
Physical Chemistry Principles And Applications In Biological Sciences

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Physical Chemistry

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Studyguide for Physical Chemistry

Principles and Applications in Biological Sciences by Jr., Ignacio Tinoco, ISBN 9780321898494

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**Chemical
Thermodynamics:
Advanced
Applications**

**Advanced
Applications** Elsevier
This book is an excellent companion to

Chemical Thermodynamics: Principles and Applications. Together they make a complete reference set for the practicing scientist. This volume extends the range of topics and applications to ones that are not usually covered in a beginning thermodynamics text. In a sense, the book covers a "middle ground" between the basic principles developed in a beginning thermodynamics textbook, and the very specialized applications that are a part of an ongoing research project. As such, it could prove invaluable to the practicing scientist who needs to apply thermodynamic relationships to aid in the understanding of

the chemical process under consideration. The writing style in this volume remains informal, but more technical than in Principles and Applications. It starts with Chapter 11, which summarizes the thermodynamic relationships developed in this earlier volume. For those who want or need more detail, references are given to the sections in Principles and Applications where one could go to learn more about the development, limitations, and conditions where these equations apply. This is the only place where Advanced Applications ties back to the previous volume. Chapter 11 can serve as a review of the fundamental thermodynamic equations that are necessary for the more sophisticated applications described in the remainder of this book. This may be all that is necessary for the practicing scientist who has been away from the field for some time and needs some review. The remainder of this book applies thermodynamics to the description of a variety of problems. The topics covered are those that are probably of the most fundamental and broadest interest. Throughout the book, examples of "real" systems are used as much as possible. This is in contrast to many books where "generic" examples are used almost exclusively. A complete set of references to all

sources of data and to supplementary reading sources is included. Problems are given at the end of each chapter. This makes the book ideally suited for use as a textbook in an advanced topics course in chemical thermodynamics. An excellent review of thermodynamic principles and mathematical relationships along with references to the relevant sections in *Principles and Applications* where these equations are developed. Applications of thermodynamics in a wide variety of chemical processes, including phase equilibria, chemical equilibrium, properties of mixtures, and surface chemistry. Case-study approach to demonstrate the

application of thermodynamics to biochemical, geochemical, and industrial processes. Applications at the "cutting edge" of thermodynamics. Examples and problems to assist in learning. Includes a complete set of references to all literature sources.

Physical Biochemistry

Principles and Applications John Wiley & Sons

"As will be seen, there is not much missing here. I thought that the sections were well balanced, with rarely too much or too little on a given topic...This is a text to be welcomed by both teachers and students."

BIOCHEMISTRY & MOLECULAR BIOLOGY EDUCATION (on the first edition) The second edition of this successful textbook explains the basic principles behind the key techniques currently used in the modern biochemical laboratory and describes the pros and cons of each technique and compares one to another. It is non-mathematical, comprehensive and approachable for students who are not physical chemists. A major update of this comprehensive, accessible introduction to physical biochemistry. Includes two new chapters on proteomics and bioinformatics. Introduces experimental approaches with a

minimum of mathematics and numerous practical examples. Provides a bibliography at the end of each chapter. Written by an author with many years teaching and research experience, this text is a must-have for students of biochemistry, biophysics, molecular and life sciences and food science.

Chemistry

Principles, Patterns, and Applications

Emphasises on contemporary applications and an intuitive problem-solving approach that helps students discover the exciting potential of chemical science. This book incorporates fresh applications from the three major areas

of modern research: materials, environmental chemistry, and biological science.

Ion-Radical Organic Chemistry

Principles and Applications, Second Edition *CRC Press*

Consolidating knowledge from a number of disciplines, *Ion-Radical Organic Chemistry: Principles and Applications, Second Edition* presents the recent changes that have occurred in the field since the publication of the first edition in 2003. This volume examines the formation, transformation, and application of ion-radicals in typical conditions of organic synthesis. Avoiding

complex mathematics, the author explains the principles of ion-radical organic chemistry and presents an overview of organic ion-radical reactions. He reviews methods of determining ion-radical mechanisms and controlling ion-radical reactions. Wherever applicable, the text addresses issues relating to ecology and biomedical concerns as well as inorganic participants of the ion-radical organic reactions. After reviewing the nature of organic ion-radicals and their ground-state electronic structure, the book discusses their formation, the relationship between electronic structure and reactivity, mechanism and regulation of reactions, stereochemical

aspects, synthetic opportunities, and practical applications. Additional topics include electronic and opto-electronic devices, organic magnets and conductors, lubricants, other materials, and reactions of industrial or biomedical importance. The book concludes by providing an outlook on possible future development in this field. Researchers and practitioners engaged in active work on synthetic or mechanistic organic chemistry and its practical applications will find this text to be invaluable in both its scope and its depth.

Principles and Applications of Quantum Chemistry

Academic Press

Principles and

Applications of Quantum Chemistry offers clear and simple coverage based on the author's extensive teaching at advanced universities around the globe. Where needed, derivations are detailed in an easy-to-follow manner so that you will understand the physical and mathematical aspects of quantum chemistry and molecular electronic structure. Building on this foundation, this book then explores applications, using illustrative examples to demonstrate the use of quantum chemical tools in research problems. Each chapter also uses innovative problems and bibliographic references to guide you, and throughout the book chapters

cover important advances in the field including: Density functional theory (DFT) and time-dependent DFT (TD-DFT), characterization of chemical reactions, prediction of molecular geometry, molecular electrostatic potential, and quantum theory of atoms in molecules. Simplified mathematical content and derivations for reader understanding Useful overview of advances in the field such as Density Functional Theory (DFT) and Time-Dependent DFT (TD-DFT) Accessible level for students and researchers interested in the use of quantum chemistry tools

Principles and Applications of Chemical Defects

Routledge

This book provides some insight into chemical defects in crystalline solids, focusing on the relationship between basic principles and device applications. It is concerned with the chemical, optical and electronic consequences of the presence of defects in crystals.

Physical Chemistry and Its Biological Applications *Elsevier*

Physical Chemistry and Its Biological Applications presents the basic principles of physical chemistry and shows how the methods of physical chemistry are being applied to increase understanding of living systems. Chapters 1 and 2 of the book discuss states of

matter and solutions of nonelectrolytes. Chapters 3 to 5 examine laws in thermodynamics and solutions of electrolytes. Chapters 6 to 8 look at acid-base equilibria and the link between electromagnetic radiation and the structure of atoms. Chapters 9 to 11 cover different types of bonding, the rates of chemical reactions, and the process of adsorption. Chapters 12 to 14 present molecular aggregates, magnetic resonance spectroscopy and photochemistry, and radiation. This book is useful to biological scientists for self-study and reference. With modest additions of mathematical material by the teacher, the book should also be

suitable for a full-year major's course in physical chemistry.

Surface and Colloid Chemistry

Principles and Applications *CRC Press*

Surface and colloid chemistry principles impact many aspects of our daily lives, ranging from the cleaners and cosmetics we use to combustion engines and cement. Exploring the range of this field of study, *Surface and Colloid Chemistry* provides a detailed analysis of its principles and applications and demonstrates how they relate to natural phenom

Principles and Applications of ESR Spectroscopy

Springer Science & Business Media

Principles and Applications of ESR Spectroscopy fills the gap between the detailed monographs in ESR spectroscopy and the general textbooks in molecular physics, physical chemistry, biochemistry or spectroscopy. The latter only briefly explain the underlying theory and do not provide details about applications, while the currently available ESR textbooks are primarily focused on the technique as such. This text is based upon the authors' long experience of teaching the subject to a mixed audience, in the extreme case ranging from physics to biology. The potential of the method is illustrated with

applications in fields such as molecular science, catalysis and environmental sciences, polymer and materials sciences, biochemistry and radiation chemistry/physics. Theoretical derivations have in general been omitted, as they have been presented repeatedly in previous works. The necessary theory is instead illustrated by practical examples from the literature.

Principles and Applications of Photochemistry *John Wiley & Sons*

A modern introduction to photochemistry covering the principles and applications of this topic from both a physical chemistry and organic chemistry angle. Coverage

ranges from subjects such as lasers, the atmosphere, biochemistry, medicine and industry and also includes the latest developments in relation to photochemical molecular machines, photodynamic therapy applied to cancer, photochromatic imaging, and photostabilizers. Little in the way of prior knowledge is assumed, and the reader is aided by numerous worked examples, learning objectives, chapter summaries and problems.

Physical Principles and Techniques of Protein Chemistry

Elsevier

Physical Principles and Techniques of Protein Chemistry, Part C focuses on the effects

of intermolecular interactions that are transmitted between ligands and proteins and from protein to protein. This book discusses the density and volume change measurements; direct volume change; osmotic pressure; and small-angle X-ray scattering. The theory of particulate scattering; pulsed nuclear magnetic resonance; absorption of water by diamagnetic molecules; and use of least squares in data analysis are also elaborated. This text likewise covers the iteration process; optical rotatory dispersion and the main chain conformation of proteins; and basic relations for optically active molecules.

Other topics include the circular dichroism, secondary structure of proteins, visible rotatory dispersion, and peptide cotton effects.

This publication is intended for protein chemists, but is also useful to biologists, medical practitioners, and students researching on protein chemistry.

Principles of Physical Chemistry

Understanding Molecules, Molecular Assemblies, Supramolecular Machines Wiley

"This admirable text provides a solid foundation in the fundamentals of physical chemistry including quantum mechanics and statistical mechanics/thermodyna

mics. The presentation assists the students in developing an intuitive understanding of the subjects as well as skill in quantitative manipulations.

Particularly exciting is the treatment of larger molecular systems. With a firm but gentle hand, the student is led to several organized molecular assemblies including supramolecular systems and models of the origin of life. By learning of some of the most productive areas of current chemical research, the student may see the discipline as an active, young science in addition to its many accomplishments of earlier years. This text makes physical chemistry fun and demonstrates why so many find it a

stimulating and rewarding profession." Professor Edel Wasserman, President (1999) of the American Chemical Society

Computational Chemistry and Molecular Modeling

Principles and Applications *Springer Science & Business Media*

The gap between introductory level textbooks and highly specialized

monographs is filled by this modern textbook. It provides in one comprehensive volume the in-depth theoretical background for molecular modeling and detailed descriptions of the applications in chemistry and related fields like drug design, molecular sciences,

biomedical, polymer and materials engineering. Special chapters on basic mathematics and the use of respective software tools are included. Numerous numerical examples, exercises and explanatory illustrations as well as a web site with application tools (<http://www.amrita.edu/cen/ccmm>) support the students and lecturers.

Understanding Bioanalytical Chemistry

Principles and Applications *John Wiley & Sons*

"The title captures the ethos and content precisely. It brings basic chemistry into real life with examples that illustrate how

chemical principals are inherent to bioanalytical procedures, making them accessible to readers with a background in life sciences." -Microbiology Today, July 2009 "... a good overview of the basic strategies to tackle the complexity of analysis in biological environments and provides some illustrative examples for a better understanding of the theoretical concepts... provides a fundamental introduction to the tools adopted by life and health scientists in the evolving and exciting new age of "omics" specifically applied to the diagnosis, treatment, cure and prevention of disease..." -Analytical and Bioanalytical Chemistry, October 2009 Although chemistry is core to the life and health sciences, it is often viewed as a challenging subject. Conventional textbooks tend to present chemistry in a way that is not always easily accessible to students, particularly those coming from diverse educational backgrounds, who may not have formally studied chemistry before. This prompted the authors to write this particular textbook, taking a new, fresh and innovative approach to teaching and learning of chemistry, focusing on bioanalysis to set knowledge in context. This textbook is primarily targeted to undergraduate life and

health science students, but may be a useful resource for practising scientists in a range of disciplines. In this textbook the authors have covered basic principles, terminology and core technologies, which include key modern experimental techniques and equipment used to analyse important biomolecules in diagnostic, industrial and research settings. Written by two authors with a wealth of experience in teaching, research and academic enterprise, this textbook represents an invaluable tool for students and instructors across the diverse range of biological and health science courses. Key Features: Innovative, stand alone teaching and learning resource to enhance delivery of undergraduate chemistry provision to life and health scientists. Develops student knowledge and understanding of core concepts with reference to relevant, real-life, examples. Clearly written and user-friendly, with numerous full colour illustrations, annotated images, diagrams and tables to enhance learning. Incorporates a modern approach to teaching and learning to motivate the reader and encourage student-centred learning. Dr Victor Gault has been named recipient of the Rising Star Award 2009 by the internationally acclaimed European Association for the Study of Diabetes (EASD).

Molecular Fluorescence

Principles and Applications *John Wiley & Sons*

This second edition of the well-established bestseller is completely updated and revised with approximately 30 % additional material, including two new chapters on applications, which has seen the most significant developments. The comprehensive overview written at an introductory level covers fundamental aspects, principles of instrumentation and practical applications, while providing many valuable tips. For photochemists and photophysicists, physical chemists, molecular physicists, biophysicists,

biochemists and biologists, lecturers and students of chemistry, physics, and biology.

Physical Chemistry and Its Applications

Physical Chemistry is the study of macroscopic, atomic, particulate and sub-atomic phenomena in chemical systems. It is studied in terms of principles, practices, and concepts of physics. Energy, thermodynamics, motion, statistical mechanics and force are some common concepts of physics applied to this field. Quantum chemistry and spectroscopy are the two primary sub-fields of physical chemistry. The application of quantum mechanics to solve chemical problems falls

under quantum chemistry. It provides tools to determine the shape of bonds, strength of the bonds, movement of nuclei and how light can be absorbed or emitted by a chemical compound. Whereas, spectroscopy is concerned with the interaction of electromagnetic radiation with matter. The objective of this book is to give a general view of the different areas of physical chemistry and its applications. Most of the topics introduced herein cover new techniques and applications of physical chemistry. This book will serve as a valuable source of reference for graduate and post graduate students.

Physical Chemistry

Understanding our Chemical World *John Wiley and Sons*

Understanding Physical Chemistry is a gentle introduction to the principles and applications of physical chemistry. The book aims to introduce the concepts and theories in a structured manner through a wide range of carefully chosen examples and case studies drawn from everyday life. These real-life examples and applications are presented first, with any necessary chemical and mathematical theory discussed afterwards. This makes the book extremely accessible and directly relevant to the reader. Aimed at undergraduate students taking a first course in physical chemistry, this book

offers an accessible applications/examples led approach to enhance understanding and encourage and inspire the reader to learn more about the subject. A comprehensive introduction to physical chemistry starting from first principles. Carefully structured into short, self-contained chapters. Introduces examples and applications first, followed by the necessary chemical theory.

Principles of Physical Chemistry

Principles and Applications of Aquatic Chemistry

John Wiley & Sons

Presents aquatic chemistry in a way that is truly useful to those with diverse

backgrounds in the sciences. Major improvements to this edition include a complete rewrite of the first three background chapters making them user-friendly. There is less emphasis on mathematics and concepts are illustrated with actual examples to facilitate understanding.

Physical Inorganic Chemistry

Reactions, Processes, and Applications

John Wiley & Sons

This go-to text provides information and insight into physical inorganic chemistry essential to our understanding of chemical reactions on the molecular level. One of the only books in the field of inorganic

physical chemistry with an emphasis on mechanisms, it features contributors at the forefront of research in their particular fields. This essential text discusses the latest developments in a number of topics currently among the most debated and researched in the world of chemistry, related to the future of solar energy, hydrogen energy, biorenewables, catalysis, environment, atmosphere, and human health.

Applied Surfactants

Principles and Applications *John Wiley & Sons*

While currently available titles either focus on the basics or on very specific subtopics, this text

meets the need for a comprehensive survey of surfactants and their properties, with a strong emphasis on applications and their correlation to the fundamentals. The author covers their classification, physical properties, phase behavior, adsorption, effects - such as wetting, spreading and adhesion - as well as industrial applications in personal care and cosmetics, pharmaceuticals, agrochemicals and food products. Professor Tadros is a well-known expert on the topic of surfactants, with much experience in colloid science. Here, he uses his industrial experience to close the gap between fundamentals of surfactants and their

relevance and applications in practice.

The Physical Chemistry of Materials

Energy and Environmental Applications CRC Press

In recent years, the area dealing with the physical chemistry of materials has become an emerging discipline in materials science that emphasizes the study of materials for chemical, sustainable energy, and pollution abatement applications. Written by an active researcher in this field, *Physical Chemistry of Materials: Energy and Environmental Appl*

Physical Chemistry for the Biological

Sciences John Wiley & Sons

This book provides an introduction to physical chemistry that is directed toward applications to the biological sciences. Advanced mathematics is not required. This book can be used for either a one semester or two semester course, and as a reference volume by students and faculty in the biological sciences.

Smart Polymers

Principles and Applications Walter de Gruyter GmbH & Co KG

Smart polymers react sharply to small changes in physical or chemical conditions and present an intelligent response to chemical stimuli (i.e., chemical species -

including biomolecules-, pH, solvents, redox, stimuli that trigger controlled depolymerization) and physical stimuli (i.e., temperature, light, mechanical stress and electrical stimuli). For these reasons, the interest in smart polymers has recently increased exponentially, especially in biological stimuli (i.e., application of polymer-based biosensors, drug delivery, tissue engineering, precision medicine and cell therapy). This book offers a unique opportunity to review the physical-chemical fundamentals of smart polymers, and their behaviour. It also provides an excellent review of the main applications of smart polymers.

Principles and Applications of Stereochemistry *Routledge*

A thorough understanding of stereochemistry is essential for the comprehension of almost all aspects of modern organic chemistry. It is also of great significance in many biochemical and medicinal disciplines, since the stereoisomers of a compound can have dramatically different biological properties. This text explains how the different properties of stereoisomers of a compound arise, and what processes can be used to prepare and analyze stereoisomerically pure compounds. It also presents prominent coverage of the stereochemistry of

inorganic and organometallic compounds, which is likely to increase in importance, as these compounds are used as symmetric catalysts in asymmetric synthesis. Modern stereochemical terminology is used throughout, although reference is also made to older terms which are still widely used. A set of problems at the end of each chapter aims to further the reader's understanding of how the content can be applied. The book is designed mainly as a textbook for undergraduate students and as a reference source for more advanced levels, but is also intended for academic and professional organic chemists.

The Molecules of Life

First Edition *W.W. Norton & Company*

This textbook provides an integrated physical and biochemical foundation for undergraduate students majoring in biology or health sciences. It is particularly suitable for students planning to enter the pharmaceutical industry. This new generation of molecular biologists and biochemists will harness the tools and insights of physics and chemistry to exploit the emergence of genomics and systems-level information in biology, and will shape the future of medicine.

Environmental Soil and Water

Chemistry

Principles and Applications *Wiley-Interscience*

An excellent knowledge base in soil and water chemistry -- the ideal basic text for students of the environmental sciences In *Environmental Soil and Water Chemistry*, leading soil and water authority V. P. Evangelou presents a complete overview of the principles and applications of soil science, addressing the subject by viewing the interactions between soil and water as a basis for understanding the nature, extent, and treatment of polluted soil and water. The text opens with a discussion of principles--the fundamental tenets of chemistry needed to

understand soil and water quality and treatment of polluted resources--and continues with a look at applications for the control and treatment of soil and water. Suitable for advanced undergraduates and beginning graduate students, this extensive, timely volume covers: * Water chemistry and mineral solubility; soil minerals and surface chemical properties and their behavior; and electrochemistry and kinetics * The control of agricultural chemical pollution and land disturbance pollution; colloids and transport processes in soils; and technologies for measuring quality and executing treatment * Specific chemical contaminants and the procedures for their

neutralization In a world where chemical pollutants pose a grave threat to the earth's natural resources, Environmental Soil and Water Chemistry offers students both an excellent textbook and a handy reference on the wide spectrum of environmental problems they will confront outside the classroom.

Physical Principles of Chemical Engineering

International Series of Monographs in Chemical Engineering *Elsevier*

Physical Principles of Chemical Engineering covers the significant advancements in the understanding of the physical principles of chemical engineering. This book is composed

of 12 chapters that describe chemical unit processes through analogy with the unit of operations of chemical engineering. The introductory chapters survey the concept and principles of mass and energy balances, as well as the application of entropy. The next chapters deal with the probability and kinetic theories of gases, the physical aspects of solids, the different dispersed systems, and the principles and application of fluid dynamics. Other chapters discuss the property dimension and model theory; heat, mass, and momentum transfer; and the characteristics of multiphase flow processes. The final chapters review the model of rheological

bodies, the molecular-kinetic interpretations of rheological behavior, and the principles of reaction kinetics. This book will prove useful to chemical engineers.

Biophysical

Chemistry *John Wiley & Sons*

"Biophysical Chemistry is an outstanding book that delivers both fundamental and complex biophysical principles, along with an excellent overview of the current biophysical research areas, in a manner that makes it accessible for mathematically and non-mathematically inclined readers." (Journal of Chemical Biology, February 2009) This text presents physical chemistry through the use of biological and biochemical topics,

examples and applications to biochemistry. It lays out the necessary calculus in a step by step fashion for students who are less mathematically inclined, leading them through fundamental concepts, such as a quantum mechanical description of the hydrogen atom rather than simply stating outcomes. Techniques are presented with an emphasis on learning by analyzing real data. Presents physical chemistry through the use of biological and biochemical topics, examples and applications to biochemistry Lays out the necessary calculus in a step by step fashion for students who are less mathematically inclined Presents

techniques with an emphasis on learning by analyzing real data. Features qualitative and quantitative problems at the end of each chapter. All art available for download online and on CD-ROM.

Principles of Polymer Chemistry
Springer Science & Business Media

This successful textbook undergoes a change of character in the third edition. Where earlier editions covered organic polymer chemistry, the third edition covers both physical and organic chemistry. Thus kinetics and thermodynamics of polymerization reactions are discussed. This edition is also distinct from all other polymer textbooks because of

its coverage of such currently hot topics as photonic polymers, electricity conducting polymers, polymeric materials for immobilization of reagents and drug release, organic solar cells, organic light emitting diodes. This textbook contains review questions at the end of every chapter, references for further reading, and numerous examples of commercially important processes.

Radiation Chemistry

Principles and Applications *Vch Pub*

NMR Spectroscopy

Basic Principles, Concepts and Applications in Chemistry *John Wiley & Sons*

Nuclear magnetic resonance (NMR) spectroscopy is one of the most powerful and widely used techniques in chemical research for investigating structures and dynamics of molecules. Advanced methods can even be utilized for structure determinations of biopolymers, for example proteins or nucleic acids. NMR is also used in medicine for magnetic resonance imaging (MRI). The method is based on spectral lines of different atomic nuclei that are excited when a strong magnetic field and a radiofrequency transmitter are applied. The method is very sensitive to the features of molecular structure because also the neighboring atoms influence the signals from individual nuclei and this is important for determining the 3D-structure of molecules. This new edition of the popular classic has a clear style and a highly practical, mostly non-mathematical approach. Many examples are taken from organic and organometallic chemistry, making this book an invaluable guide to undergraduate and graduate students of organic chemistry, biochemistry, spectroscopy or physical chemistry, and to researchers using this well-established and extremely important technique. Problems and solutions are included.

Physical Chemistry

Concepts and Theory *Elsevier*

Physical Chemistry: Concepts and Theory provides a comprehensive overview of physical and theoretical chemistry while focusing on the basic principles that unite the sub-disciplines of the field. With an emphasis on multidisciplinary, as well as interdisciplinary applications, the book extensively reviews fundamental principles and presents recent research to help the reader make logical connections between the theory and application of physical chemistry concepts. Also available from the author: Physical Chemistry: Multidisciplinary Applications (ISBN 9780128005132).

Describes how materials behave and chemical reactions occur at the molecular and atomic levels Uses theoretical constructs and mathematical computations to explain chemical properties and describe behavior of molecular and condensed matter Demonstrates the connection between math and chemistry and how to use math as a powerful tool to predict the properties of chemicals Emphasizes the intersection of chemistry, math, and physics and the resulting applications across many disciplines of science

General Chemistry**Principles and Modern Applications**

Pearson

The most trusted general chemistry text in Canada is back in a thoroughly revised 11th edition. General Chemistry: Principles and Modern Applications, is the most trusted book on the market recognized for its superior problems, lucid writing, and precision of argument and precise and detailed treatment of the subject. The 11th edition offers enhanced hallmark features, new innovations and revised discussions that respond to key market needs for detailed and modern treatment of organic chemistry, embracing the power of visual learning and conquering the challenges of effective problem solving and

assessment. Note: You are purchasing a standalone product; MasteringChemistry does not come packaged with this content. Students, if interested in purchasing this title with

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