with multiple substrates and cooperativity in enzymatic catalysis also receive individual chapter treatments. Two appendices on suppliers and software tools round out the text.

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