Introduction To Phase Equilibria In Ceramic Systems

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High-Pressure Fluid Phase Equilibria
High temperature phase equilibria studies play an increasingly important role in materials science and engineering. It is especially significant in the research into the properties of the material and the ways in which they can be improved. This is achieved by observing equilibrium and by examining the phase relationships at high temperature. The study of high temperature phase diagrams of nonmetallic systems began in the early 1900s when silica and mineral systems containing silica were focussed upon. Since then technical ceramics emerged and more emphasis has been placed on high temperature studies. This book covers many aspects, from the fundamentals of phase diagrams, experimental and computational methods, applications, to the results of research. It provides an excellent source of information for a range of scientists such as materials scientists, especially ceramicists, metallurgists, solid-state physicists and chemists, and mineralogists.

**CRC Handbook of Phase Equilibria and Thermodynamic Data of Polymer Solutions at Elevated Pressures**

Traditionally, the teaching of phase equilibria emphasizes the relationships between the thermodynamic variables of each phase in equilibrium rather than its engineering applications. This book changes the focus from the use of thermodynamics relationships to compute phase equilibria to the design and control of the phase conditions that a process needs. Phase Equilibrium Engineering presents a systematic study and application of phase equilibrium tools to the development of chemical processes. The thermodynamic modeling of mixtures for process development, synthesis, simulation, design and optimization is analyzed. The relation between the mixture molecular properties, the selection of the thermodynamic model and the process technology that could be applied are discussed. A classification of mixtures, separation process, thermodynamic models and technologies is presented to guide the engineer in the world of separation processes. The phase condition required for a given reacting system is studied at subcritical and supercritical conditions. The four cardinal points of phase equilibrium engineering are: the chemical plant or process, the laboratory, the modeling of phase equilibria and the simulator. The harmonization of all these components to obtain a better design or operation is the ultimate goal of phase equilibrium engineering.
Methodologies are discussed using relevant industrial examples. The molecular nature and composition of the process mixture is given a key role in process decisions. Phase equilibrium diagrams are used as a drawing board for process implementation.

**Phase Equilibria in Ionic Liquid Facilitated Liquid-Liquid Extractions**

Multiple Equilibria in Proteins covers the multiple interactions between small ions and molecules and a protein molecule. The book also deals with the physicochemical mechanisms of this interaction and the information about protein structure and the forces stabilizing that structure. The text discusses the mathematical description of complex formation, the thermodynamic analysis of binding data, and various theoretical models which can be used to describe the phenomena of small molecule-macromolecule interactions. The measurement of complex formation; the binding of neutral molecules; and hydrogen-ion equilibria are also considered. The book further tackles metal-ion binding; the binding of organic ions by proteins; as well as protein-protein interaction. Chemists and biochemists will find the book useful.

**CRC Handbook of Liquid-Liquid Equilibrium Data of Polymer Solutions**

Volume 61 of Reviews in Mineralogy and Geochemistry presents an up-to-date review of sulfide mineralogy and geochemistry. The crystal structures, electrical and magnetic properties, spectroscopic studies, chemical bonding, thermochemistry, phase relations, solution chemistry, surface structure and chemistry, hydrothermal precipitation processes, sulfur isotope geochemistry and geobiology of metal sulfides are reviewed. Where it is appropriate for comparison, there is brief discussion of the selenide or telluride analogs of the metal sulfides. When discussing crystal structures and structural relationships, the sulfosalt minerals as well as the sulfides are considered in some detail.

**Encyclopedia of Geochemistry**
Ternary Equilibrium Diagrams

Written by a leading practitioner and teacher in the field of ceramic science and engineering, this outstanding text provides advanced undergraduate- and graduate-level students with a comprehensive, up-to-date Introduction to Phase Equilibria in Ceramic Systems. Building upon a concise definition of the phase rule, the book logically proceeds from one- and two-component systems through increasingly complex systems, enabling students to utilize the phase rule in real applications. Unique because of its emphasis on phase diagrams, timely because of the rising importance of ceramic applications, practical because of its pedagogical approach, Introduction to Phase Equilibria in Ceramic Systems offers end-of-chapter review problems, extensive reading lists, a solid thermodynamic foundation and clear perspectives on the special properties of ceramics as compared to metals. This authoritative volume fills a broad gap in the literature, helping undergraduate- and graduate-level students of ceramic engineering and materials science to approach this demanding subject in a rational, confident fashion. In addition, Introduction to Phase Equilibria in Ceramic Systems serves as a valuable supplement to undergraduate-level metallurgy programs.

Phase Equilibria in Metamorphic Rocks

Fluid Mechanics for Chemical Engineers, third edition retains the characteristics that made this introductory text a success in prior editions. It is still a book that emphasizes material and energy balances and maintains a practical orientation throughout. No more math is included than is required to understand the concepts presented. To meet the demands of today's market, the author has included many problems suitable for solution by computer. Two brand new chapters are included. The first, on mixing, augments the book's coverage of practical issues encountered in this field. The second, on computational fluid dynamics (CFD), shows students the connection between hand and computational fluid dynamics.

Molecular Thermodynamics of Fluid-Phase Equilibria

This book aims to provide an introduction to various techniques to
determine the pressure and temperature conditions of formation of metamorphic rocks. The necessary thermodynamic foundations and principles, and the basis of geothermobarometric methods, are carefully derived. Special emphasis is placed on the use of phase diagrams to determine the conditions of formation and to unravel the PT paths of metamorphic rocks during orogeny. The book is divided into three parts. Part A introduces some of the broader aspects of mineral solid solutions, Part B discusses the theoretical basis of geothermometry and geobarometry, and Part C deals with phase diagrams. Many examples are incorporated into the main body of the text to enable the reader to "learn-by-doing".

**Introduction to Phase Equilibria in Ceramic Systems**

**Equilibrium Between Phases of Matter**

This book provides the reader with some thermochemistry notes. The intention is to provide a simple, easy to understand text which serves as a complimentary material to more complex books. It also provide students and those beginning in the field with several application examples used in different areas of materials processing. The book presents fully solved problems, some quite often found in major metallurgical operations.

**CRC Handbook of Phase Equilibria and Thermodynamic Data of Copolymer Solutions**

This textbook provides an intuitive yet mathematically rigorous introduction to the thermodynamics and thermal physics of planetary processes. It demonstrates how the workings of planetary bodies can be understood in depth by reducing them to fundamental physics and chemistry. The book is based on two courses taught by the author for many years at the University of Georgia. It includes 'Guided Exercise' boxes; end-of-chapter problems (worked solutions provided online); and software boxes (Maple code provided online). As well as being an ideal textbook on planetary thermodynamics for advanced students in the Earth and planetary sciences, it also provides an innovative and quantitative complement to more traditional courses in geological thermodynamics, petrology,
chemical oceanography and planetary science. In addition to its use as a textbook, it is also of great interest to researchers looking for a 'one stop' source of concepts and techniques that they can apply to their research problems.

**CO2 Sequestration and Valorization**

This advanced comprehensive textbook introduces the practical application of phase diagrams to the thermodynamics of materials consisting of several phases. It describes the fundamental physics and thermodynamics as well as experimental methods, treating all material classes: metals, glasses, ceramics, polymers, organic materials, aqueous solutions. With many application examples and realistic cases from chemistry and materials science, it is intended for students and researchers in chemistry, metallurgy, mineralogy, and materials science as well as in engineering and physics. The authors treat the nucleation of phase transitions, the production and stability of technologically important metastable phases, and metallic glasses. Also concisely presented are the thermodynamics and composition of polymer systems. This innovative text puts this powerful analytical approach into a readily understandable and practical context, perhaps for the first time.

**Phase Equilibrium Engineering**

The first volume of this work is organized in three levels, so that the portion and importance of thermodynamics and mathematics increase from level to level. The ground level shows that basics of phase equilibria can be understood without thermodynamics provided the concept of chemical potential is introduced early. The intermediate level introduces thermodynamics, culminating in the Gibbs energy as the arbiter for equilibrium. At the third level the accent is on binary systems, where one or more phases are solutions of the components. Priority is given throughout to the thermodynamic assessment of experimental data. 200 exercises are included with solutions.

**Fluid Mechanics for Chemical Engineers**

**Thermodynamics of Phase Equilibria in Food Engineering is the**
definitive book on thermodynamics of equilibrium applied to food engineering. Food is a complex matrix consisting of different groups of compounds divided into macronutrients (lipids, carbohydrates, and proteins), and micronutrients (vitamins, minerals, and phytochemicals). The quality characteristics of food products associated with the sensorial, physical and microbiological attributes are directly related to the thermodynamic properties of specific compounds and complexes that are formed during processing or by the action of diverse interventions, such as the environment, biochemical reactions, and others. In addition, in obtaining bioactive substances using separation processes, the knowledge of phase equilibria of food systems is essential to provide an efficient separation, with a low cost in the process and high selectivity in the recovery of the desired component. This book combines theory and application of phase equilibria data of systems containing food compounds to help food engineers and researchers to solve complex problems found in food processing. It provides support to researchers from academia and industry to better understand the behavior of food materials in the face of processing effects, and to develop ways to improve the quality of the food products. Presents the fundamentals of phase equilibria in the food industry Describes both classic and advanced models, including cubic equations of state and activity coefficient Encompasses distillation, solid-liquid extraction, liquid-liquid extraction, adsorption, crystallization and supercritical fluid extraction Explores equilibrium in advanced systems, including colloidal, electrolyte and protein systems

Vapor-Liquid Equilibria Using Unifac

A self-contained, mathematical introduction to the driving ideas in equilibrium statistical mechanics, studying important models in detail.

Molecular Thermodynamics of Fluid-phase Equilibria

A discussion of the topological relations between the compositions of phases and the p-T representation of the invariant, univariant, and divariant equilibria in which these phases participate.
Read Free Introduction To Phase Equilibria In Ceramic Systems

Phase Equilibrium in Mixtures

Written by a leading practitioner and teacher in the field of ceramic science and engineering, this outstanding text provides advanced undergraduate- and graduate-level students with a comprehensive, up-to-date Introduction to Phase Equilibria in Ceramic Systems. Building upon a concise definition of the phase rule, the book logically proceeds from one- and two-component systems through increasingly complex systems, enabling students to utilize the phase rule in real applications. Unique because of its emphasis on phase diagrams, timely because of the rising importance of ceramic applications, practical because of its pedagogical approach, Introduction to Phase Equilibria in Ceramic Systems offers end-of-chapter review problems, extensive reading lists, a solid thermodynamic foundation, and clear perspectives on the special properties of ceramics as compared to metals. This authoritative volume fills a broad gap in the literature, helping undergraduate- and graduate-level students of ceramic engineering and materials science to approach this demanding subject in a rational, confident fashion. In addition, Introduction to Phase Equilibria in Ceramic Systems serves as a valuable supplement to undergraduate-level metallurgy programs.

Construction of Pressure-temperature Diagrams for Multicomponent Systems After the Method of Schreinemakers

Phase Equilibrium in Mixtures deals with phase equilibrium and the methods of correlating, checking, and predicting phase data. Topics covered range from latent heat and vapor pressure to dilute solutions, ideal and near-ideal solutions, and consistency tests. Molecular considerations and their use for the prediction and correlation of data are also discussed. Comprised of nine chapters, this volume begins with an introduction to the role of thermodynamics and the criteria for equilibrium between phases, along with fugacity and the thermodynamic functions of mixing. The discussion then turns to some of the phase phenomena which may be encountered in chemical engineering practice; methods of correlating and extending vapor pressure data and practical techniques for calculating latent heats from these data; the behavior
of dilute solutions both at low and high pressures for reacting and non-reacting systems; and the behavior of ideal and near-ideal solutions. The remaining chapters explore non-ideal solutions at normal pressures; practical methods for testing the thermodynamic consistency of phase data; and the extent to which the broad aspects of phase behavior may be interpreted in the light of simple molecular considerations. This book is intended primarily for graduate chemical engineers but should also be of interest to those graduates in physics or chemistry who need to use phase equilibrium data.

Multiple Equilibria in Proteins

Thermodynamic data form the basis for separation processes used in different fields of science and industry, from specialty chemicals to foods and pharmaceuticals. One obstacle to developing new production processes, products, or optimization is the lack, or inaccessibility, of experimental data related to phase equilibrium. Access More Than 1200 Data Sets, Including 810 Binary Systems, 325 Ternary Systems, and 25 Quaternary (or Higher) Systems The CRC Handbook of Liquid-Liquid Equilibrium Data of Polymer Solutions provides a thorough and up-to-date compilation of experimental liquid-liquid equilibrium (LLE) data and their original sources. Arranged in a consistent format, the handbook provides convenient access to cloud-point and coexistence data as well as upper and lower critical solution temperatures and important demixing data for each system. An Excellent Companion to the Author’s Previous Collections of Thermodynamic Data! While the author’s previous data compilations center around specific types of polymer systems, Wohlfarth’s latest work distinguishes itself by focusing instead on representing LLE data for all types of polymer systems in a single source.

Thermodynamics and Chemistry
gives an introduction into the relevant thermodynamic equations for fluid mixtures, including some that are rarely found in modern textbooks, and shows how they can they be used to compute phase diagrams and related properties. This chapter gives a consistent and axiomatic approach to fluid thermodynamics; it avoids using activity coefficients. Further chapters are dedicated to solid-fluid phase equilibria and global phase diagrams (systematic search for phase diagram classes). The appendix contains numerical algorithms needed for the computations. The book thus enables the reader to create or improve computer programs for the calculation of fluid phase diagrams. Introduces phase diagram classes, how to recognize them and identify their characteristic features presents rational nomenclature of binary fluid phase diagrams includes problems and solutions for self-testing, exercises or seminars

Phase Equilibria

This is a complete and authoritative reference text on an evolving field. Over 200 international scientists have written over 340 separate topics on different aspects of geochemistry including organics, trace elements, isotopes, high and low temperature geochemistry, and ore deposits, to name just a few.

High Temperature Phase Equilibria and Phase Diagrams

The reconciliation of economic development, social justice and reduction of greenhouse gas emissions is one of the biggest political challenges of the moment. Strategies for mitigating CO2 emissions on a large scale using sequestration, storage and carbon technologies are priorities on the agendas of research centres and governments. Research on carbon sequestration is the path to solving major sustainability problems of this century a complex issue that requires a scientific approach and multidisciplinary and interdisciplinary technology, plus a collaborative policy among nations. Thus, this challenge makes this book an important source of information for researchers, policymakers and anyone with an inquiring mind on this subject.

Phase Diagrams and Heterogeneous Equilibria
Appropriate for chemical engineering students, Molecular Thermodynamics of Fluid-Phase Equilibria presents a broad introduction to the thermodynamics of phase equilibria in chemical engineering design, especially in separation operations.

Vapour–Liquid Equilibrium

The second edition of this book introduces the interpretation of ternary equilibrium diagrams for many alloy systems. The theory is supported by a wealth of examples and problems, many of which are drawn from systems used industrially.

Hydrothermal Properties of Materials

Hydrothermal Properties of Materials: Experimental Data on Aqueous Phase Equilibria and Solution Properties at Elevated Temperatures and Pressures is designed for any scientists and engineer who deals with hydrothermal investigations and technologies. The book is organized into eight chapters, each dealing with a key physical property of behavior of solutions, so that a reader can obtain information on: hydrothermal experimental methods; available experimental data and the main features of properties behavior in a wide range of temperatures and pressures; and possible ways of experimental data processing for obtaining the derivative properties.

Phase Equilibria in Chemical Engineering

The classic guide to mixtures, completely updated with new models, theories, examples, and data. Efficient separation operations and many other chemical processes depend upon a thorough understanding of the properties of gaseous and liquid mixtures. Molecular Thermodynamics of Fluid-Phase Equilibria, Third Edition is a systematic, practical guide to interpreting, correlating, and predicting thermodynamic properties used in mixture-related phase-equilibrium calculations. Completely updated, this edition reflects the growing maturity of techniques grounded in applied statistical thermodynamics and molecular simulation, while relying on classical thermodynamics, molecular physics, and physical chemistry wherever these fields offer superior solutions. Detailed
new coverage includes: Techniques for improving separation processes and making them more environmentally friendly. Theoretical concepts enabling the description and interpretation of solution properties. New models, notably the lattice-fluid and statistical associated-fluid theories. Polymer solutions, including gas-polymer equilibria, polymer blends, membranes, and gels. Electrolyte solutions, including semi-empirical models for solutions containing salts or volatile electrolytes. Coverage also includes: fundamentals of classical thermodynamics of phase equilibria; thermodynamic properties from volumetric data; intermolecular forces; fugacities in gas and liquid mixtures; solubilities of gases and solids in liquids; high-pressure phase equilibria; virial coefficients for quantum gases; and much more. Throughout, Molecular Thermodynamics of Fluid-Phase Equilibria strikes a perfect balance between empirical techniques and theory, and is replete with useful examples and experimental data. More than ever, it is the essential resource for engineers, chemists, and other professionals working with mixtures and related processes.

Introduction To Phase Diagrams In Materials Science And Engineering

Computational tools allow material scientists to model and analyze increasingly complicated systems to appreciate material behavior. Accurate use and interpretation however, requires a strong understanding of the thermodynamic principles that underpin phase equilibrium, transformation and state. This fully revised and updated edition covers the fundamentals of thermodynamics, with a view to modern computer applications. The theoretical basis of chemical equilibria and chemical changes is covered with an emphasis on the properties of phase diagrams. Starting with the basic principles, discussion moves to systems involving multiple phases. New chapters cover irreversible thermodynamics, extremum principles, and the thermodynamics of surfaces and interfaces. Theoretical descriptions of equilibrium conditions, the state of systems at equilibrium and the changes as equilibrium is reached, are all demonstrated graphically. With illustrative examples - many computer calculated - and worked examples, this textbook is an valuable resource for advanced undergraduates and graduate students in materials science and engineering.
Introduction to Phase Equilibria in Ceramics

This book provides a comprehensive overview of ionic liquid based separation techniques. The glimpse of thermodynamic predictive models along with global optimization techniques will help readers understand the separation techniques at molecular and macroscopic levels. Experimental and characterization techniques are coupled with model based predictions so as to provide multicomponent data for the scientific community. The models will focus more on the a-priori based predictions which gives higher emphasis on hydrogen-bonded systems. Particle Swarm Optimization (PSO) technique will also eventually help the readers to apply optimization technique to an extraction process. The overriding goal of this work is to provide pathways for leading engineers and researchers toward a clear understanding and firm grasp of the phase equilibria of Ionic Liquid systems.

Thermodynamics of Phase Equilibria in Food Engineering

Vapor-Liquid Equilibria Using UNIFAC: A Group- Contribution Method focuses on the UNIFAC group-contribution method used in predicting quantitative information on the phase equilibria during separation by estimating activity coefficients. Drawing on tested vapor-liquid equilibrium data on which UNIFAC is based, it demonstrates through examples how the method may be used in practical engineering design calculations. Divided into nine chapters, this volume begins with a discussion of vapor and liquid phase nonidealities and how they are calculated in terms of fugacity and activity coefficients, respectively. It then introduces the reader to the UNIFAC method and how it works, the procedure used in establishing the parameters needed for the model, prediction of binary and multicomponent vapor-liquid equilibria for a large number of systems, the potential of UNIFAC for predicting liquid-liquid equilibria, and how UNIFAC can be used to solve practical distillation design problems. This book will benefit process design engineers who want to reliably predict phase equilibria for designing
Principles of Igneous and Metamorphic Petrology

PVT and Phase Behaviour Of Petroleum Reservoir Fluids

Ten years after the debut of the expansive CRC Handbook of Thermodynamic Data of Copolymer Solutions, The CRC Handbook of Phase Equilibria and Thermodynamic Data of Copolymer Solutions updates and expands the world’s first comprehensive source of this vital data. Author Christian Wohlfarth, a chemical thermodynamicist specializing in phase equilibria of polymer and copolymer solutions and a respected contributor to the CRC Handbook of Chemistry and Physics, has gathered up-to-the-minute data from more than 500 newly published references. Fully committed to ensuring the reliability of the data, the author included only results with published or personally communicated numerical values. With volumetric, calormetric, and various phase equilibrium data on more than 450 copolymers and 130 solvents, this handbook furnishes: 150 new vapor-liquid equilibrium datasets 50 new tables containing classical Henry’s coefficients 250 new liquid-liquid equilibrium datasets 350 new high-pressure fluid phase equilibrium 70 new PVT-properties datasets 40 new enthalpic datasets Expanded second osmotic virial coefficients data table Carefully organized, clearly presented, and fully referenced, The Handbook of Phase Equilibria and Thermodynamic Data of Copolymer Solutions will prove a cardinal contribution to the open literature and invaluable to anyone working with copolymers.

Concept Development Studies in Chemistry

This textbook provides a basic understanding of the formative processes of igneous and metamorphic rock through quantitative applications of simple physical and chemical principles. The book encourages a deeper comprehension of the subject by explaining the petrologic principles rather than simply presenting the student with petrologic facts and terminology. Assuming knowledge of only introductory college-level courses in physics, chemistry, and calculus, it lucidly outlines mathematical derivations fully and at an...
elementary level, and is ideal for intermediate and advanced courses in igneous and metamorphic petrology. The end-of-chapter quantitative problem sets facilitate student learning by working through simple applications. They also introduce several widely-used thermodynamic software programs for calculating igneous and metamorphic phase equilibria and image analysis software. With over 350 illustrations, this revised edition contains valuable new material on the structure of the Earth's mantle and core, the properties and behaviour of magmas, recent results from satellite imaging, and more.

**Thermodynamics of the Earth and Planets**

*Phase Equilibria: Basic Principles, Applications, Experimental Techniques* presents an analytical treatment in the study of the theories and principles of phase equilibria. The book is organized to afford a deep and thorough understanding of such subjects as the method of species model systems; condensed phase-vapor phase equilibria and vapor transport reactions; zone refining techniques; and nonstoichiometry. Physicists, physical chemists, engineers, and materials scientists will find the book a good reference material.

**Sulfide Mineralogy and Geochemistry**

**Introduction to Phase Equilibria in Ceramic Systems**

Phase diagrams are a MUST for materials scientists and engineers (MSEs). However, understanding phase diagrams is a difficult task for most MSEs. The audience of this book are young MSEs who start learning phase diagrams and are supposed to become specialists and those who were trained in fields other than materials science and engineering but are involved in research and/or development of materials after they are employed. Ternary phase diagrams presented in Chapter 4 are far more complex than binary phase diagrams. For this reason, ternary phase diagrams are nowadays less and less taught. However, in ceramics and semiconductors ternary phase diagrams become more and more important. Recent software provides necessary information to handle ternary phase diagrams. However, needless to say, without fundamental knowledge of ternary
phase diagrams it is impossible to understand ternary phase
diagrams correctly. In this book ternary phase diagrams are
presented in a completely original way, with many diagrams
illustrated in full color. In this book the essence of phase diagrams is
presented in a user-friendly manner. This book is expected to be a
Bible for MSEs.

Alloy Phase Equilibria

Phase Equilibria in Chemical Engineering is devoted to the
thermodynamic basis and practical aspects of the calculation of
equilibrium conditions of multiple phases that are pertinent to
chemical engineering processes. Efforts have been made
throughout the book to provide guidance to adequate theory and
practice. The book begins with a long chapter on equations of state,
since it is intimately bound up with the development of
thermodynamics. Following material on basic thermodynamics and
nonidealities in terms of fugacities and activities, individual chapters
are devoted to equilibria primarily between pairs of phases. A few
topics that do not fit into these categories and for which the state of
the art is not yet developed quantitatively have been relegated to a
separate chapter. The chapter on chemical equilibria is pertinent
since many processes involve simultaneous chemical and phase
equilibria. Also included are chapters on the evaluation of enthalpy
and entropy changes of nonideal substances and mixtures, and on
experimental methods. This book is intended as a reference and self-
study as well as a textbook either for full courses in phase equilibria
or as a supplement to related courses in the chemical engineering
curriculum. Practicing engineers concerned with separation
technology and process design also may find the book useful.

Statistical Mechanics of Lattice Systems

Vapor-Liquid Equilibrium, Second Edition covers the theoretical
principles and methods of calculation of equilibrium conditions from
various experimental data and the elements of measuring technique,
as well as the instruments for the direct determination of the
equilibrium compositions of the liquid and vapor phases of the
system. The book discusses the relations necessary for the
thermodynamic treatment of the equilibrium between the liquid and
vapor phase of a system; the concept of an ideal solution and auxiliary thermodynamic functions; and the activity and the activity coefficient. The text also describes vapor-liquid equilibrium in real systems (electrolytes and non-electrolytes) and in systems whose components (i.e. temperature, pressure, and composition of phases) mutually react according to several stoichiometric equations. The criteria of purity of substances and the methods of measuring temperature; low, medium, and high pressures; the pressures of the saturated vapors at given temperatures; and the boiling points at given pressures used in laboratory work in the field of vapor-liquid equilibrium are considered. The book also tackles the methods for the direct determination of equilibrium data (distillation, circulation, static, dew and bubble point, and flow methods). The text concludes with a review of the literature on the systems whose vapor-liquid equilibrium data had been measured and reported to the beginning of 1954. Workers in the chemical industry who deal with problems of distillation and rectification will find the book useful.

**Basic Thermochemistry in Materials Processing**


**Phase Equilibria, Phase Diagrams and Phase Transformations**

Thermodynamic data of polymer solutions are paramount for industrial and laboratory processes. These data also serve to understand the physical behavior of polymer solutions, study intermolecular interactions, and gain insights into the molecular nature of mixtures. Nearly a decade has passed since the release of a similar CRC Handbook and since th