Chapter 2 Experimental Techniques 2 1 Introduction

This is the second volume of a four volume set intended to describe the techniques and applications of thermoanalytical and calorimetric methods. The general techniques and methodology are covered extensively in Volume 1, along with the fundamental physicochemical background needed. Consequently the subsequent volumes dwell on the applications of these powerful and versatile methods, while assuming a familiarity with the techniques. Volume 2 covers major areas of inorganic materials and some related general topics, e.g., catalysis, geochemistry, and the preservation of art. The chapters are written by established practitioners in the field with the intent of presenting a sampling of the how thermoanalytical and calorimetric methods have contributed to progress in their respective areas. The chapters are not intended as exhaustive reviews of the topics, but rather, to illustrate to the readers what has been achieved and to encourage them to consider extending these applications further into their domains of interest. - Provides an appreciation for how thermal methods can be applied to inorganic materials and processes. - Provides an insight into the versatility of thermal methods. - Shares the experiences of experts in a variety of different fields. - A valuable reference source covering a huge area of materials coverage.
The authors' aim is to present a review of experimental and theoretical research that has been done to establish and to explain the physical properties of actinide compounds. The book is aimed at physicists and chemists. It was thought useful to collect a large selection of diagrams of experimental data scattered in the literature. Experiment and theory are presented separately, with cross references. Not all work has been included: rather, typical examples are discussed. We apologize to all researchers whose work has not been quoted. Since we report on an active field of research, clearly the data and their interpretation are subject to change. We benefitted greatly from discussions with many of our colleagues, particularly with Drs. G. H. Lander and W. Suski. The help of Mrs. C. Bovey and Ch. Lewis in the preparation of the manuscript, and the artwork and photo graphic work of Ms. Y. Magnenat and E. Spielmann of the Institute of Experi mental Physics of the University of Lausanne, are gratefully acknowledged. Our particular thanks are due to Ms. J. Ubby for her skillful and patient editorial work.
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 engineer ing 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.
Still the Most Complete, Up-To-Date, and Reliable Reference in the FieldDrying is a highly energy-intensive operation and is encountered in nearly all industrial sectors. With rising energy costs and consumer demands for higher quality dried products, it is increasingly important to be aware of the latest developments in industrial drying technolog

Reflecting the growing volume of published work in this field, researchers will find this book an invaluable source of information on current methods and applications.

Experimental Techniques in Materials and Mechanics provides a detailed yet easy-to-follow treatment of various techniques useful for characterizing the structure and mechanical properties of materials. With an emphasis on techniques most commonly used in laboratories, the book enables students to understand practical aspects of the methods and derive the maximum possible information from the experimental results obtained. The text focuses on crystal structure determination, optical and scanning electron microscopy, phase diagrams and heat treatment, and different types of mechanical testing methods. Each chapter follows a similar format: Discusses the importance of each technique Presents the necessary theoretical and background details Clarifies concepts with numerous worked-out examples Provides a detailed description of the experiment to be conducted and how the data could be tabulated and interpreted Includes a large number of illustrations, figures, and micrographs Contains a wealth of exercises and references for further reading Bridging the gap between lecture and lab, this text gives students hands-on experience using mechanical engineering and materials science/engineering techniques for determining the structure and properties of materials. After completing the book, students will be able to confidently perform experiments in the lab and extract valuable data from the experimental results.

Spectroscopic techniques are among the most powerful characterization methods used to study semiconductors. This volume presents reviews of a number of major spectroscopic techniques used to investigate bulk and artificially structured semiconductors including: photoluminescence, photo-reflectance, inelastic light scattering, magneto-optics, ultrafast work, piezo-spectroscopy methods, and spectroscopy at extremely low temperatures and high magnetic fields. Emphasis is given to major semiconductor systems, and artificially structured materials such as GaAs, InSb, Hg1-xCdxTe and MBE grown structures based upon GaAs/AlGaAs materials. Both the spectroscopic novice and the expert will benefit from the descriptions and discussions of the methods, principles, and applications relevant to today's semiconductor structures. Key Features * Discusses the latest advances in spectroscopic techniques used to investigate bulk and artificially structured semiconductors * Features detailed review articles which cover basic principles * Highlights specific applications such as the use of laser spectroscopy for the characterization of GaAs quantum well structures

The first chapter of this volume deals with computer simulation of molten salt behavior by molecular dynamics calculations. The next four chapters are reviews of experimental work: Chapter 2 deals with the solubility of nonre- active gases in molten salts, Chapter 3 with various types of organic reactions in molten tetrachloroaluminates, Chapter 4 with techniques for the study of molten fluorides, and Chapter 5 with the physical and chemical properties of thiocyanate melts. The last chapter is a collection of phase diagrams for binary and ternary fluoride systems. J. B., G. M., G. P. S. v CONTENTS Chapter 1 MOLECULAR DYNAMICS CALCULATIONS ON MOLTEN IONIC SALTS L. V. Woodcock 1. Introduction. . 4 2. Intermolecular Forces in Molten Salts 4 2.1. True and Effective Pair Potentials 2.2. Semiempirical Models 6 3. Computational Techniques 13 3.1. Molecular Dynamics Simulation 13 3.2. The Monte Carlo Method 15 3.3. Electrostatic Summations . . 18 4. Calculation of Physical Properties 23 4.1. Equilibrium Properties . 23 4.2. Transport Coefficients 27 4.3. Spectroscopic Properties 32 5. Applications...35 5.1. Studies of Interionic Forces. 35 5.2. Microstructure and Mechanisms 40 5.3.Interpretation of Experimental Observables 50 5.4. Reappraisal of Molten Salt Theories . 64 70 6. Conclusions 7. References. 72 vii Contents viii Chapter 2 GAS SOLUBILITY IN MOLTEN SALTS P. Field 1. Introduction 75 2. Experimental

Techniques 78 3. Solution Thermodynamics.

Structural Modeling and Experimental Techniques presents a current treatment of structural modeling for applications in design, research, education, and product development. Providing numerous case studies throughout, the book emphasizes modeling the behavior of reinforced and prestressed concrete and masonry structures. Structural Modeling and Experimental Techniques: Concentrates on the modeling of the true inelastic behavior of structures Provides case histories detailing applications of the modeling techniques to real structures Discusses the historical background of model analysis and similitude principles governing the design, testing, and interpretation of models Evaluates the limitations and benefits of elastic models Analyzes materials for reinforced concrete masonry and steel models Assesses the critical nature of scale effects of model testing Describes selected laboratory techniques and loading methods Contains material on errors as well as the accuracy and reliability of physical modeling Examines dynamic similitude and modeling techniques for studying dynamic loading of structures Covers actual applications of structural modeling This book serves students in model analysis and experimental methods, professionals manufacturing and testing structural models, as well as professionals testing large or full-scale structures - since the instrumentation techniques and overall approaches for testing large structures are very similar to those used in small-scale modeling work.

The book is intended to help under- and postgraduate students and young scientists in the correct application of NMR to the solution of physico-chemical problems concerning the study of equilibria in solution. The first part of the book (Chapters 1-3) is a trivium, but should enable a student to design and conduct simple physico-chemical NMR experiments. The following chapters give illustrative material on the physico-chemical applications of NMR of increasing complexity. These chapters include the problem of determination of equilibrium and rate constants in solution, the study of paramagnetism using NMR, the application of Dynamic NMR techniques and relaxation measurements. A multipurpose nonlinear regression program is supplied (on disc for PC) and is referred to throughout the book.

This volume provides a broad overview of the principal theoretical techniques applied to non-equilibrium and finite temperature quantum gases. Covering Bose-Einstein condensates, degenerate Fermi gases, and the more recently realised exciton-polariton condensates, it fills a gap by linking between different methods with origins in condensed matter physics, quantum field theory, quantum optics, atomic physics, and statistical mechanics.

This dissertation is primarily a compilation of a variety of computational applications to chemical investigations, with a single project that was purely experimental. The inorganic research is an example of the necessity of understanding the fundamental characteristics of a system for engineering applications. The computational chemistry projects illustrate the advantages of integrated computation and experimental techniques into a single exploratory mission. Chapter 1 introduces the fundamental theory underlying the computational techniques used throughout the dissertation. It briefly describes the mathematic foundation of Density Functional Theory, the functionals and basis sets employed in this research, and the theory behind calculated potential energy surfaces and mechanistic pathways. Chapter 2 describes an experimental investigation of the photocatalytic ability of inorganic iron (III) oxide

nanoparticles to generate oxygen gas by water splitting. We found that the Fe2O3 nanoparticles exhibit catalytic activity that produces oxygen when exposed to visible light in the presence of NaIO4 sacrificial agent, though the system loses efficacy over time. Chapter 3 illustrates the capability of computational chemistry to assist experimental chemistry in the identification of the structure and synthesis of a novel organic compound. We were able to corroborate the structural findings of the experimental data, determine the likely relative stereochemical configuration of the compound, and propose a credible synthesis mechanism. Chapter 4 describes the use of computational chemistry to supplement an experimental investigation into a category of highly substituted olefins. We proposed a viable synthesis mechanism for one compound, and conducted an NMR comparison study of two of the synthesized compounds. Chapter 5 presents a computational approach to the study of bifurcated potential energy surfaces. We engineered bifurcated systems by modifying previously studied reactions. The reactions chosen presented secondary cation-like transition state structures, which were designed to be the branching points of the designed potential energy surfaces. These systems can be further probed in future molecular dynamics and experimental studies.

Semiconductors and Semimetals

Remarks by JVS. Volumes 1 and 2 of Feldspar Minerals were published in 1974, but Volume 3 was not completed because I was forced to devote 3 years to the resolution of unforeseen problems in the construction of an ion probe. By 1977, the incomplete draft for Volume 3 had become obsolete because of the enormous advances in knowledge of feldspars, particularly those in lunar rocks and meteorites, and in both deep-seated and ancient terrestrial rocks. Furthermore, it soon became obvious that a completely new version of Feldspar Minerals was needed because of the important new results on the physical and chemical properties. I had kept up with the interesting but tedious chore of weekly reading of the incoming literature and maintenance of the files. By 1980, the intense day-to day pressure had gone from my research programs on lunar rocks and on the development of the ion microprobe as a quantitative geochemical instrument, and I began preparation of a second edition of Feldspar Minerals.

The present book presents the results of a systematic investigation of the dielectric, ferroelectric and piezoelectric properties of this type of lead-free solid solution ceramics Keywords: Piezoelectric Materials, Lead Toxicity, Lead-free Piezo-Ceramics, Perovskite Ceramics, Sensor Devices, Actuator Devices, Piezoelectric Devices, Ferroelectric Devices, Barium Titanate, Sodium Potassium Niobate, Sodium Bismuth Titanate, Electron Density Distribution, X-ray Diffraction, Scanning Electron Microscopy, Energy Dispersive X-ray Spectroscopy, UV-visible Spectroscopy, Dielectric Measurements, Ferroelectric Measurements, Piezoelectric Measurements.

Using lasers to induce and probe surface processes has the advantages of quantum state specificity, species selectivity, surface sensitivity, fast time-resolution, high frequency resolution, and accessibility to full pressure ranges. These advantages make it highly desirable to use light to induce, control, or monitor surface chemical and physical processes. Recent applications of laser based techniques in studying surface processes have stimulated new developments and enabled the understanding of fundamental problems in energy transfer and reactions. This volume will include

discussions on spectroscopic techniques, energy transfer, desorption dynamics, and photochemistry.

Structured Biological Modelling presents a straightforward introduction for computer-aided analysis, mathematical modelling, and simulation of cell biological systems. This unique guide brings together the physiological, structural, molecular biological, and theoretical aspects of the signal transduction network that regulates growth and proliferation in normal and tumor cells. It provides comprehensive survey of functional and theoretical features of intracellular signal processing and introduces the concept of cellular self-organization. Exemplified by oscillatory calcium waves, strategies for the design of computer experiments are presented that can assist or even substitute for time-consuming biological experiments. The presented minimal model for proliferation-associated signal transduction clearly shows the alterations of the cellular signal network involved in neoplastic growth. This book will be useful to cell and molecular biologists, oncologists, physiologists, theoretical biologists, computer scientists, and all other researchers and students studying functional aspects of cellular signaling.

Volume 2 of this series concentrates on the use of synchrotron radiation which covers that region of the electromagnetic spectrum which extends from about 10eV to 3keV in photon energy and is essentially the region where the radiation is strongly absorbed by atmospheric gases. It therefore has to make extensive use of a high vacuum to transport the radiation to the workstation where the presence of hard X-rays can cause extensive damage to both the optics and the targets used in the experimental rigs. The topics chosen for this volume have been limited to the disciplines of physics and chemistry.

Energy Rating is a crucial consideration in modern building design, affirmed by the new EC Directive on the energy performance of buildings. Energy represents a high percentage of the running costs of a building, and has a significant impact on the comfort of the occupants. This book represents detailed information on energy rating of residential buildings, covering: * Theoretical and experimental energy rating techniques: reviewing the state of the art and offering guidance on the in situ identification of the UA and gA values of buildings. * New experimental protocols to evaluate energy performance: detailing a flexible new approach based on actual energy consumption. Data are collected using the Billed Energy Protocol (BEP) and Monitored Energy Protocol (MEP) * Energy Normalization techniques: describing established methods plus a new Climate Severity Index, which offers significant benefits to the user. Also included in this book are audit forms and a CD-ROM for applying the new rating methodology. The software, prepared in Excel, is easy to use, can be widely applied using both deterministic and experimental methods, and can be adapted to national peculiarities and energy policy criteria. Energy Performance of Residential Buildings offers full and clear treatment of the key issues and will be an invaluable source of information for energy experts, building engineers, architects, physicists, project managers and local authorities. The book stems from the EC-funded SAVE project entitled EUROCLASS. Participating institutes included: * University of Athens, Greece * Belgium Building Research Institute, Belgium * University of Seville, Spain * Royal Institute of Technology, Sweden

As a spectroscopic method, Nuclear Magnetic Resonance (NMR) has seen spectacular growth over the past two decades, both as a technique and in its applications. Today

the applications of NMR span a wide range of scientific disciplines, from physics to biology to medicine. Each volume of Nuclear Magnetic Resonance comprises a combination of annual and biennial reports which together provide comprehensive of the literature on this topic. This Specialist Periodical Report reflects the growing volume of published work involving NMR techniques and applications, in particular NMR of natural macromolecules which is covered in two reports: "NMR of Proteins and Acids" and "NMR of Carbohydrates, Lipids and Membranes". For those wanting to become rapidly acquainted with specific areas of NMR, this title provides unrivalled scope of coverage. Seasoned practitioners of NMR will find this an in valuable source of current methods and applications. Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research. Compiled by teams of leading authorities in the relevant subject areas, the series creates a unique service for the active research chemist, with regular, in-depth accounts of progress in particular fields of chemistry. Subject coverage within different volumes of a given title is similar and publication is on an annual or biennial basis.

Most books on epidemiology have treated the subject from a statistical, mathematical or computer applicational point of view. However, experiments must be performed first to provide the data for models which in turn can then be proven by further experimentation. This mutual interplay of theory and empirics gives epidemiology its scientific thrust and charm. This book provides a choice of methods for varying applications and objectives, covering all important aspects for the designing of experiments. Furthermore, the reader is supplied with solutions to his experimental problems and many "tricks of the trade". The newcomer to the field will also profit by this methodology guide.

Knowledge of the concentration of the contaminants and the molecular state of their degradation products is helpful in assessing the environmental risks associated with the contaminants as well as evaluating the design of remediation technologies. A great deal of interest has been generated recently in the determination of explosives and explosives' by-products in plant tissues. The methods traditionally used for the analysis of explosives in solid matrixes are not adequate due to the high organic content of the plant tissues. Data that are obtained using analytical methods not designed for the specific matrix encountered may lead to incorrect quantitation of the target analyte. The methods used to detect the explosives and their degradation products require matrix-specific sample preparation, separation by reversed phase high performance liquid chromatography, and ultraviolet detection. This report addresses three important points in connection with the analysis of explosives in plant tissues: extraction, interferences, and method performance. The extraction of the contaminants from the matrix requires a different set of extraction techniques from those used for standard water and soil extractions. These exotic matrixes contain much higher organic content than soil or water and, as a result, are prone to interference from biological molecules. A liquid chromatographic cleanup step is utilized to reduce these interferences. The performance of the modified method is reported with respect to method detection limits, analyte percent recoveries, and the methods applicability for analysis of contaminated plant tissues from plant uptake studies.

Nanocrystalline FINEMET-type alloys (FeSiBCuNb) having average grain diameter ~ 10 nm , obtained by the devitrification of rapidly solidified (typically 20 mm thick ribbons)

amorphous alloys are attractive for applications due to their excellent soft magnetic properties e. g. – high saturation magnetic induction comparable with Fe-based amorphous alloys and large permeability as observed in Co-based metallic glasses. In Finemet type alloys the presence of small amount of Cu enhances the nucleation rate, while presence of Nb inhibits the grain growth, resulting in nano-crystallization which proved to be key factor for obtaining the particular ultra fine grain structure.

Over the nearly 20 years of Kelvin probe force microscopy, an increasing interest in the technique and its applications has developed. This book gives a concise introduction into the method and describes various experimental techniques. Surface potential studies on semiconductor materials, nanostructures and devices are described, as well as application to molecular and organic materials. The current state of surface potential at the atomic scale is also considered. This book presents an excellent introduction for the newcomer to this field, as much as a valuable resource for the expert.

The chemical properties of superoxide ion, its biological role, and the role of other oxygen radicals which arise as a result of its transformations are contained in this text. In Volume I the principal reactions of superoxide ion, including protonation reactions with proton donors, nucleophilic reactions with esters, alkyl halides and other compounds, electron transfer reactions with quinones and metal complexes, are described. Basic quantitative data including rate constants and yields for the reactions of superoxide ion of all types are given in tables. This volumecontains the mechanisms of the generation of oxygen radicals in cells and the interaction of superoxide ion with cell components. The role of superoxide ion in lipid peroxidation and destruction of proteins and nucleic acids is explained, as well as oxygen radicals in the mechanisms of toxic and therapeutic action of drugs, especially anticancer antibiotics. In addition, the action of superoxide ion and other oxygen radicals on plants, micro-, and macroorganisms is discussed, along with the role of oxygen radicals in normal metabolic and pathological processes.

Within the last two decades, the experimental technology for the study of high temperature solid-vapor and liquid-vapor equilibria has mushroomed so fast that· both academic and industrial research ers desirous of working in this field -- be they physical chemists, metallurgists, ceramists, petrologists, crystal chemists, or mem bers of any of the several branches of materials science -- find themselves in the situation that in order to learn the art of the latest techniques, a period of apprenticeship or residency needs be spent at an institution or laboratory currently engaged in this type of solid-vapor or liquid-vapor research. The tech niques for control of the vapor phase at total pressures of one atmosphere or greater have not been well defined in the literature. Therefore, the purpose of this volume will be to serve as a labora tory manual for the control, calibration, and measurement of high temperature-high pressure equilibria. The avowed aims of this treatment of experimental techniques are: (1) to give, in terms understandable at the graduate student level, the laboratory procedures necessary to the design and utilization of good experimental technique, (2) to list the limitations, dangers, and technical pitfalls inherent or intrinsic to the described techniques, (3) to give theory and specific data only where they are essential to the experimental design, (4) to give with each chapter references that are extensive enough to serve as a bibliography of the state-of-the-art of technique development within the last decade.

Human biological liquids contain numerous low- and high-molecular weight surfactants.

The human organism contains interfaces with enormous surfaces. The physicochemical and biochemical processes taking place at these interfaces are extremely important for the vital functions of the organism as a whole, and the interfacial properties may reflect peculiarities of age and sex, health and disease. The present book is the first attempt to systematically present the results of dynamic and equilibrium surface tensions measurements of serum and urine samples that were obtained from healthy humans of various sex and age, and to compare these results with measurements of biological liquids obtained from patients suffering from various diseases or with measurements of amniotic fluid obtained from women at various stages of pregnancy. Pulmonary medicine, especially neonatology, has systematically used interfacial tensiometry for studying pulmonary surfactant. In this particular area, significant progress was achieved in the treatment of diseases related to alterations of the lung surfactant system. We believe that, similar to the progress in pulmonary medicine attributed to surface chemical studies of lung surfactant, progress in other medical branches could be expected through studies of interfacial characteristics of other human biological liquids. For several years the authors of this book have been engaged in studies aimed at the improvement of the maximum bubble pressure method, resulting in the development of computer controlled tensiometers which are capable of measuring dynamic surface tensions within a wide range of surface lifetime. In addition to the measurement techniques, a correct interpretation and analysis of the tensiometric data obtained is extremely important. The kinetic theory of adsorption from solutions, and the theory of equilibrium adsorption layers of surfactant/protein mixtures provide the basis for both the choice of the most characteristic parameters of tensiograms and the analysis of the results. Some theoretical models describing the adsorption of proteins are presented in Chapter 1. The main theoretical and experimental issues related to the maximum bubble pressure technique as applied to biological liquids are presented in Chapter 2. A more detailed discussion of the differences of the various methods in use for measuring dynamic surface tension of biological fluids is provided in Chapter 3. Chapter 4 gives data from patients with kidney disease, Chapter 5 from patients with rheumatic diseases, Chapter 6 with pulmonary diseases, Chapter 7 with diseases of the central nervous system, and Chapter 8 with neoplasms. Dynamic interface tensiometry of human biological liquids is a fascinating new method which deserves a broad use for prospective studies of various diseases.

College Chemistry Multiple Choice Questions and Answers (MCQs): Quizzes & Practice Tests with Answer Key PDF, College Chemistry Worksheets & Quick Study Guide covers exam review worksheets to solve problems with 1400 solved MCQs. "College Chemistry MCQ" PDF with answers covers concepts, theory and analytical assessment tests. "College Chemistry Quiz" PDF book helps to practice test questions from exam prep notes. Chemistry study guide provides 1400 verbal, quantitative, and analytical reasoning solved past question papers MCQs. College Chemistry Multiple Choice Questions and Answers PDF download, a book covers solved quiz questions and answers on chapters: atomic structure, basic chemistry, chemical bonding: chemistry, experimental techniques, gases, liquids and solids worksheets for college and university revision guide. "College Chemistry Quiz Questions and Answers" PDF download with free sample test covers beginner's questions and mock tests with exam workbook answer key. College chemistry MCQs book, a quick study guide from

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During the past two centuries, crystallography, mineralogy and petrology have evolved from simple compilations of data to powerful disciplines based on interlocking networks of laws, hypotheses and rules-of-thumb. While many data still consist of isolated facts which defy synthesis, a gratifying portion can be organized according to physical and chemical principles. Unfortunately the separation of physical sciences into sub-divisions, especially at the teaching level, makes it difficult to integrate the different approaches to minerals. This separation is worsened by the increasing technical demands of chemical and physical theories, by the number and complexity of experimental methods, by the sheer mass of facts in an observational discipline such as mineralogy or petrology, and by the explosion of papers. This book concentrates on those aspects of the genesis and properties of feldspar minerals which can be related to physical and chemical principles. My main aim is frankly pedagogic: I wish to show how chemical and physical principles can be combined with geologic observation to produce an enhanced level of understanding of the genesis of minerals. The feldspars which demonstrate almost all of the general principles provide the most suitable example.

Wettability at High TemperaturesElsevier

The purpose of this book is to bring together current scientific understanding of wetting behaviour that has been gained from theoretical models and quantitative experimental observations. The materials considered are liquid metals or inorganic glasses in contact with solid metals or ceramics at temperatures of 200-2000oC. Wetting has been a significant scientific concern for the last two centuries and reference will be made to classical work by nineteenth century scientists such as Dupré, Laplace and Young that was validated by observations of the behaviour of chemically inert ambient temperature systems. In attempting to achieve the aims of the book, the text has been divided into ten Chapters that can be grouped into four stages of presentation. The first stage comprises two Chapters that review established and newly developed models for their relevance to wetting behaviour at high temperatures, including recent models that encompass the role of chemical reactions at the solid/liquid interfaces. Attention is paid both to equilibrium wetting behaviour (Chapter 1) and to the factors that control the approach to equilibrium (Chapter 2). Then follow Chapters concerned with experimental techniques for scientific measurement of the extent of wetting (Chapter 3) and with the surface energy data for both metals and non-metals that are essential for quantitative interpretation of wetting behaviour (Chapter 4). Descriptions of experimentally determined and quantified wetting behaviour are presented and interpreted in the third part comprising five Chapters dealing with the characteristics of metal/metal, metal/oxide, metal/non-oxide, metal/carbon and molten glass/solid systems. The book concludes with a Chapter commenting on the role of wetting behaviour in joining similar and dissimilar materials by liquid route techniques.

0Keywords:Surface Photochemistry;Photochemistry;Laser Spectroscopy;Surface Spectroscopy;Photodesorption;Surface Dynamics;Surface Femtochemistry;Surface Nonlinear Optics;Surface Analysis;Metal Surfaces