

Handbook Of Thermodynamic Diagrams Paape

Research into the field of stem cell biology has developed exponentially over recent years, and is beginning to offer significant promise for unravelling the molecular basis of a multitude of disease states. Importantly, in addition to offering the opportunity to delve deeply into the mechanisms that drive disease aetiology the research is realistically opening the doors for development of targeted and personalized therapeutic applications that many considered, until recently, to be nothing more than a far fetched dream. This volume provides a timely glimpse into the methods that have been developed to investigate, and the mechanisms that have been identified to drive, the process of nuclear reprogramming, chronicling how the field has developed over the last 50-60 years. Since the early 1950s a small number of notable experiments have provided significant impetus to the field, primarily the demonstration of reprogramming ability, first by the complex cytoplasmic milieu that constitutes the amphibian egg, then that of the mammalian egg, and finally that of the mammalian embryonic stem cell. Most recently, the demonstration that a limited pool of defined molecules is capable of reprogramming a multitude of cell types has provided massive impetus and facilitated transition towards realistic therapeutic application. We have therefore reproduced some of the key articles that elegantly document these dramatic stages of development of the field in an inclusive appendix to the book, for the benefit of readers keen to investigate the history of how the field of stem cell biology has evolved. Owing to the ever broadening nature of this field, and the incredible rate at which it is evolving, the main content of this volume focuses on areas that have shown significant movement in recent years, are most likely to translate into personalized therapeutic application, and thus provide greatest potential for significant impact on human health in the not too distant future. We recognize that research into many other disease states and cell types are all equally worthy of discussion. We would therefore like to acknowledge those researchers involved whose work we have not been able to include in this volume. Nuclear Reprogramming and Stem Cells will serve as a valuable resource for all researchers in the field of stem cell biology, including those just setting out on their career path as well as those already established in the field.

This book offers up-to-date information on different microbiomes, their community composition and interactive functions with the host, bringing together information from diverse research reports to provide an overview of the rapid developments in meta-omics technologies. It is a valuable resource for scientists, researchers, postgraduate and graduate students interested in understanding the impact and importance of next generation sequencing technologies on different hosts and their microbiomes.

An improved understanding of the interactions between nanoparticles and plant retorts, including their uptake, localization, and activity, could revolutionize crop production through increased disease resistance, nutrient utilization, and crop yield. This may further impact other agricultural and industrial processes that are based on plant crops. This two-volume book analyses the key processes involved in the nanoparticle delivery to plants and details the interactions between plants and nanomaterials. Potential plant nanotechnology applications for enhanced nutrient uptake, increased crop productivity and plant disease management are evaluated with careful consideration regarding safe use, social acceptance and ecological impact of these technologies. Plant Nanobionics: Volume 1, Advances in the Understanding of Nanomaterials Research and Applications begins the discussion of nanotechnology applications in plants with the characterization and nanosynthesis of various microbes and covers the mechanisms and etiology of nanostructure function in microbial cells. It focuses on the potential alteration of plant production systems through the controlled release of agrochemicals and targeted delivery of biomolecules. Industrial and medical applications are included. Volume 2 continues this discussion with a focus on biosynthesis and toxicity.

Compiled by an expert in the field, the book provides an engineer with data they can trust. Spanning gases, liquids, and solids, all critical properties (including viscosity, thermal conductivity, and diffusion coefficient) are covered. From Cl to Cl100 organics and Ac to Zr inorganics, the data in this handbook is a perfect quick reference for field, lab or classroom usage. By collecting a large - but relevant - amount of information in one source, the handbook enables engineers to spend more time developing new designs and processes, and less time collecting vital properties data. This is not a theoretical treatise, but an aid to the practicing engineer in the field, on day-to-day operations and long range projects. Simplifies research and significantly reduces the amount of time spent collecting properties data Compiled by an expert in the field, the book provides an engineer with data they can trust in design, research, development and manufacturing A single, easy reference for critical temperature dependent properties for a wide range of hydrocarbons, including Cl to Cl100 organics and Ac to Zr inorganics

Ionic Liquids II

Catalyst Separation, Recovery and Recycling

Electrodeposition From Ionic Liquids

Hydrogen and Fuel Cell

Emerging Technologies to Benefit Farmers in Sub-Saharan Africa and South Asia

Nuclear Reprogramming and Stem Cells

This book describes the significance of metrology for inclusive growth in India and explains its application in the areas of physical-mechanical engineering, electrical and electronics, Indian standard time measurements, electromagnetic radiation, environment, biomedical, materials and Bhartiya Nirdeshak Dravyas (BND®). Using the framework of “Aswal Model”, it connects the metrology, in association with accreditation and standards, to the areas of science and technology, government and regulatory agencies, civil society and media, and various other industries. It presents critical analyses of the contributions made by CSIR-National Physical Laboratory (CSIR-NPL), India, through its world-class science and apex measurement facilities of international equivalence in the areas of industrial growth, strategic sector growth, environmental protection, cybersecurity, sustainable energy, affordable health, international trade, policy-making, etc. The book will be useful for science and engineering students, researchers, policymakers and entrepreneurs.

A monograph examining recent progress in the field of inhomogeneous fluids, focusing on the theoretical - as well as experimental - techniques used. It presents the comprehensive theory of first-order phase transitions, including melting, and contains numerous figures, tables and display equations.The contributors treat such subjects as: exact sum rules for inhomogenous fluids, explaining density functional and integral equation methods; exact solutions for two-dimensional homogeneous and inhomogeneous plasmas; current advances in the theory of interfacial electrochemistry; wetting experiments and the theory of wetting; freezing, with an emphasis on quantum systems and homogeneous nucleation in liquid-vapour and solid-liquid transitions; self-organizing liquids as well as kinetic phenomena in inhomogeneous fluids, using a modified Enskog theory.;Featuring over 1000 bibliographic citations, this volume is aimed at physical, surface, colloid and surfactant chemists; also physicists, electrochemists and graduate-level students in these disciplines.

Free Radicals in Biology and Medicine has become a classic text in the field of free radical and antioxidant research. Now in its fifth edition, the book has been comprehensively rewritten and updated whilst maintaining the clarity of its predecessors. Two new chapters discuss 'in vivo' and 'dietary' antioxidants, the first emphasising the role of peroxiredoxins and integrated defence mechanisms which allow useful roles for ROS, and the second containing new information on the role of fruits, vegetables, and vitamins in health and disease. This new edition also contains expanded coverage of the mechanisms of oxidative damage to lipids, DNA, and proteins (and the repair of such damage), and the roles played by reactive species in signal transduction, cell survival, death, human reproduction, defence mechanisms of animals and plants against pathogens, and other important biological events. The methodologies available to measure reactive species and oxidative damage (and their potential pitfalls) have been fully updated, as have the topics of phagocyte ROS production, NADPH oxidase enzymes, and toxicology. There is a detailed and critical evaluation of the role of free radicals and other reactive species in human diseases, especially cancer, cardiovascular, chronic inflammatory and neurodegenerative diseases. New aspects of ageing are discussed in the context of the free radical theory of ageing. This book is recommended as a comprehensive introduction to the field for students, educators, clinicians, and researchers. It will also be an invaluable companion to all those interested in the role of free radicals in the life and biomedical sciences.

This volume deals with substances in the liquid state that range from high melting salts, such as calcium fluoride, through slags, such as silicates, down to lower melting salts, such as lithium nitrate, molten hydrated salts, such as magnesium chloride hexahydrate, to room temperature ionic liquids, such as 1,3-dimethylimidazolium tetraphenylborate. It provides the reader with annotated, critically examined, and compiled data for such materials. The data includes a variety of thermochemical, structural, and transport properties. The book includes correlations of measured properties; these correlations should enable the reader to estimate, on a sound basis, properties for ionic liquids that have not yet been measured.

Ionic Liquids in Separation Technology

Surface and Interface Science

Special Distillation Processes

Ionic Liquids in Biotransformations and Organocatalysis

Solids Far from Equilibrium

Volume 1, Advances in the Understanding of Nanomaterials Research and Applications

Special distillation processes are required for separation of mixtures close to boiling point or for forming azeotrope mixtures into their pure components. In Special Distillation Processes, the authors focus on latest developments in the field, such as separation methods that may prove useful for solving problems encountered during research. Topics include extraction, membrane and adsorption distillation involving the separation principle, process design and experimental techniques. The relationship between the processes and the techniques are also presented. Comprehensive and easy-to-read, this book provides key information needed to understand the processes and is a valuable reference source for chemical engineers as well as students wishing to branch out in chemical engineering. * The only comprehensive book available on special distillation processes * Contains a thorough introduction to recent developments in the field * A valuable reference for students and engineers in chemical engineering

Based on a symposium sponsored by the Environmental Division of the American Chemical Society, Perchlorate in the Environment is the first comprehensive book to address perchlorate as a potable water contaminant. The two main topics are: analytical chemistry (focusing on ion chromatography and electrospay ionization mass spectrometry), and treatment or remediation. Also included are topics such as ion exchange, photoreduction, bacterial reduction of perchlorate, bioreactors, and in situ bioremediation. To provide complete coverage, background chapters on fundamental chemistry, toxicology, and reulatory issues are also included. The authors are environmental consultants, government researchers, industry experts, and university professors from a wide array of disciplines.

Reflecting the dramatic rise in interest shown in this field over the last few years, this book collates the widespread knowledge into one handy volume. It covers in depth all classes of ionic liquids thus far in existence, with the individual chapters written by internationally recognized experts. The text is written to suit several levels of difficulty, containing information on basic physical chemistry in ionic liquids, a theory on the conductivity as well as plating protocols suited to undergraduate courses. The whole is rounded off with an appendix providing experimental procedures to enable readers to experiment with ionic liquids for themselves.

Recently, there has been a surge of activity to elucidate the behavior of highly charged soft matter and Coulomb liquids in general. Such systems are ubiquitous, especially in biological matter where the length scale and the strength of the interaction between highly charged biomolecules are governed by strong electrostatic effects. Several interesting limits have been discovered in the parameter space of highly charged many-particle Coulomb matter where analytical progress is possible and completely novel and unexpected results have been obtained. One of the challenges in highly charged matter is to correctly describe systems with finite coupling strength in the transition regime between weak and strong couplings. After studying the fluctuations of both, several theories have been developed that describe this experimentally highly relevant regime. At the same time, computer simulation algorithms and computing power have advanced to the level where all-ion simulations, including many-body and polarization effects, are possible; the new theories thus can be subjected to numerical confirmation. Another important question is the effect of the structural disorder on electrostatic interactions. It has recently been demonstrated, both theoretically and experimentally, that charge disorder can impose long-range interaction between charged or even uncharged surfaces. These interactions might become very significant in biological processes. Filling a void in the literature, this volume cross-pollinates different theoretical and simulation approaches with new experiments and ties together the low temperature, high coupling constant, and disorder parameters in a unified description of the electrostatic interactions, which largely determine the stability and conformations of most important biological macromolecules. With striking graphical illustrations, the book presents a unified view of the current advances in the field of Coulomb (bio)colloidal systems, building on previous literature that summarized the field over 20 years ago. Leading scientists in the field offer a detailed introduction to different modern methods in statistical physics of Coulomb systems. They detail various approaches to elucidate the behavior of strongly charged soft matter. They also provide experimental and theoretical descriptions of disorder effects in Coulomb systems, which have not been discussed in any other book.

Fundamentals of Inhomogeneous Fluids

Perchlorate in the Environment

Surface and Interface Science, Volume 7

From Molten Salts to RTILs

Fundamentals of Ionic Liquids

First published in 1971, this highly popular text is devoted to the interdisciplinary area of critical phenomena, with an emphasis on liquid-gas and ferromagnetic transitions. Advanced undergraduate and graduate students in thermodynamics, statistical mechanics, and solid state physics, as well as researchers in physics, mathematics, chemistry, and materials science, will welcome this paperback edition of Stanley's acclaimed text.

This book looks at new ways of tackling the problem of separating reaction products from homogeneous catalytic solutions. The new processes involve low leaching supported catalysts, soluble supports such as polymers and dendrimers and unusual solvents such as water, fluorinated organics, ionic liquids and supercritical fluids. The advantages of the different possibilities are discussed alongside suggestions for further research that will be required for commercialisation. Unlike other books, in addition to the chemistry involved, the book looks at the process design that would be required to bring the new approaches to fruition. Comparisons are given with existing processes that have already been successfully applied and examples are given where these approaches are not suitable. The book includes - New processes for the separation of products from solutions containing homogeneous catalysts - Catalysts on insoluble or soluble supports - fixed bed catalysts - continuous flow or ultrafiltration - Biphasic systems: water - organic, fluorous - organic, ionic liquid - organic, supercritical fluids (monophasic or biphasic with water, organic or ionic liquid).

Comparisons with current processes involving atmospheric or low temperature distillation - Consideration of Chemistry and Process Design - Advantages and disadvantages of each process exposed - Consideration of what else is need for commercialisation

This book introduces readers to hydrogen as an essential energy carrier for use with renewable sources of primary energy. It provides an overview of the state of the art, while also highlighting the developmental and market potential of hydrogen in the context of energy technologies; mobile, stationary and portable applications; uninterruptible power supplies and in the chemical industry. Written by experienced practitioners, the book addresses the needs of engineers, chemists and business managers, as well as graduate students and researchers.

This comprehensive database on physical properties of pure ionic liquids (ILs) contains data collected from 269 peer-reviewed papers in the period from 1982 to June 2008. There are more than 9,400 data points on the 29 kinds of physicochemical properties for 1886 available ionic liquids, from which 807 kinds of cations and 185 kinds of anions were extracted. This book includes nearly all known pure ILs and their known physicochemical properties through June 2008. In addition, the authors incorporate the main applications of individual ILs and a large number of references. Nearly 50 tables include typical data, experimental and modelling or simulation comparison, and model parameters, enhancing the application of ILs 100 figures—from OSPR, EOS and gE models to quantum and molecular simulations—help readers understand ILs at molecular level Applications illustrate the role of IL properties in industry, in particular the development of novel clean processes and products

Classes and Properties

Electrostatics of Soft and Disordered Matter

Nanocatalysis in Ionic Liquids

Solvents and Beyond

Drug Resistance in Leishmania Parasites

Fractals, Scaling and Growth Far from Equilibrium

This book addresses the use of ionic liquids in biotransformation and organocatalysis. Its major parts include: an overview of the fundamentals of ionic liquids and their interactions with proteins and enzymes; the use of ILs in biotransformations; non-solvent applications such as additives, membranes, substrate anchoring, and the use of ILs in organocatalysis (from solvents to co-catalysts and new reactivities, as well as non-solvent applications such as anchoring and immobilization).

This volume describes the most recent findings on the structure of ILs interpreted through cutting-edge experimental and theoretical methods. Research in the field of ionic liquids (ILs) keeps a fast and steady pace. Since these new-generation molten salts first appeared in the chemistry and physics landscape, a large number of new compounds has been synthesized. Most of them display unexpected behaviour and possess stunning properties. The coverage in this book ranges from the mesoscopic structure of ILs to their interaction with proteins. The reader will learn how diffraction techniques (small and large angle X-Ray and neutron scattering, powder methods), X-Ray absorption spectroscopies (EXAFS/XANES), optical methods (IR, RAMAN), NMR and calorimetric methods can help the study of ILs, both as neat liquids and in mixtures with other compounds. It will enable the reader to choose the best method to suit their experimental needs. A detailed survey of the theoretical methods, both quantum-chemical and classical, and of their predictive power will accompany the exposition of experimental ones. This book is a must read for postgraduate students, for post-doctoral and for researchers who are interested in understanding the structural properties of ILs.

The current book brings together the latest developments in the area of ionic liquids, including synthesis, purity control, toxicity, and scaling-up technologies. In addition, the authors explore the applications of ionic liquids in organic synthesis and catalysis, separation techniques and nanomaterials engineering. Written by key experts in the field, this book is an invaluable material for organic and green chemists in academia and industry.

The aim of this book is to develop a unified approach to nonlinear science, which does justice to its multiple facets and to the diversity and richness of the concepts and tools developed in this field over the years. Nonlinear science emerged in its present form following a series of closely related and decisive analytic, numerical and experimental developments that took place over the past three decades. It appeals to an extremely large variety of subject areas, but, at the same time, introduces into science a new way of thinking based on a subtle interplay between qualitative and quantitative techniques, topological and metric considerations and deterministic and statistical views. Special effort has been made throughout the book to illustrate both the development of the subject and the mathematical techniques, by reference to simple models. Each chapter concludes with a set of problems. This book will be of great value to graduate students in physics, applied mathematics, chemistry, engineering and biology taking courses in nonlinear science and its applications.

Electrochemical Aspects of Ionic Liquids

Pattern Formation

CRC Handbook of Thermophysical and Thermochemical Data

Consequences, Molecular Mechanisms and Possible Treatments

Understanding Host-Microbiome Interactions - An Omics Approach

An Introduction to Methods

Ionic LiquidsClasses and PropertiesBoD – Books on Demand

A comprehensive, 1998 account of the practical aspects and pitfalls of the applications of fractal modelling in the physical sciences.

Room temperature ionic liquids (RTILs) are an interesting and valuable family of compounds. Although they are all salts, their components can vary considerably, including imidazolium, pyridinium, ammonium, phosphonium, thiazolium, and triazolium cations. In general, these cations have been combined with weakly coordinating anions. Common examples include tetrafluoroborate, hexafluorophosphate, triflate, triflimide, and dicyanamide. The list of possible anionic components continues to grow at a rapid rate. Besides exploring new anionic and cation components, another active and important area of research is the determination and prediction of their physical properties, particularly since their unusual and tunable properties are so often mentioned as being one of the key advantages of RTILs over conventional solvents. Despite impressive progress, much work remains before the true power of RTILs as designer solvents (i.e. predictable selection of a particular RTIL for any given application) can be effectively harnessed.

One of the main problems concerning therapeutic tools for the treatment of parasitic diseases, including leishmaniasis, is that some field parasites are naturally resistant to the classical drugs; additionally, current therapies may select parasites prone to be resistant to the applied drugs. These features are (at least partially) responsible for the disappointing persistence of the disease and resultant deaths worldwide. This book provides a comprehensive view of the pathology of the disease itself, and of parasitic drug resistance, its molecular basis, consequences and possible treatments. Scientists both from academic fields and from the industry involved in biomedical research and drug design, will find in this book a valuable and fundamental guide that conveys the knowledge needed to understand and to improve the success in combating this disease worldwide.

Plant Nanobionics

Technologies and Market Perspectives

Introduction to Phase Transitions and Critical Phenomena

Modern Thermodynamics

Ionic Liquid Properties

Thermotherapy for Neoplasia, Inflammation, and Pain

Increased agricultural productivity is a major stepping stone on the path out of poverty in sub-Saharan Africa and South Asia, but farmers there face tremendous challenges improving production. Poor soil, inefficient water use, and a lack of access to plant breeding resources, nutritious animal feed, high quality seed, and fuel and electricity-combined with some of the most extreme environmental conditions on Earth-have made yields in crop and animal production far lower in these regions than world averages. Emerging Technologies to Benefit Farmers in Sub-Saharan Africa and South Asia identifies sixty emerging technologies with the potential to significantly improve agricultural productivity in sub-Saharan Africa and South Asia. Eighteen technologies are recommended for immediate development and further exploration. Scientists from all backgrounds have an opportunity to become involved in bringing these and other technologies to fruition. The opportunities suggested in this book offer new approaches that can synergize with each other and with many other activities to transform agriculture in sub-Saharan Africa and South Asia.

The second edition is based on the original book, which has been revised, updated and expanded in order to cover the latest information on this rapidly growing field. The book begins with a description of general and electrochemical properties of ionic liquids and continues with a discussion of applications in biochemistry, ionic devices, functional design and polymeric ionic liquids. The new edition includes new chapters on Li ion Batteries and Actuators, as well as a revision of existing chapters to include a discussion on purification and the effects of impurities, adsorption of ionic liquids on interfaces and on the electrochemical double layer, among other topics.

Written by experts who have been part of this field since its beginnings in both research and academia, this textbook introduces readers to this evolving topic and the broad range of applications that are being explored. The book begins by examining what it is that defines ionic liquids and what sets them apart from other materials. Chapters describe the various types of ionic liquids and the different techniques used to synthesize them, as well as their properties and some of the methods used in their measurement. Further chapters delve into synthetic and electrochemical applications and their broad use as “Green” solvents. Final chapters examine important applications in a wide variety of contexts, including such devices as capacitor cells and batteries, electrochemistry, and biotechnology. The result is a must-have resource for any researcher beginning to work in this growing field, including senior undergraduates and postgraduates.

Covering interface science from a novel surface science perspective, this seven-volume handbook offers a comprehensive overview of both these and numerous other topics. The initial chapters treat basic fundamentals on such topics as vacuum technology, while general chapters -- where appropriate -- describe theoretical methods and provide models to help explain the respective phenomena, such as band structure calculations, chemisorption and segregation. Additionally, short references to more specialized methodology accompany the descriptions of the most important techniques. Ideal as a reference for scientists in the field, as well as an introduction to current methods for newcomers.

Principles of Condensed Matter Physics

Metrology for Inclusive Growth of India

From Chemistry to Applications

Synthesis, Properties, Technologies and Applications

Thermophysical Properties of Chemicals and Hydrocarbons

Omics of Host-Microbiome Association

Written by recognized experts in the study of proteins, Proteomics for Biological Discovery begins by discussing the emergence of proteomics from genome sequencing projects and a summary of potential answers to be gained from proteome-level research. The tools of proteomics, from conventional to novel techniques, are then dealt with in terms of underlying concepts, limitations and future directions. An invaluable source of information, this title also provides a thorough overview of the current developments in post-translational modification studies, structural proteomics, biochemical proteomics, microfabrication, applied proteomics, and bioinformatics relevant to proteomics. Presents a comprehensive and coherent review of the major issues faced in terms of technology development, bioinformatics, strategic approaches, and applications Chapters offer a rigorous overview with summary of limitations, emerging approaches, questions, and realistic future industry and basic science applications Discusses higher level integrative aspects, including technical challenges and applications for drug discovery Accessible to the novice while providing experienced investigators essential information Proteomics for Biological Discovery is an essential resource for students, postdoctoral fellows, and researchers across all fields of biomedical research, including biochemistry, protein chemistry, molecular genetics, cell/developmental biology, and bioinformatics.

Employing a multidisciplinary approach to phospholipid research, this work catalogues the current knowledge of this class of molecules and details the general, chemical, physical and structural properties of phospholipid monolayers and bilayers. Phospholipid applications are also covered.

Modern Thermodynamics: From Heat Engines to Dissipative Structures, Second Edition presents a comprehensive introduction to 20th century thermodynamics that can be applied to both equilibrium and non-equilibrium systems, unifying what was traditionally divided into ‘thermodynamics’ and ‘kinetics’ into one theory of irreversible processes. This comprehensive text, suitable for introductory as well as advanced courses on thermodynamics, has been widely used by chemists, physicists, engineers and geologists. Fully revised and expanded, this new edition includes the following updates and features: Includes a completely new chapter on Principles of Statistical Thermodynamics. Presents new material on solar and wind energy flows and energy flows of interest to engineering. Covers new material on self-organization in non-equilibrium systems and the thermodynamics of small systems. Highlights a wide range of applications relevant to students across physical sciences and engineering courses. Introduces students to computational methods using updated Mathematica codes. Includes problem sets to help the reader understand and apply the principles introduced throughout the text. Solutions to exercises and supplementary lecture material provided online at <http://sites.google.com/site/moderthermodynamics/>. Modern Thermodynamics: From Heat Engines to Dissipative Structures, Second Edition is an essential resource for undergraduate and graduate students taking a course in thermodynamics.

Fully illustrated mathematical guide to pattern formation. Includes instructive exercises and examples.

Chemistry and Process Design

Phospholipids Handbook

Proteomics for Biological Discovery

Solid-Liquid and Biological Interfaces

Theory of Simple Liquids

From Heat Engines to Dissipative Structures

This book gives a comprehensive and up-to-date treatment of the theory of “simple” liquids. The new second edition has been rearranged and considerably expanded to give a balanced account both of basic theory and of the advances of the past decade. It presents the main ideas of modern liquid state theory in a way that is both pedagogical and self-contained. The book should be accessible to graduate students and research workers, both experimentalists and theorists, who have a good background in elementary mechanics. Compares theoretical deductions with experimental results Molecular dynamics Monte Carlo computations Covers ionic, metallic, and molecular liquids

Now in paperback, this book provides an overview of the physics of condensed matter systems. Assuming a familiarity with the basics of quantum mechanics and statistical mechanics, the book establishes a general framework for describing condensed phases of matter, based on symmetries and conservation laws. It explores the role of spatial dimensionality and microscopic interactions in determining the nature of phase transitions, as well as discussing the structure and properties of materials with different symmetries. Particular attention is given to critical phenomena and renormalization group methods. The properties of liquids, liquid crystals, quasicrystals, crystalline solids, magnetically ordered systems and amorphous solids are investigated in terms of their symmetry, generalised rigidity, hydrodynamics and topological defect structure. In addition to serving as a course text, this book is an essential reference for students and researchers in physics, applied physics, chemistry, materials science and engineering, who are interested in modern condensed matter physics.

This book provides a comprehensive overview of the multitude of different forms of thermotherapy in connection with aspects of thermal physiology and cell biology. The aim is to elucidate the scientific background of therapeutic actions and to promote effective new applications at the beginning of the 21st century. Significant to these purposes is cooperation between experts in the fields of thermal biology, hyper thermic oncology, rheumatology, and balneology, as represented by the editors. Emphasis has been placed on a balanced choice of contributions, in the hope that this will enable the reader to draw helpful connections between the principles and practice of thermotherapy. It is apparent that a wealth of published data exists concerning thermotherapy on the one hand and thermal physiology on the other. However, in the former field empirical aspects of therapeutic usefulness prevail, while in the latter, aspects of basic science are in the foreground. Accordingly, the sources where published data may be found are quite different and as a consequence many findings of potential mutual interest published in medical journals have gone unnoticed by readers of physio logical journals, and vice versa. It is hoped that this book will bridge the gap and encourage researchers’ efforts to integrate the available knowledge to attain optimal coordination of clinical and theoretical aspects.

Originally published in 1991, this book, based on the 1989 Beg-Rohu summer school, contains six sets of pedagogical lectures by internationally respected researchers on the statistical physics of crystal growth. Providing a course in which the phenomena of shape and growth are viewed from a fresh vantage point, the lectures cover a variety of developments in the field and reflect on problems that have received inadequate attention. Statistical physicists, condensed matter physicists, metallurgists, and applied mathematicians will find this a stimulating and valuable book on an important topic.

Physicochemical Properties

The Structure of Ionic Liquids

Free Radicals in Biology and Medicine

Ionic Liquids

Introduction to Nonlinear Science

The series ‘Topics in Current Chemistry’ Collections presents critical reviews from the Journal Topics in Current Chemistry organized in topical volumes. The scope of coverage is all areas of chemical science including the interfaces with related disciplines such as biology, medicine and materials science. The goal of each thematic volume is to give the non-specialist reader, whether in academia or industry, a comprehensive insight into an area where new research is emerging which is of interest to a larger scientific audience. Each review within the volume critically surveys each aspect of that topic and places it within the context of the volume as a whole. The most significant developments of the last 5 to 10 years are presented using selected examples to illustrate the principles discussed. The coverage is not intended to be an exhaustive summary of the field or include large quantities of data, but should rather be conceptual, concentrating on the methodological thinking that will allow the non-specialist reader to understand the information presented. Contributions also offer an outlook on potential future developments in the field. The chapters “ Ionic Liquid–Liquid Chromatography: A New General Purpose Separation Methodology ” , “ Proteins in Ionic Liquids: Current Status of Experiments and Simulations ” , “ Lewis Acidic Ionic Liquids ” and “Quantum Chemical Modeling of Hydrogen Bonding in Ionic Liquids” are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

The CRC Handbook of Thermophysical and Thermochemical Data is an interactive software and handbook package that provides an invaluable source of reliable data embracing a wide range of properties of chemical substances, mixtures, and reacting systems. Use the handbook and software together to quickly, and easily generate property values at any desired temperature, pressure, or mixture composition.

Edited and written by renowned experts in the field, this is the first book to reflect the state of the art of nanocatalysis in ionic liquids. Divided into two core areas, the first part of the book describes the different classes of metal nanoparticles as well as their synthesis in ionic liquids, while the second focuses on such emerging issues as the application of such systems to energy and biomass conversion.

Ionic Liquids in Separation Technology reports on the most important fundamental and technological advances in separation processes using ionic liquids. It brings together the latest developments in this fascinating field, supplements them with numerous practical tips, and thus provides those working in both research and industry with an indispensable source of information. The book covers fundamental topics of physical, thermal, and optical properties of ionic liquids, including green aspects. It then moves on to contexts and applications, including separation of proteins, reduction of environmental pollutants, separation of metal ions and organic compounds, use in electrochromic devices, and much more. For the specialist audience the book serves as a recompilation of the most important knowledge in this field, whereas for starting researchers in ionic liquid separation technology the book is a great introduction to the field. First book in the marketplace dedicated to ionic liquids in separation technology Contributions from scientists in academia and researchers in industry ensure the coverage of both scientific fundamentals and industrial applications Covers a broad collection of applications in separation technology which makes the book a single source of information Includes many practical tips for researchers in industry and scientists who apply ionic liquids in their work