



Solidstate Chemistry

N. B. Hannay



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Solid State Chemistry and its Applications Anthony R. West, 2022-04-06 SOLID STATE CHEMISTRY AND ITS APPLICATIONS A comprehensive treatment of solid state chemistry complete with supplementary material and full colour illustrations from a leading expert in the field Solid State Chemistry and its Applications Second Edition delivers an advanced version of West's classic text in solid state chemistry expanding on the undergraduate Student Edition to present a comprehensive treatment of solid state chemistry suitable for advanced students and researchers The book provides the reader with an up to date account of essential topics in solid state chemistry and recent developments in this rapidly developing field of inorganic chemistry Significant updates and new content in this second edition include A more extensive overview of important families of inorganic solids including spinels perovskites pyrochlores garnets Ruddlesden Popper phases and many more New methods to synthesise inorganic solids including sol gel methods combustion synthesis atomic layer deposition spray pyrolysis and microwave techniques Advances in electron microscopy X ray and electron spectroscopies New developments in electrical properties of materials including high T_c superconductivity lithium batteries solid oxide fuel cells and smart windows Recent developments in optical properties including fibre optics solar cells and transparent conducting oxides Advances in magnetic properties including magnetoresistance and multiferroic materials Homogeneous and heterogeneous ceramics characterization using impedance spectroscopy Thermoelectric materials MXenes low dimensional structures memristors and many other functional materials Expanded coverage of glass including metallic and fluoride glasses cement and concrete geopolymers refractories and structural ceramics Overview of binary oxides of all the elements their structures properties and applications Featuring full color illustrations throughout readers will also benefit from online supplementary materials including access to CrystalMaker software and over 100 interactive crystal structure models Perfect for advanced students seeking a detailed treatment of solid state chemistry this new edition of Solid State Chemistry and its Applications will also earn a place as a desk reference in the libraries of experienced researchers in chemistry crystallography physics and materials science *Chemistry of the Solid State* William Edward Garner, 1955 Solid State Chemistry Richard C. Ropp, 2003-06-12 Solid State Chemistry is a general textbook composed for those with little background knowledge of the subject but who wish to learn more about the various segments of solid state theory and technology The information is presented in a form that can easily be understood and will be useful to readers wishing to build on their own store of knowledge and experience Well presented in easy to understand format Informative textbook aimed primarily at the novice Comprehensively covers the segments of solid state theory and technology *Principles of Solid State Chemistry* Petr Petrovich Budnikov, Arkadii Mikhaïlovich Ginstling, 1968 **Treatise on Solid State Chemistry** N. Hannay, 2012-12-06 The last quarter century has been marked by the extremely rapid growth of the solid state sciences They include what is now the largest subfield of physics and the materials engineering sciences

have likewise flourished And playing an active role throughout this vast area of science and engineering have been very large numbers of chemists Yet even though the role of chemistry in the solid state sciences has been a vital one and the solid state sciences have in turn made enormous contributions to chemical thought solid state chemistry has not been recognized by the general body of chemists as a major subfield of chemistry Solid state chemistry is not even well defined as to content Some for example would have it include only the quantum chemistry of solids and would reject thermodynamics and phase equilibria this is nonsense Solid state chemistry has many facets and one of the purposes of this Treatise is to help define the field Perhaps the most general characteristic of solid state chemistry and one which helps differentiate it from solid state physics is its focus on the chemical composition and atomic configuration of real solids and on the relationship of composition and structure to the chemical and physical properties of the solid Real solids are usually extremely complex and exhibit almost infinite variety in their compositional and structural features

Solid State Chemistry Bernadett Kent, 2021-11-16

Solid state chemistry refers to the study of structure properties and synthesis of solid materials It focuses on the making and characterization of the constituent particles of novel materials Solids are divided into two categories based on the arrangement of their particles and the nature of order present These categories are crystalline and amorphous solids A wide variety of techniques are used to study these properties of solids Some of these are oven techniques like gas reaction melt methods and solution methods along with *chemie douce* The field primarily overlaps with other areas such as thermodynamics crystallography solid state physics ceramics material science and electronics This book is a valuable compilation of topics ranging from the basic to the most complex theories and principles related to this discipline It studies analyzes and upholds the pillars of solid state chemistry and its utmost significance in modern times For someone with an interest and eye for detail this book covers the most significant topics of solid state chemistry

Introduction to Solid State Chemistry James E. House, 2024-02-21

Introduction to Solid State Chemistry provides a strong background to the structures of solids and factors that determine this structure The content presented will also stress transformations of solids both in physical forms and chemical composition In so doing topics such as phase transitions sintering reactions of coordination compounds photovoltaic compounds are described whilst kinetics and mechanisms of solid state reactions are covered in depth There are currently few books that deal with solid state chemistry where a considerable number instead deal with solid state physics and materials science engineering This book provides someone needing or wishing to learn about the chemistry of solids a comprehensive resource that describes structures of solids the behaviour of solids under applied stresses the types of reactions that solids undergo and the phenomenological aspects of reactions in solids Kinetics of reactions in solids is very seldom covered in current literature and an understanding of the mechanisms of reactions in solids is necessary for many applications James E House provides a balanced treatment of structure dynamics and behaviour of solids at a level commensurate with upper level undergraduates or beginning graduate students who wish to obtain an introduction and

overview to solid state chemistry Provides a fundamental introduction and entry point to solid state chemistry acting as a useful prerequisite for further learning in the area Presents a balanced approach that not only emphasizes structures of solids but also provides information on reactions of solids and how they occur Gives much needed focus to the kinetics of reactions of solids and their mechanisms where existing literature covers little of this Explores crucial solid state chemistry topics such as solar energy conversion reactions of solid coordination compounds diffusion sintering and other transformations of solids Features accessible and well written examples and case studies featuring many new and bespoke supporting illustrations offering an excellent framework that will help students to understand reaction mechanisms Solid State Chemistry and Physics Paul F. Weller, 1973 Progress in Solid State Chemistry J. O. McCaldin, Gabor A. Sommorjai, 1973

Preparative Methods in Solid State Chemistry Paul Hagenmuller, 2012-12-02 Preparative Methods in Solid State Chemistry deals with the preparative methods used in solid state chemistry and highlights the importance of the chemist's role in preparing materials of desired quality as well as obtaining materials according to the requirements of the user such as the physicist Topics covered range from high pressure techniques in preparative chemistry to methods of growing single crystals of high melting point oxides This book is comprised of 14 chapters and begins with an overview of possibilities for high pressure synthesis as well as the methods used to obtain high pressures including transmission by gaseous or liquid fluids or in the solid state The method of shock waves is then considered both from the point of view of thermodynamics and thermoelasticity along with the possibility of using superpressures for evidently revolutionary applications Subsequent chapters focus on the synthesis of single crystals of refractory oxides either at high temperatures essentially liquid solid transformations or at lower temperatures in the presence of a solvent or a chemical reagent The production of single crystals by electrolytic reduction in molten salts is also described Numerous examples of vapor transport reactions in a temperature gradient are presented This monograph should be of interest to chemists and students of solid state chemistry *Solid State Chemistry* Elaine A. Moore, Lesley E. Smart, 2020-08-03 A comprehensive guide to solid state chemistry which is ideal for all undergraduate levels It covers well the fundamentals of the area from basic structures to methods of analysis but also introduces modern topics such as sustainability Dr Jennifer Readman University of Central Lancashire UK The latest edition of Solid State Chemistry combines clear explanations with a broad range of topics to provide students with a firm grounding in the major theoretical and practical aspects of the chemistry of solids Professor Robert Palgrave University College London UK Building a foundation with a thorough description of crystalline structures this fifth edition of Solid State Chemistry An Introduction presents a wide range of the synthetic and physical techniques used to prepare and characterise solids Going beyond this this largely nonmathematical introduction to solid state chemistry includes the bonding and electronic magnetic electrical and optical properties of solids Solids of particular interest porous solids superconductors and nanostructures are included Practical examples of applications and modern developments are

given It offers students the opportunity to apply their knowledge in real life situations and will serve them well throughout their degree course New in the Fifth Edition A companion website which offers accessible resources for students and instructors alike featuring topics and tools such as quizzes videos web links and more A new chapter on sustainability in solid state chemistry written by an expert in this field Cryo electron microscopy X ray photoelectron spectroscopy ESCA Covalent organic frameworks Graphene oxide and bilayer graphene Elaine A Moore studied chemistry as an undergraduate at Oxford University and then stayed on to complete a DPhil in theoretical chemistry with Peter Atkins After a two year postdoctoral position at the University of Southampton she joined the Open University in 1975 becoming a lecturer in chemistry in 1977 senior lecturer in 1998 and reader in 2004 She retired in 2017 and currently has an honorary position at the Open University She has produced OU teaching texts in chemistry for courses at levels 1 2 and 3 and written texts in astronomy at level 2 and physics at level 3 She was team leader for the production and presentation of an Open University level 2 chemistry module delivered entirely online She is a Fellow of the Royal Society of Chemistry and a Senior Fellow of the Higher Education Academy She was co chair for the successful Departmental submission of an Athena Swan bronze award Lesley E Smart studied chemistry at Southampton University United Kingdom After completing a PhD in Raman spectroscopy she moved to a lectureship at the then Royal University of Malta After returning to the United Kingdom she took an SRC Fellowship to Bristol University to work on X ray crystallography From 1977 to 2009 she worked at the Open University chemistry department as a lecturer senior lecturer and Molecular Science Programme director and she held an honorary senior lectureship there until her death in 2016 At the Open University she was involved in the production of undergraduate courses in inorganic and physical chemistry and health sciences She served on the Council of the Royal Society of Chemistry and as the chair of their Benevolent Fund

Treatise on Solid State Chemistry N. Hannay, 2012-12-06 The last quarter century has been marked by the extremely rapid growth of the solid state sciences They include what is now the largest subfield of physics and the materials engineering sciences have likewise flourished And playing an active role throughout this vast area of science and engineering have been very large numbers of chemists Yet even though the role of chemistry in the solid state sciences has been a vital one and the solid state sciences have in turn made enormous contributions to chemical thought solid state chemistry has not been recognized by the general body of chemists as a major subfield of chemistry Solid state chemistry is not even well defined as to content Some for example would have it include only the quantum chemistry of solids and would reject thermodynamics and phase equilibria this is nonsense Solid state chemistry has many facets and one of the purposes of this Treatise is to help define the field Perhaps the most general characteristic of solid state chemistry and one which helps differentiate it from solid state physics is its focus on the chemical composition and atomic configuration of real solids and on the relationship of composition and structure to the chemical and physical properties of the solid Real solids are usually extremely complex and exhibit almost infinite variety in their compositional and structural features Solid State

Chemistry Aaron Wold, Kirby Dwight, 1993-04-30 The subject matter of solid state chemistry lies within the spheres of both physical and inorganic chemistry. In addition, there is a large overlap with solid state physics and materials engineering. However, solid state chemistry has still to be recognized by the general body of chemists as a legitimate subfield of chemistry. The discipline is not even well defined as to content and has many facets that make writing a textbook a formidable task. The early studies carried out in the United States by Roland Ward and his co-workers emphasized the synthesis of new materials and the determination of their structure. His work on doped alkaline earth sulfides formed the basis for the development of infrared phosphors and his pioneering studies on oxides were important in understanding the structural features of both the perovskite oxides as well as the magnetoplumbites. In 1945 A. F. Wells published the first edition of *Structural Inorganic Chemistry*. This work attempts to demonstrate that the synthesis, structure, and properties of solids form an important part of inorganic chemistry. Now, after almost 50 years during which many notable advances have been made in solid state chemistry, it is still evident that the synthesis, structure, determination, and properties of solids receive little attention in most treatments of inorganic chemistry. The development of the field since the early studies of Roland Ward in the early 1940s has been rapid.

Solid State Chemistry Lesley Smart, 1993 **Solid State Chemistry** M. G. Arora, 1997-01-01 The present book on solid state chemistry has been written to cover the complete syllabus in such a manner that students do not get confused while going through this book. Each topic included in this book is self-sufficient in the light of recent developments and research in a simple and elegant style throughout this book. It is assumed that the students understand the fundamental concept in physical chemistry. Each topic covered in this book will do full justification for most of the students. *Handbook of Solid State Chemistry, 6 Volume Set* Richard Dronskowski, Shinichi Kikkawa, Andreas

Stein, 2017-10-23 This most comprehensive and unrivaled compendium in the field provides an up-to-date account of the chemistry of solids, nanoparticles, and hybrid materials. Following a valuable introductory chapter reviewing important synthesis techniques, the handbook presents a series of contributions by about 150 international leading experts. The Who's Who of solid state science. Clearly structured in six volumes, it collates the knowledge available on solid state chemistry, starting from the synthesis and modern methods of structure determination. Understanding and measuring the physical properties of bulk solids and the theoretical basis of modern computational treatments of solids are given ample space, as are such modern trends as nanoparticles, surface properties, and heterogeneous catalysis. Emphasis is placed throughout not only on the design and structure of solids but also on practical applications of these novel materials in real chemical situations.

The Chemical Structure of Solids N. Hannay, 2012-04-24 The last quarter century has been marked by the extremely rapid growth of the solid state sciences. They include what is now the largest subfield of physics and the materials engineering sciences have likewise flourished. And playing an active role throughout this vast area of science and engineering have been very large numbers of chemists. Yet even though the role of chemistry in the solid state sciences has been a

vital one and the solid state sciences have in turn made enormous contributions to chemical thought solid state chemistry has not been recognized by the general body of chemists as a major subfield of chemistry Solid state chemistry is not even well defined as to content Some for example would have it include only the quantum chemistry of solids and would reject thermodynamics and phase equilibria this is nonsense Solid state chemistry has many facets and one of the purposes of this Treatise is to help define the field Perhaps the most general characteristic of solid state chemistry and one which helps differentiate it from solid state physics is its focus on the chemical composition and atomic configuration of real solids and on the relationship of composition and structure to the chemical and physical properties of the solid Real solids are usually extremely complex and exhibit almost infinite variety in their compositional and structural features

Frontiers of Solid State Chemistry Shou-Hua Feng, Jie-Sheng Chen, 2002 Solid state chemistry is a multidisciplinary field that deals with the synthesis structural characterization and properties of various solids and it has been playing a more and more important role in the design and preparation of advanced materials This book includes the excellent research results recently obtained by a wide spectrum of solid state chemists both from China and from abroad Among the distinguished contributors are C N R Rao M Greenblatt and Y T Qian to name a few A variety of subjects representing the frontiers of solid state chemistry which are categorized into solids with electrical optical and magnetic properties porous solids and catalysts hybrid inorganic organic solids solid nanomaterials and new synthetic methods and theory are presented This book will benefit readers who are interested in the chemistry and physics of solids as well as materials scientists and engineers The proceedings have been selected for coverage in Chemistry Citation Index™ Index to Scientific Technical Proceedings ISTP CDROM version ISI Proceedings

Treatise on Solid State Chemistry N. B. Hannay, 1973

Treatise on Solid State Chemistry N. Hannay, 2012-12-06 The last quarter century has been marked by the extremely rapid growth of the solid state sciences They include what is now the largest subfield of physics and the materials engineering sciences have likewise flourished And playing an active role throughout this vast area of science and engineering have been very large numbers of chemists Yet even though the role of chemistry in the solid state sciences has been a vital one and the solid state sciences have in turn made enormous contributions to chemical thought solid state chemistry has not been recognized by the general body of chemists as a major subfield of chemistry Solid state chemistry is not even well defined as to content Some for example would have it include only the quantum chemistry of solids and would reject thermodynamics and phase equilibria this is nonsense Solid state chemistry has many facets and one of the purposes of this Treatise is to help define the field Perhaps the most general characteristic of solid state chemistry and one which helps differentiate it from solid state physics is its focus on the chemical composition and atomic configuration of real solids and on the relationship of composition and structure to the chemical and physical properties of the solid Real solids are usually extremely complex and exhibit almost infinite variety in their compositional and structural features

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Solidstate Chemistry Introduction

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