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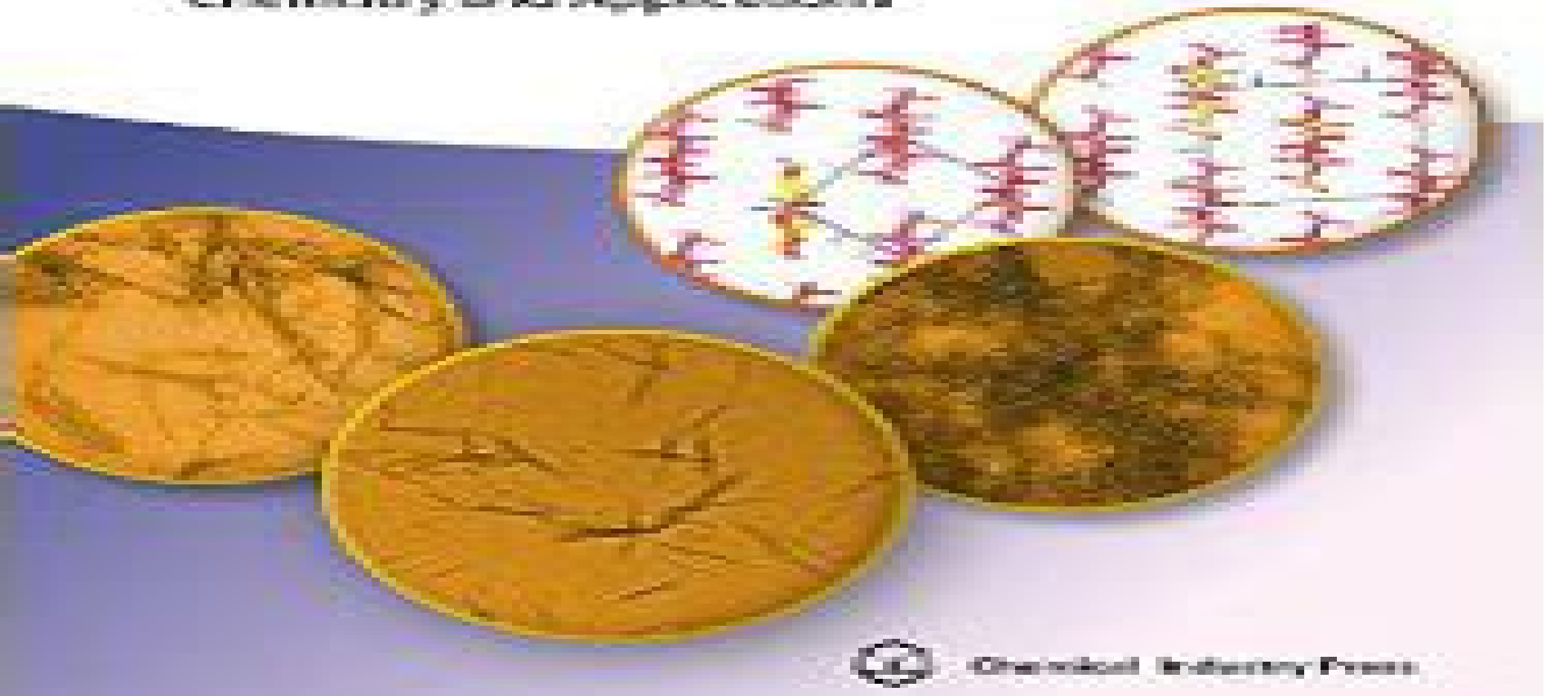
Polysaccharide-Based Nanocrystals

Chemistry and Applications



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Polysaccharide Based Nanocrystals Chemistry And Applications

Bhasha Sharma,M. Enamul Hoque

Polysaccharide Based Nanocrystals Chemistry And Applications:

Polysaccharide-Based Nanocrystals Jin Huang,Peter R. Chang,Ning Lin,Alain Dufresne,2015-03-09 Polysaccharide nanocrystals an emerging green nanoingredient nanomaterial with high crystallinity obtained by acid hydrolysis of biomass based polysaccharides are of scientific and economic significance owing to their abundance biodegradation potential and fascinating functional performance This versatile class of materials can be used in nanocomposites such as rubber or polyester and in functional materials such as drug carriers bio inspired mechanically adaptive materials or membranes to name but a few This book encompasses the extraction structure properties surface modification theory and mechanism of diverse functional systems derived from polysaccharide nanocrystals This highly sought after trendy book is currently the only monograph devoted to the most current knowledge pertaining to this exciting subject area It is ideal for researchers and stakeholders who wish to broaden and deepen their knowledge in the fast moving and rapidly expanding R D field of polymeric materials *Polysaccharide-based Nanocrystals* Peter R. Chang,Ning Lin,Alain Dufresne,2014 Polysaccharide nanocrystals can be derived from the renewable resources cellulose chitin or starch which makes them ideal candidates for Green Materials Science This versatile material class can be used in nanocomposites such as rubber or polyester and in functional materials such as drug carriers bio inspired mechanically adaptive materials or membranes Moreover polysaccharide based nanomaterials are environmentally friendly due to their intrinsic biodegradability With its interdisciplinary approach the book gives a thorough introduction to extraction structure properties surfac **Green Micro- and Nanocomposites** Sabu Thomas,Abitha V. K.,Hanna J Maria,2023-10-20 Green materials derived from renewable resources are increasingly being advocated for sustainable development due to rising environmental consciousness waste management difficulties depleting fossil resources and rising oil prices to name a few Renewable green resources such as starchy and cellulose polymers natural fibers vegetable oils wood bark cotton wool and silk have been utilized for food furniture and clothing for thousands of years They have only recently undergone a revival as one of the most cost effective alternatives to synthetic polymers in a variety of industrial applications including building and construction automotive packaging films and paper coating as well as biomedical uses The primary drawbacks of synthetic polymers such as the release of toxic gases and vapors during incineration and the difficulty in disposing of them have prompted extensive research on new green polymeric materials with special focus on the use of biopolymers derived from renewable resources for green composite applications This book gives a true reflection of the vast area of research in green composites as it has contributions from internationally recognized experts in the field of green polymer materials representing a wide range of disciplines backgrounds and expertise **Handbook of Composites from Renewable Materials, Nanocomposites** Vijay Kumar Thakur,Manju Kumari Thakur,Michael R. Kessler,2017-03-28 This unique multidisciplinary 8 volume set focuses on the emerging issues concerning synthesis characterization design manufacturing and various other aspects of composite

materials from renewable materials and provides a shared platform for both researcher and industry The Handbook of Composites from Renewable Materials comprises a set of 8 individual volumes that brings an interdisciplinary perspective to accomplish a more detailed understanding of the interplay between the synthesis structure characterization processing applications and performance of these advanced materials The Handbook comprises 169 chapters from world renowned experts covering a multitude of natural polymers reinforcement fillers and biodegradable materials Volume 7 is solely focused on the Nanocomposites Science and Fundamentals of renewable materials Some of the important topics include but not limited to Preparation characterization and applications of nanomaterials from renewable resources hydrogels and its nanocomposites from renewable resources preparation of chitin based nanocomposite materials through gelation with ionic liquid starch based bionanocomposites biorenewable nanofiber and nanocrystal investigation of wear characteristics of dental composite reinforced with rice husk derived nanosilica filler particles performance of regenerated cellulose vermiculite nanocomposites fabricated via ionic liquid preparation structure properties and interactions of the PVA cellulose composites green composites with cellulose nanoreinforcements biomass composites from bamboo based micro nanofibers synthesis and medicinal properties of polycarbonates and resins from renewable sources nanostructured polymer composites with modified carbon nanotubes organic inorganic nanocomposites derived from polysaccharides natural polymer based nanocomposites cellulose whisker based green polymer composites poly lactic acid nanocomposites reinforced with different additives nanocrystalline cellulose halloysite based bionanocomposites nanostructurated composites based on biodegradable polymers and silver nanoparticles starch based biomaterials and nanocomposites green nanocomposites based on PLA and natural organic fillers and chitin and chitosan based nanocomposites Sustainability of Biomass through Bio-based Chemistry Valentin Popa,2021-03-21 The process of photosynthesis is a potential source of energy and bioproducts Renewable sources of polymeric materials offer an answer to maintaining sustainable development of economically and ecologically attractive technology The innovations in the development of materials from biopolymers preservation of fossil based raw materials complete biological degradability reduction in the volume of garbage and compostability in the natural cycle climate protection through reduction of carbon dioxide released and the application possibilities of agricultural resources for the production of bio green materials are some of the reasons why such materials are attracting public interest FEATURES Discusses waste from urban areas forestry and agricultural processes specifically grown crops such as trees starch crops sugar crops hydrocarbon plants and oils and finally aquatic plants such as water seaweeds and algae which can be used as raw materials for sustainable development Presents recent advances in the development of some specifically chemical components of biomasses for a sustainable future Focuses on lignocellulose as a source of bio based products Draws upon expertise from various countries Describes how upgraded and integrated biomass processing may reduce the risks associated with the COVID 19 pandemic Valentin I Popa is professor emeritus of Wood Chemistry and Biotechnology at

Gheorghe Asachi Technical University of Iasi Romania **Gold Nanoparticles, Nanomaterials and Nanocomposites** S. K. Khadheer Pasha,Kalim Deshmukh,Chaudhery Mustansar Hussain,2024-11-30 Gold Nanoparticles Nanomaterials and Nanocomposites Science Technology and Applications provides a comprehensive review of recent research developments in the synthesis processing functionalization characterization and properties of gold nanoparticles Au NPs for a broad range of different applications Emphasis is placed on the fundamental chemistry different synthesis approaches strategies for stabilization and control of shape size and morphology surface chemistry and physicochemical characteristics as well as surface functionalization and applications of Au NPs The book also covers important topics such as biocompatibility biodegradability cytotoxicity and the health and environmental impact of Au NPs The book will be a valuable reference resource for academic and industrial researchers working in the fields of materials science and engineering nanomaterials polymer composites and biomedical engineering It will help them to find solutions to both fundamental and applied problems associated with this important research field and it will also enable new researchers to become acquainted with this field within a short period Covers current and emerging research trends in the synthesis processing functionalization characterization and performance of gold nanoparticles Au NPs Includes comprehensive coverage of a broad range of applications such as sensing and biosensing electronic devices electro and photocatalysis solar cells supercapacitors point of care diagnostic tools and devices drug delivery and controlled drug release antimicrobial antifungal and antiviral applications cancer diagnostics and therapy tissue engineering bioimaging as well as for bioremediation and pharmaceutical applications Contains contributions from leading researchers across the globe from academic industrial government and private research institutions *Biopolymer Grafting: Synthesis and Properties* Vijay Kumar Thakur,2017-09-27 Biopolymer Grafting Synthesis and Properties presents the latest research and developments in fundamental of synthesis and properties of biopolymer based graft copolymers The book presents a broad overview of the biopolymer grafting process along with trends in the field It also introduces a range of grafting methods which lead to materials with enhanced properties for a range of practical applications along with the positives and limitations of these techniques The book bridges the knowledge gap between the scientific principles and industrial applications of polymer grafting This book covers synthesis and characterization of graft copolymers of plant polysaccharides functional separation membranes from grafted biopolymers and polysaccharides in alternative methods for insulin delivery Recent trends and advances in this area are discussed assisting materials scientists and researchers in mapping out the future of these new green materials through value addition to enhance their use Introduces polymer researchers to a promising rapidly developing method for modifying naturally derived biopolymers Provides a one stop shop covering synthesis properties characterization and graft copolymerization of bio based polymeric materials Increases familiarity with a range of biopolymer grafting processes enabling materials scientists and engineers to improve material properties and widen the range of potential biopolymer applications *Biocompatible Hybrid*

Oxide Nanoparticles for Human Health Inna V. Melnyk,Miroslava Vaclavikova,Gulaim A. Seisenbaeva,Vadim G. Kessler,2019-06-30 Biocompatible Hybrid Oxide Nanoparticles for Human Health From Synthesis to Applications explores the synthesis structure properties and applications of functionalized oxide nanoparticles The books shows the applications of materials depending on their composition and structure with a focus on silicon titanium and iron oxides each of which was chosen because of their unique features including silica because it is chemically resistant to most organic solvents harmless to living organisms can thicken flowable formulations and increase the strength of materials titania for its unique chemical optical electrophysical and bactericidal properties and iron containing materials because they possess important magnetic properties Shows how oxide nanoparticles are being used to solve current problems in the fields of environmental protection medicine and in the creation of smart materials Includes case studies that explore the major characteristics and applications of silica titania and iron oxide nanomaterials Discusses the use of biocompatible oxide nanostructures in the development of new sensing technology Handbook of Nanocelluloses Ahmed Barhoum,2022-07-15 This Handbook covers the fundamental aspects experimental setup synthesis properties and characterization of different nanocelluloses It also explores the technology challenges of nanocelluloses and the emerging applications and the global markets of nanocelluloses based systems In particular this book Covers the history of nanocelluloses types and classifications fabrication techniques critical processing parameters physical and chemical properties surface functionalization and other treatments to allow practical applications Covers all recent aspects of nanocelluloses technologies from experimental set up to industrial applications Includes new physical chemical and biological techniques for nanocelluloses fabrication in depth treatment of their surface functionalization and characterization Discusses the unique properties of nanocelluloses that can be obtained by modifying their diameter morphology composition and dispersion in other materials Discusses the properties and morphology of several kinds of dispersion in polymeric materials such as micro nanofiberlated cellulose cellulose nanofibers cellulose nanocrystals amorphous cellulose nanoparticles and hybrid cellulose nanomaterials Presents the different techniques for dispersion and self assembly of polymeric materials critical parameters of synthesis modelling and simulation and characterization methods Highlights a wide range of emerging applications of nanocelluloses e g drug delivery tissue engineering medical implants medical diagnostics and therapy biosensors catalysis energy harvesting energy storage water waste treatment papermaking textiles construction industry automotive aerospace and many more Provides an outlook on the opportunities and challenges for the fabrication and manufacturing of nanocelluloses in industry Provides an in depth look at the nature of nanocelluloses in terms of their applicability for industrial uses Provides in depth insight and review on most recent types of nanocelluloses based systems of unique structures and compositions Highlights the challenges and interdisciplinary perspective of nanocelluloses based systems in science biology engineering medicine and technology incorporating both fundamentals and applications Demonstrates how cutting edge developments in nanofibers translate into real world innovations in a range of

industry sectors This Handbook is a valuable reference for materials scientists biologists physicians chemical biomedical manufacturing and mechanical engineers working in R D industry and academia who want to learn more about how nanocelluloses based systems are commercially applied **Polysaccharide based Nano-Biocarrier in Drug Delivery** Tapan Kumar Giri,Bijaya Ghosh,2018-09-03 This book discusses various fundamental aspects of polysaccharide based nano biocarrier drug delivery systems and its application in the delivery of small molecules proteins peptides oligonucleotides and genes It also discusses advances in drug delivery systems in treatment of cancer cardiovascular pulmonary and infectious diseases **Polysaccharide Based Hybrid Materials** Carla Vilela,Ricardo João Borges Pinto,Susana Pinto,Paula Marques,Armando Silvestre,Carmen Sofia da Rocha Freire Barros,2018-09-26 This brief explores polysaccharides the most abundant family of naturally occurring polymers and explains how they have gained considerable attention in recent decades as a source of innovative bio based materials The authors present a range of material including an extensive array of polysaccharide hybrid nanomaterials with distinct applications The most recent knowledge regarding polysaccharide based hybrid nanomaterials with metal and metal oxide nanoparticles NPs carbon nanotubes and graphene is presented as well as the main polysaccharides namely cellulose chitin and chitosan starch and their most relevant derivatives The book features a description of important production methodologies properties and applications of these types of hybrids Polysaccharide Building Blocks Youssef Habibi,Lucian A. Lucia,2012-04-17 This book is an archival reference for the evolving field of biomaterials and their applications in society focusing on their composition properties characterization chemistry and applications in bioenergy chemicals and novel materials and biomaterials It has broad appeal due to the recent heightened awareness around bioenergy and biomass as potential replacements for petroleum feedstocks The book is divided into three parts cellulose based biomaterials chitin and chitosan biomaterials and hemicelluloses and other polysaccharides Each chapter addresses a separate biomaterial discussing its chemical physical and biological attributes and hones in on each compound s intrinsic tunability for numerous chemical transformations In the current quest for a green economy and resources this book will help inspire scientists towards novel sources for chemicals materials and energy in the years to come

Functionalized Nanomaterials Vineet Kumar,Praveen Guleria,Nandita Dasgupta,Shivendu Ranjan,2021-07-28 Nanomaterials contain some unique properties due to their nanometric size and surface functionalization Nanomaterial functionalization also affects their compatibility to biocompatibility and toxicity behaviors environment and living organism This makes functionalized nanomaterials a material with huge scope and few challenges This book provides detailed information about the nanomaterial functionalization and their application Recent advancements challenges and opportunities in the preparation and applications of functionalized nanomaterials are also highlighted This book can serve as a reference book for scientific investigators doctoral and post doctoral scholars undergrad and grad This book is very useful for multidisciplinary researchers industry personnel s journalists and policy makers Features Covers all aspects of

Nanomaterial functionalization and its applications Describes and methods of functionalized nanomaterials synthesis for different applications Discusses the challenges recent findings and cutting edge global research trends on functionalization of nanomaterials and its applications It discusses the regulatory frameworks for the safe use of functionalized nanomaterials It contains contributions from international experts from multiple disciplines **Handbook of Nanocellulose and Cellulose Nanocomposites** Hanieh Kargarzadeh,Ishak Ahmad,Sabu Thomas,Alain Dufresne,2017-03-02 An up to date and comprehensive overview summarizing recent achievements the state of the art and trends in research into nanocellulose and cellulose nanocomposites Following an introduction this ready references discusses the characterization as well surface modification of cellulose nanocomposites before going into details of the manufacturing and the self assembly of such compounds After a description of various alternatives including thermoplastic thermosetting rubber and fully green cellulose nanocomposites the book continues with their mechanic and thermal properties as well as crystallization and rheology behavior A summary of spectroscopic and water sorption properties precedes a look at environmental health and safety of these nanocomposites With its coverage of a wide variety of materials important characterization tools and resulting applications this is an essential reference for beginners as well as experienced researchers Food Hydrocolloids Yapeng Fang,Hongbin Zhang,Katsuyoshi Nishinari,2021-05-18 The book introduces the definition classification source and structure of hydrocolloids and provides a comprehensive description of their functionalities and food related applications The emphasis is put on the basic concepts and mechanisms underlying functionalities and the new developments in fundamental knowledge and practice The book would be useful for students or professionals working in the fields of food science technology and biopolymers etc It would help to organize hydrocolloids knowledge in a more systematic framework and enlighten further profound investigations **Advances in Physical Organic Chemistry** ,2024-11-12 Advances in Physical Organic Chemistry Volume 58 is the latest release in this definitive resource for authoritative reviews of work in physical organic chemistry It aims to provide a valuable source of information not only for physical organic chemists applying their expertise to both novel and traditional problems but also for non specialists across diverse areas Its hallmark is quantitative molecular level understanding of phenomena across a diverse range of disciplines Sample chapters in this new release include Coacervate formation and the partitioning of molecules into these phases and The area of artificial signal transduction systems Provides the only regularly published resource for reviews in physical organic chemistry Includes chapters written by authoritative experts **Polysaccharide-Based Nanocomposites for Gene Delivery and Tissue Engineering** Showkat Ahmad Bhawani,Zoheb Karim,Mohammad Jawaid,2021-06-02 Polysaccharide Based Nanocomposites for Gene Delivery and Tissue Engineering presents quantitative background on new polysaccharide nanocomposites in a clear and logical way highlighting the most exciting applications in gene delivery and tissue engineering and their progress The book focuses on the different types of polysaccharide nanocomposites for gene delivery and tissue engineering and covers polysaccharide hydrogels for

tissue engineering and polysaccharide magnetic nanocomposites for gene delivery Chapters cover various nanocomposites presented in twenty one separate chapters This book will be of great interest to all those researching the development and applications of polysaccharide based nanocomposites for modeling As polysaccharide based nanocomposites promise cutting edge applications in gene delivery and tissue engineering with their development at the forefront of modern medicine this book is a welcome title on this exciting science Presents quantitative background on new polysaccharide nanocomposites for advanced medicine Focuses on polysaccharide nanocomposites in relation to gene delivery and tissue engineering Highlights the most exciting leading edge applications in gene delivery and tissue engineering Covers polysaccharide hydrogels for tissue engineering and magnetic nanocomposites for gene delivery Offers a logical and useful presentation of polysaccharide nanocomposites organized first by application and then by nanocomposite **Carbohydrates in Chemistry and Biology** Vinod Kumar Tiwari,Bubun Banerjee,2025-04-21 Carbohydrates in Chemistry and Biology provides detailed information about the green synthesis biological importance and catalytic applications of carbohydrate derivatives It covers various topics including carbohydrate decorated compounds bioconjugation carbohydrate functionalized heterocycles carbohydrate spiro heterocycles heterocycles from carbohydrate precursors and natural sources of bioactive carbohydrates

Polysaccharides Bhasha Sharma,M. Enamul Hoque,2023-12-14 Polysaccharides offer unique and valuable functional properties persisting in technological importance and poised to grow more critical due to sustainability demands and emerging applications in medical and life sciences This book presents comprehensive information about carbohydrate polymers providing readers with an enhanced appreciation of carbohydrate structure and function a new enzyme library and extraction strategies that will help to advance a number of exciting domains of research including genomics proteomics chemical synthesis materials science and engineering Key Features Details the source production structures properties and current and potential applications of polysaccharides Discusses general strategies of isolation separation and characterization of polysaccharides Describes botanical algal animal and microbial sources of polysaccharides Demonstrates the importance of carbohydrates in new lead generation Highlights the range of possibilities for polysaccharides to make real world impact **Peptide and Protein Drug Delivery Using Polysaccharides** Aakanchha Jain,Sonia Malik,2023-10-05 Peptide and Protein Drug Delivery Using Polysaccharides offers an interdisciplinary discussion of polysaccharides applied in peptide and protein drug delivery Chapters consider basic biology of different polysaccharides of current interest and their production at pilot and large scale stages by various techniques including but not limited to cell and hairy root cultures Other sections examine factors affecting polysaccharide absorption metabolism and excretion in nascent encapsulated or conjugated forms with unique coverage of vaccine absorption metabolism and drug delivery A final section considers analytical methods for detection in tissue fluids and homogenates Accessible figures tables and graphical abstracts are included throughout to support understanding Specific polysaccharides discussed for therapeutic purposes include cellulose

hyaluronic acid heparin carageenan alginic acid agar and myrrh acacia tragacanth ghatti gum chitin chitosan starch glycogen and dextran Adopts an interdisciplinary approach across biochemistry molecular biology pharmaceutical sciences and drug delivery and biotechnological perspectives Features accessible figures tables and graphical abstracts across all chapters to support understanding Examines various polysaccharides of current interest and aspects affecting their absorption metabolism excretion and detection

Polysaccharide Based Nanocrystals Chemistry And Applications Book Review: Unveiling the Magic of Language

In a digital era where connections and knowledge reign supreme, the enchanting power of language has become more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is truly remarkable. This extraordinary book, aptly titled "**Polysaccharide Based Nanocrystals Chemistry And Applications**," published by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we will delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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