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High Pressure Molecular Science** High-Pressure Physics High-Pressure Shock Compression of Solids High-Pressure Crystallography High-Pressure Shock Compression of Solids III **High Pressure Processing of Food** Techniques in High Pressure Neutron Scattering Ultra High Pressure Treatment of Foods High-Pressure Science and Technology High Pressure Technologies in Biomass Conversion High Pressure Fluid Technology for Green Food Processing **Carbon in Earth's Interior** **High Pressure Processing of Food** Monthly Weather Review High-pressure Pumps Science and Technology of High Pressure Compounds and Alloys Under High Pressure High Pressure High Pressure in Semiconductor Physics II Frontiers of High Pressure Research **Encyclopedia of Spectroscopy and Spectrometry** The Canadian Patent Office Record and Register of Copyrights and Trade Marks High Pressure Chemistry, Biochemistry and Materials Science Frontiers in High Pressure Biochemistry and Biophysics Official Gazette of the United States Patent Office Solids Under High-Pressure Shock Compression Long Island Medical Journal High-pressure Flows for Propulsion Applications High Pressure Rheology for Quantitative Elastohydrodynamics Common Rail Fuel Injection Technology in Diesel Engines **High Pressure NMR** **Electronic Transitions and the High Pressure Chemistry and Physics of Solids** Phase Transformations of Elements Under High Pressure Patents for inventions. Abridgments of specifications Parts Manufacturer Approvals High-Pressure Fluid Phase Equilibria Earth Materials Pounder's Marine Diesel Engines and Gas Turbines Journal of the American Medical Association **High Pressure Processing of Fruit and Vegetable Products

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Proceedings of the NATO Advanced Study Institute, Erice, Italy, 4-15 June 2003 The aim of this book is to present the fundamentals of high pressure technologies from the perspective of mass transfer phenomena and thermodynamic considerations. Novel food applications are exposed and their relation to chemical analysis, extraction, reaction and particle formation processes are outlined. The chapters are written by a diverse group of scientists with expertise in chemistry, food processes, analytical chemistry, chemical engineering and chemical engineering thermodynamics, and biotechnology. The mission of green food engineering is to promote innovative technologies that reduce or eliminate the use or generation of hazardous materials (solvents, reagents) in the design and operation of food related processes, with the view to improve food safety and quality. Several efficient, environmentally friendly and benign

technologies based on the use of high pressure and green solvents have demonstrated to be sustainable alternatives to traditional processes in the food industry. Although hundreds of new ideas are being published in the open literature, reliable engineering tools to simulate and design those processes are still under development. High Pressure Fluid Technology for Green Food Processing presents in-depth analyses and outlines the ways towards their maturity. Tiziana Fornari, Research Institute of Food Science (CIAL) Universidad Autonoma de Madrid, Madrid, Spain Roumiana P. Stateva, Institute of Chemical Engineering, Bulgarian Academy of Sciences, Sofia, Bulgaria Drawing on the author's practical work from the last 20 years, Techniques in High Pressure Neutron Scattering is one of the first books to gather recent methods that allow neutron scattering well beyond 10 GPa. The author shows how neutron scattering has to be adapted to the pressure range and type of measurement. Suitable for both newcomers and experienced high pressure scientists and engineers, the book describes various solutions spanning two to three orders of magnitude in pressure that have emerged in the past three decades. Many engineering concepts are illustrated through examples of real high pressure devices that have demonstrated their capacity and have produced scientific results. After introducing basic engineering concepts related to the elastic and plastic behavior of cylindrical pressure devices, the text emphasizes mechanical and neutronic properties of construction materials. Subsequent chapters describe numerous high pressure techniques, including liquid/gas, clamp, and McWhan cells. The book also focuses on Paris-Edinburgh devices, high pressure metrology, and scientific applications. The main contributions to this volume present overviews of the different subfields or applications of high pressure studies. In contrast, contributed papers offer more specialized aspects of various high pressure studies. The various contributions to this volume make clear the wide range of fundamental and applied problems that can be studied by high pressure techniques, and also point towards a major growth of high pressure science and technology in the near future. The text

focuses mainly on advances achieved in the years since the previous ASI devoted to the high pressure field. Since its inception in 1966, the series of numbered volumes known as Semiconductors and Semimetals has distinguished itself through the careful selection of well-known authors, editors, and contributors. The "Willardson and Beer" Series, as it is widely known, has succeeded in publishing numerous landmark volumes and chapters. Not only did many of these volumes make an impact at the time of their publication, but they continue to be well-cited years after their original release. Recently, Professor Eicke R. Weber of the University of California at Berkeley joined as a co-editor of the series. Professor Weber, a well-known expert in the field of semiconductor materials, will further contribute to continuing the series' tradition of publishing timely, highly relevant, and long-impacting volumes. Some of the recent volumes, such as Hydrogen in Semiconductors, Imperfections in III/V Materials, Epitaxial Microstructures, High-Speed Heterostructure Devices, Oxygen in Silicon, and others promise indeed that this tradition will be maintained and even expanded. Reflecting the truly interdisciplinary nature of the field that the series covers, the volumes in Semiconductors and Semimetals have been and will continue to be of great interest to physicists, chemists, materials scientists, and device engineers in modern industry. Volumes 54 and 55 present contributions by leading researchers in the field of high pressure semiconductors. Edited by T. Suski and W. Paul, these volumes continue the tradition of well-known but outdated publications such as Brigman's The Physics of High Pressure (1931 and 1949) and High Pressure Physics and Chemistry edited by Bradley. Volumes 54 and 55 reflect the industrially important recent developments in research and applications of semiconductor properties and behavior under desirable risk-free conditions at high pressures. These developments include the advent of the diamond anvil cell technique and the availability of commercial piston cylinder apparatus operating at high hydrostatic pressures. These much-needed books will be useful to both researchers and practitioners in applied physics, materials science, and engineering. Since the

1950s shock compression research contributed greatly to scientific knowledge and industrial technology. As a result, for example, our understanding of meteorite impacts has substantially improved, and shock processes have become standard industrial methods in materials synthesis and processing. Investigations of shock-compressed matter involve physics,electrical engineering, solid mechanics, metallurgy, geophysics and materials science. The description of shock-compressed matter presented here, which is derived from physical and chemical observations, differs significantly from the classical descriptions derived from strictly mechanical characteristics. This volume, with over 900 references, provides an introduction for scientists and engineers interested in the present state of shock compression science. High pressure processing is a fast-growing food processing technology and opens the door to nearly-fresh products that retain their sensorial and nutritional qualities. High Pressure Processing of Fruit and Vegetable Products reviews and summarizes the latest advances in novel high-pressure processing techniques for preserving fruits, fruit juices, and their mixtures. It contains basic information on the relation of high-process treatment parameters with the safety and quality of fruit and vegetable juices/products. The book focuses on product quality parameters, nutritional value, bio-active health components, and microbial safety and stability. The main aim of this book is to summarize the advances in the utilization of modern high pressure pasteurization (HPP) treatment to preserve and stabilize fruit and vegetable products. HPP technology is related to the product quality parameters, the content of nutritional and health active components, and the microbial safety and subsequent shelf life. One chapter of this book is devoted to industrial equipment available; other chapters deal with examples of commercial fruit and vegetable products. Another chapter of this book is dedicated to packaging, as packaging of food before HPP is mandatory in this technology. The regulatory aspects for high-pressure treated fruit and vegetable products in different regions of the world (Europe, the United States, Asia, and Australia) are

also an important topic dealt within one chapter of the book. The effects of HPP technology on the quality of fruit and vegetable products, namely nutrients and stability, health active components, and sensory aspects, are reviewed in a trio of chapters. Developments in experimental methods are providing an increasingly detailed understanding of shock compression phenomena on the bulk, intermediate, and molecular scales. This third volume in a series of reviews of the curent state of knowledge covers several diverse areas. The first group of chapters addresses fundamental physical and chemical aspects of the response of condensed matter to shock comression: equations of state, molecular-dynamic analysis, deformation of materials, spectroscopic methods. Two further chapters focus on a particular group of materials: ceramics. Another chapter discusses shock-induced reaction of condensed-phase explosives. And a final pair of chapters considers shock phenomena at low stresses from the point of view of continuum mechanics. A wide-ranging and practical handbook that offers comprehensive treatment of high-pressure common rail technology for students and professionals In this volume, Dr. Ouyang and his colleagues answer the need for a comprehensive examination of high-pressure common rail systems for electronic fuel injection technology, a crucial element in the optimization of diesel engine efficiency and emissions. The text begins with an overview of common rail systems today, including a look back at their progress since the 1970s and an examination of recent advances in the field. It then provides a thorough grounding in the design and assembly of common rail systems with an emphasis on key aspects of their design and assembly as well as notable technological innovations. This includes discussion of advancements in dual pressure common rail systems and the increasingly influential role of Electronic Control Unit (ECU) technology in fuel injector systems. The authors conclude with a look towards the development of a new type of common rail system. Throughout the volume, concepts are illustrated using extensive research, experimental studies and simulations. Topics covered include: Comprehensive detailing of common rail system

elements, elementary enough for newcomers and thorough enough to act as a useful reference for professionals Basic and simulation models of common rail systems, including extensive instruction on performing simulations and analyzing key performance parameters Examination of the design and testing of next-generation twin common rail systems, including applications for marine diesel engines Discussion of current trends in industry research as well as areas requiring further study Common Rail Fuel Injection Technology is the ideal handbook for students and professionals working in advanced automotive engineering, particularly researchers and engineers focused on the design of internal combustion engines and advanced fuel injection technology. Wide-ranging research and ample examples of practical applications will make this a valuable resource both in education and private industry. Proceedings of a NATO ARW held in Fort Collins, Colorado, July 15-18, 1991 High pressure processing technology has been adopted worldwide at the industrial level to preserve a wide variety of food products without using heat or chemical preservatives. High Pressure Processing: Technology Principles and Applications will review the basic technology principles and process parameters that govern microbial safety and product quality, an essential requirement for industrial application. This book will be of interest to scientists in the food industry, in particular to those involved in the processing of products such as meat, fish, fruits, and vegetables. The book will be equally important to food microbiologists and processing specialists in both the government and food industry. Moreover, it will be a valuable reference for authorities involved in the import and export of high pressure treated food products. Finally, this update on the science and technology of high pressure processing will be helpful to all academic, industrial, local, and state educators in their educational efforts, as well as a great resource for graduate students interested in learning about state-of-the-art technology in food engineering. Computational elastohydrodynamics, a part of tribology, has existed happily enough for about fifty years without the use of accurate models

*for the rheology of the liquids used as lubricants. For low molecular weight liquids, such as low viscosity mineral oils, it has been possible to calculate, with precision, the film thickness in a concentrated contact provided that the pressure and temperature are relatively low, even when the pressure variation of viscosity is not accurately modelled in detail. Other successes have been more qualitative in nature, using effective properties which come from the fitting of parameters used in calculations to experimental measurements of the contact behaviour, friction or film thickness. High Pressure Rheology for Quantitative Elastohydrodynamics is intended to provide a sufficiently accurate framework for the rheology of liquids at elevated pressure that it may be possible for computational elastohydrodynamics to discover the relationships between the behaviour of a lubricated concentrated contact and the measurable properties of the liquid lubricant. The required high-pressure measurement techniques are revealed in detail and data are presented for chemically well-defined liquids that may be used as quantitative reference materials. * Presents the property relations required for a quantitative calculation of the tribological behaviour of lubricated concentrated contacts. * Details of high-pressure experimental techniques. * Complete description of the pressure and temperature dependence of viscosity for high pressures. * Some little-known limitations on EHL modelling. For chemists, biochemists, physicists and materials scientists, pressure as an experimental variable represents a tool that provides unique information about the microscopic properties of the materials being studied. In addition to its use as a research tool for investigating the energetics, structure, dynamics and kinetics of molecular transformations of materials, pressure is also being used to modify the properties of materials to preserve or improve their properties. The contributions collected here cover the main areas of high pressure research, including applications in materials science, condensed matter physics, chemistry and biochemistry. In addition, some papers offer more specialised aspects of high pressure studies. The book makes clear the impressive range of*

fundamental and applied problems that can be studied by high pressure techniques and also points towards a major growth of high pressure science and technology in the near future. During the past decade, consumer demand for convenient, fresh-like, safe, high-quality food products has grown. The food industry has responded by applying a number of new technologies including high hydrostatic pressure for food processing and preservation. In addition, food scientists have demonstrated the feasibility of industrial-scale high pressure processing. This technology is of specific interest to the food industry because it provides an attractive alternative to conventional methods of thermal processing, which often produce undesirable changes in foods and hamper the balance between high quality (color, flavor, and functionality) and safety. In addition, it offers opportunities for creating new ingredients and products because of the specific actions of high pressure on bio logical materials and food constituents. It allows food scientists to redesign exist ing processes and to create entirely new ones using high pressure technology alone or in combination with conventional processes (e. g. , pressure-temperature combinations). Researchers have investigated high pressure processing for the past century. Scientists such as Hite and Bridgman did pioneering work at the turn of the 20th century. Then during the 1980s and 1990s, there was a large effort to investigate the effects of high pressure on biological materials, particularly foods. The initial research activities in the late 1980s and early 1990s focused on exploratory activ ities in the food area. High Pressure Pumps provides a look into recent experience and research to help engineers, scientist and end users to understand the technical side of pumps, nozzles and accessories that have been developed for special applications. High pressure system design with formulas to calculate pressure drop, orifice size, cleaning paths, horsepower, torque and trouble shooting that may not be found in any other single book are included. High pressure pumps and systems are used in shipbuilding, steel mills, automotive plants, research, petrochemical and water jetting industries. This book covers high pressure pumps used in water

*jetting, cryogenics, hot fluid pumping, chemical pumping and oil field services. The development of 10,000 psi to 40,000 psi pumps over the lat 30 years is covered along with the auxiliary hardware needed to do surface preparation, high pressure cleaning and water jet cutting. * Goes a step further than manufacture's manuals and to explore applications and system design * Only book on the market that covers this technology from installation to management * Need to know reference for operating high pressure pumps A gripping standalone thriller from the No.1 bestselling author of Little Bones and The Dark Room As temperatures soar across Europe during the hottest summer for forty years, a series of hoax terrorist attacks is generating panic in London. Then a bus blows up on Oxford Street and the hoaxes have suddenly become real. Student Brioni O'Brien has been desperately trying to contact her older sister since she unexpectedly returned early from travelling, so when Marissa's bag is found near the site of the explosion, she fears the worst. Teaming up with terrorism expert Anna Lockharte to search for Marissa, Brioni discovers that her sister had got herself into a very dangerous situation - and that now she and Anna could be caught in the fallout. High-pressure science has undergone a revolution in the last 15 years. The development of intense new x-ray and neutron sources, improved detectors, new instrumentation, greatly increased computation power, and advanced computational algorithms have enabled researchers to determine the behavior of matter at static pressures in excess of 400 GPa. Shock-wave techniques have allowed access to the experimental pressure-temperature range beyond 1 TPa and 10,000 K. High-Pressure Physics introduces the current state of the art in this field. Based on lectures presented by leading researchers at the 63rd Scottish Universities Summer School in Physics, the book summarizes the latest experimental and theoretical techniques. Highlighting applications in a range of physics disciplines—from novel materials synthesis to planetary interiors—this book cuts across many areas and supplies a solid grounding in high-pressure physics. Chapters cover a wide array of topics and techniques, including: High-pressure devices The*

design of pressure cells Electrical transport experiments The fabrication process for customizing diamond anvils Equations of state (EOS) for solids in a range of pressures and temperatures Crystallography, optical spectroscopy, and inelastic x-ray scattering (IXS) techniques Magnetism in solids The internal structure of Earth and other planets Measurement and control of temperature in high-pressure experiments Solid state chemistry and materials research at high pressure Liquids and glasses The study of hydrogen at high density A resource for graduate students and young researchers, this accessible reference provides an overview of key research areas and applications in high-pressure physics. In recent years, there has been a major expansion of high pressure research providing unique information about systems of interest to a wide range of scientific disciplines. Since nuclear magnetic resonance has been applied to a wide spec trum of problems in chemistry, physics and biochemistry, it is not surprising to find that high pressure NMR techniques have also had many applications in these fields of science. Clearly, the high information content of NMR experiments combined with high pressure provides a powerful tool in modern chem istry. It is the aim of this monograph, in the series on NMR Basic Principles and Progress, to illustrate the wide range of prob lems which can be successfully studied by high pressure NMR. Indeed, the various contributions in this volume discuss studies of interest to physics, chemical physics, biochemistry, and chemical reaction kinetics. In many different ways, this monograph demonstrates the power of modern experimental and theoretical techniques to investigate very complex systems. The first contribution, by D. Brinkman, deals with NMR and NQR studies of superionic conductors and high-Tc supercon ductors at high pressure. Pressure effects on phase transitions, detection of new phases, and pressure effects on diffusion and spin-lattice relaxation, represent a few of the topics discussed in this contribution of particular interest to solid state physics. This third edition of the Encyclopedia of Spectroscopy and Spectrometry provides authoritative and comprehensive coverage of all aspects of spectroscopy and closely related

subjects that use the same fundamental principles, including mass spectrometry, imaging techniques and applications. It includes the history, theoretical background, details of instrumentation and technology, and current applications of the key areas of spectroscopy. The new edition will include over 80 new articles across the field. These will complement those from the previous edition, which have been brought up-to-date to reflect the latest trends in the field. Coverage in the third edition includes: Atomic spectroscopy Electronic spectroscopy Fundamentals in spectroscopy High-Energy spectroscopy Magnetic resonance Mass spectrometry Spatially-resolved spectroscopic analysis Vibrational, rotational and Raman spectroscopies The new edition is aimed at professional scientists seeking to familiarize themselves with particular topics quickly and easily. This major reference work continues to be clear and accessible and focus on the fundamental principles, techniques and applications of spectroscopy and spectrometry. Incorporates more than 150 color figures, 5,000 references, and 300 articles for a thorough examination of the field Highlights new research and promotes innovation in applied areas ranging from food science and forensics to biomedicine and health Presents a one-stop resource for quick access to answers and an in-depth examination of topics in the spectroscopy and spectrometry arenas This is the first book to classify and systematize the available data on the behavior of binary alloys under high pressure. Despite the fact that there is a strong correlation between temperature-composition (T-C) phase diagrams at normal pressure and three- dimensional temperature-composition-pressure (T-C-P) diagrams, many material scientists seldom refer to the (T-C-P) diagrams, just as many high pressure researchers often ignore the data obtained at normal pressure. This book aims to bridge the gap between data obtained at high pressure and that obtained at normal pressure. The most recent research covers not only elements and stoichiometric compounds, but also binary, ternary, and multicomponent alloys, and so this book covers an extended range of substances. The properties of 890 binary systems and a further 1153

pseudobinary and ternary systems are summarized, and accompanied by an extensive bibliography. The data includes information on the solubility of components in solid solutions, melting, and first- and second-order phase transformations in alloys and stoichiometric compounds. Carbon in Earth's fluid envelopes - the atmosphere, biosphere, and hydrosphere, plays a fundamental role in our planet's climate system and a central role in biology, the environment, and the economy of earth system. The source and original quantity of carbon in our planet is uncertain, as are the identities and relative importance of early chemical processes associated with planetary differentiation. Numerous lines of evidence point to the early and continuing exchange of substantial carbon between Earth's surface and its interior, including diamonds, carbon-rich mantle-derived magmas, carbonate rocks in subduction zones and springs carrying deeply sourced carbon-bearing gases. Thus, there is little doubt that a substantial amount of carbon resides in our planet's interior. Yet, while we know it must be present, carbon's forms, transformations and movements at conditions relevant to the interiors of Earth and other planets remain uncertain and untapped. Volume highlights include: - Reviews key, general topics, such as carbonate minerals, the deep carbon cycle, and carbon in magmas or fluids - Describes new results at the frontiers of the field with presenting results on carbon in minerals, melts, and fluids at extreme conditions of planetary interiors - Brings together emerging insights into carbon's forms, transformations and movements through study of the dynamics, structure, stability and reactivity of carbon-based natural materials - Reviews emerging new insights into the properties of allied substances that carry carbon, into the rates of chemical and physical transformations, and into the complex interactions between moving fluids, magmas, and rocks to the interiors of Earth and other planets - Spans the various chemical redox states of carbon, from reduced hydrocarbons to zero-valent diamond and graphite to oxidized CO2 and carbonates - Captures and synthesizes the exciting results of recent, focused efforts in an emerging scientific discipline - Reports advances over the last

decade that have led to a major leap forward in our understanding of carbon science - Compiles the range of methods that can be tapped tap from the deep carbon community, which includes experimentalists, first principles theorists, thermodynamic modelers and geodynamicists - Represents a reference point for future deep carbon science research Carbon in Planetary Interiors will be a valuable resource for researchers and students who study the Earth's interior. The topics of this volume are interdisciplinary, and therefore will be useful to professionals from a wide variety of fields in the Earth Sciences, such as mineral physics, petrology, geochemistry, experimentalists, first principles theorists, thermodynamics, material science, chemistry, geophysics and geodynamics. In recent years carbon dioxide has played an increasingly important role in biomass processing. This book presents the state-of-the-art of a range of diverse approaches for the use of carbon dioxide in biomass valorisation. The book explores cutting-edge research and important advances in green high-pressure technologies. It gives an overview of the most relevant and promising applications of high-pressure CO2-based technologies in biomass processing from the perspective of the biorefinery concept. Demonstrating the interdisciplinary aspects of high-pressure technologies from biology, chemistry and biochemical engineering areas, this book brings researchers and industrialists up to date with the latest advances in this field, including novel technologies for energy; biochemicals and materials production; and green chemical engineering processes. The book begins with an overview of the phase diagrams of fluid mixtures (fluid = liquid, gas, or supercritical state), which can show an astonishing variety when elevated pressures are taken into account; phenomena like retrograde condensation (single and double) and azeotropy (normal and double) are discussed. It then 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 Designed specifically for one-semester courses, this beautifully illustrated textbook explains the key concepts in mineralogy and petrology. High pressure has become a basic variable in many areas of science and engineering. It extends from disciplines of geophysics and astrophysics through chemistry and physics to those of modern biology, electrical and chemical engineering. This breadth has been recognized for some time, but it was not until the early 1960's that an international group of scientists and engineers established the Association Internationale for Research and Advancement of High Pressure Science and Technology (AIRAPT) for bringing these various aspects of high pressure together at an international conference. The First AIRAPT International High Pressure Conference was held in 1965 in France and has been convened at approximately two to three year intervals since that time. The past four AIRAPT International High Pressure Conferences have been held in Germany, Scotland, Japan and the U.S.S.R. Since the first meeting of this kind, our understanding of high pressure behavior of physical systems has increased greatly. These books presents a wide spectrum of research and development activities in the field of High Pressure Science and Technology. These book provide comprehensive and interdisciplinary descriptions of recent research accomplishments in the biological, chemical, Earth, materrals, physical, physiological and related sciences. As laboratories replace heavy hydraulic presses and bulky high-pressure chambers with miniature diamond anvils, traditional heaters with laser heating, and continue to improve methods of shock

compression, there has been considerable new data obtained from the high-pressure, high-temperature modification of pure elements. The dense metallic modification of elements shows the potential for achieving superconductivity akin to theoretical predictions. Phase Transformations of Elements Under High Pressure contains the latest theoretical and experimental information on nearly 100 elements, including first-and second-phase transitions, melting lines, crystal structures of stable and metastable phases, stability of polymorphic modifications, and other useful properties and data. It emphasizes features such as changes in the liquid state, amorphization, and metallization, and provides temperature-pressure diagrams for every element. The book also describes the transitions of polymeric forms of fullerene, crystal modifications of elements stable under high pressures, and provides data that confirms their superconducting and magnetic properties. This handbook will be a lasting reference for scientists in a broad range of disciplines, including solid-state physics, chemistry, crystallography, mineralogy, and materials science. There is no paucity of books on high pressure. Beginning with P. W. Bridgman's The Physics of High Pressure, books of general interest include the two-volume Physics and Chemistry of High Pressure, edited by R. S. Bradley, and the series, Advances in High Pressure Research, as well as the report on the Lake George Conference in 1960. Solid state physics is well represented by Solids Under Pressure, edited by Paul and Warschauer, by Physics of Solids at High Pressure, edited by Tomizuka and Emrick, and by Properties Physiques des Solides sous Pression, edited by Bloch, as well as by chapters in Volumes 6, 13, 17, and 19 of Solid State Physics, edited by Seitz, Turnbull, and Ehrenreich. Chemistry in gases and liquids is covered in Weale's Chemical Reactions at High Pressure, and Hamann's Physico-chemical Effects of Pressure. In addition to the coverage of techniques and calibrations in the above volumes, Modern Very High Pressure Techniques, edited by Wentorf, High Pressure Methods in Solid State Research, by C. C. Bradley, The Accurate Characterization of the High Pressure Environment, edited by E. C. Lloyd, and a chapter in Volume 11 of Solid State Physics are

devoted entirely to this facet of high pressure research. It is not our plan either to supersede or extend these approaches. It is our purpose here to discuss the effect of high pressure on the electronic properties of solids. This is the first book covering all aspects of high pressure biochemistry and biophysics of proteins. Hydrostatic pressure is a powerful tool for study of biological systems. As a thermodynamic parameter, hydrostatic pressure has been known for a century to act on biological materials in a similar, but not identical, way to temperature. However, pressure was disregarded for a long time by biochemists mainly because the basic concepts (and the thermodynamics) focused on the chemical reactions involved and because general ideas on what pressure can add to the understanding of the behaviour of proteins were lacking. In recent decades, technological progress in the field of physics has shown, along with parameters such as temperature and solvent conditions, that pressure can be used for more refined thermodynamic and kinetic descriptions of biological processes and regulation of biological systems. The effects of pressure on proteins, nucleoproteins and membranes have recently been reviewed and several proceedings books have been published. This book presents a set of basic understandings of the behavior and response of solids to propagating shock waves. The propagation of shock waves in a solid body is accompanied by large compressions, decompression, and shear. Thus, the shear strength of solids and any inelastic response due to shock wave propagation is of the utmost importance. Furthermore, shock compres sion of solids is always accompanied by heating, and the rise of local tempera ture which may be due to both compression and dissipation. For many solids, under a certain range of impact pressures, a two-wave structure arises such that the first wave, called the elastic prescursor, travels with the speed of sound; and the second wave, called a plastic shock wave, travels at a slower speed. Shock-wave loading of solids is normally accomplished by either projectile impact, such as produced by guns or by explosives. The shock heating and compression of solids covers a wide range of temperatures and densities. For example, the temperature may be as high as a few

*electron volts (1 eV = 11,500 K) for very strong shocks and the densification may be as high as four times the normal density. Since its first appearance in 1950, Pounder's Marine Diesel Engines has served seagoing engineers, students of the Certificates of Competency examinations and the marine engineering industry throughout the world. Each new edition has noted the changes in engine design and the influence of new technology and economic needs on the marine diesel engine. Now in its ninth edition, Pounder's retains the directness of approach and attention to essential detail that characterized its predecessors. There are new chapters on monitoring control and HiMSEN engines as well as information on developments in electronic-controlled fuel injection. It is fully updated to cover new legislation including that on emissions and provides details on enhancing overall efficiency and cutting CO2 emissions. After experience as a seagoing engineer with the British India Steam Navigation Company, Doug Woodyard held editorial positions with the Institution of Mechanical Engineers and the Institute of Marine Engineers. He subsequently edited The Motor Ship journal for eight years before becoming a freelance editor specializing in shipping, shipbuilding and marine engineering. He is currently technical editor of Marine Propulsion and Auxiliary Machinery, a contributing editor to Speed at Sea, Shipping World and Shipbuilder and a technical press consultant to Rolls-Royce Commercial Marine. * Helps engineers to understand the latest changes to marine diesel engineers * Careful organisation of the new edition enables readers to access the information they require * Brand new chapters focus on monitoring control systems and HiMSEN engines. * Over 270 high quality, clearly labelled illustrations and figures to aid understanding and help engineers quickly identify what they need to know. High pressure processing technology has been adopted worldwide at the industrial level to preserve a wide variety of food products without using heat or chemical preservatives. High Pressure Processing: Technology Principles and Applications will review the basic technology principles and process parameters that govern microbial safety and product quality, an essential*

requirement for industrial application. This book will be of interest to scientists in the food industry, in particular to those involved in the processing of products such as meat, fish, fruits, and vegetables. The book will be equally important to food microbiologists and processing specialists in both the government and food industry. Moreover, it will be a valuable reference for authorities involved in the import and export of high pressure treated food products. Finally, this update on the science and technology of high pressure processing will be helpful to all academic, industrial, local, and state educators in their educational efforts, as well as a great resource for graduate students interested in learning about state-of-the-art technology in food engineering.