

# Solid Propellant Chemistry Combustion And Motor Interior Ballistics 1999 Progress In Astronautics And Aeronautics

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Solid Rocket Propulsion Technology - A. Davenas 2012-12-02

This book, a translation of the French title Technologie des Propergols Solides, offers otherwise unavailable information on the subject of solid propellants and their use in rocket propulsion. The fundamentals of rocket propulsion are developed in chapter one and detailed descriptions of concepts are covered in the following chapters. Specific design methods and the theoretical physics underlying them are presented, and finally the industrial production of the propellant itself is explained. The material used in the book has been collected from different countries, as the development of this field has occurred separately due to the classified nature of the subject. Thus the reader not only has an overall picture of solid rocket propulsion technology but a comprehensive view of its different developmental permutations worldwide.

Nano-Energetic Materials - Shantanu Bhattacharya 2018-11-09

This book presents the latest research on the area of nano-energetic materials, their synthesis, fabrication, patterning, application and integration with various MEMS systems and platforms. Keeping in mind the applications for this field in aerospace and defense sectors, the articles in this volume contain contributions by leading researchers in the field, who discuss the current challenges and future perspectives. This volume will be of use to researchers working on various applications of high-energy research.

Rocket Propulsion Elements - George P. Sutton 2016-12-27

ROCKET PROPULSION ELEMENTS THE DEFINITIVE INTRODUCTION TO ROCKET PROPULSION THEORY AND APPLICATIONS The recent upsurge in global government and private spending and in space flight events has resulted in many novel applications of rocket propulsion technology. Rocket Propulsion Elements remains the definitive guide to the field, providing a comprehensive introduction to essential concepts and applications. Led by industry veteran George P. Sutton and by Professor Oscar Biblarz, this book provides interdisciplinary coverage including thermodynamics, aerodynamics, flight performance, propellant chemistry and more. This thoroughly revised ninth edition includes discussion and analysis of recent advances in the field, representing an authoritative reference for students and working engineers alike. In any engineering field, theory is only as useful as it is practical; this book emphasizes relevant real-world applications of fundamental concepts to link "thinking" and "doing". This book will help readers: Understand the physics of flight and the chemistry of propulsion Analyze liquid, solid, gas, and hybrid propellants, and the engines they fuel Consider high-temperature combustion, stability, and the principles of electric and chemical propulsion Dissect the workings of systems in common use around the world today Delve into the latest advances in materials, systems, propellants, and more Broad in scope, rich in detail, and clear in explanation, this seminal work provides an unparalleled foundation in aerospace engineering topics. Learning through the lens of modern applications untangles complex topics and helps students fully grasp the intricacies on a more intuitive level. Rocket Propulsion Elements, Ninth Edition merges information and utility building a solid foundation for innovation.

Energetic Polymers - How Ghee Ang 2012-03-26

This up-to-date overview provides the latest information on the performance, sensitivity, strength and processability aspects of propellants and explosive formulations, with the nature of polymer binder/plasticizer as the variable factor. Apart from applications, this monograph explores the principles behind energetic polymers, while

discussing the synthetic routes and energetic characteristics of individual family of energetic polymers. Furthermore, a number of case studies illustrate the role of energetic polymers on enhancing the performance of formulations as compared to their inert counterparts. The emphasis is on safety throughout, with practical guidance on how to safely handle and formulate energetic polymer based formulations. With the advent of a new generation of energetic polymers, this book is relevant to industry and defense organizations as well as for academic research.

Energetic Materials Research, Applications, and New Technologies - Goncalves, Rene Francisco Boschi 2017-12-29

In the last decade, there has been an influx in the development of new technologies for deep space exploration. Countries all around the world are investing in resources to create advanced energetic materials and propulsion systems for their aerospace initiatives. Energetic Materials Research, Applications, and New Technologies is an essential reference source of the latest research in aerospace engineering and its application in space exploration. Featuring comprehensive coverage across a range of related topics, such as molecular dynamics, rocket engine models, propellants and explosives, and quantum chemistry calculations, this book is an ideal reference source for academicians, researchers, advanced-level students, and technology developers seeking innovative research in aerospace engineering.

*37th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit* - 2001

**Publications Combined - Over 100 Studies In Nanotechnology With Medical, Military And Industrial Applications 2008-2017** -

Over 7,300 total pages ... Just a sample of the contents: Title : Multifunctional Nanotechnology Research Descriptive Note : Technical Report,01 Jan 2015,31 Jan 2016 Title : Preparation of Solvent-Dispersible Graphene and its Application to Nanocomposites Descriptive Note : Technical Report Title : Improvements To Micro Contact Performance And Reliability Descriptive Note : Technical Report Title : Delivery of Nanotethered Therapies to Brain Metastases of Primary Breast Cancer Using a Cellular Trojan Horse Descriptive Note : Technical Report,15 Sep 2013,14 Sep 2016 Title : Nanotechnology-Based Detection of Novel microRNAs for Early Diagnosis of Prostate Cancer Descriptive Note : Technical Report,15 Jul 2016,14 Jul 2017 Title : A Federal Vision for Future Computing: A Nanotechnology-Inspired Grand Challenge Descriptive Note : Technical Report Title : Quantifying Nanoparticle Release from Nanotechnology: Scientific Operating Procedure Series: SOP C 3 Descriptive Note : Technical Report Title : Synthesis, Characterization And Modeling Of Functionally Graded Multifunctional Hybrid Composites For Extreme Environments Descriptive Note : Technical Report,15 Sep 2009,14 Mar 2015 Title : Equilibrium Structures and Absorption Spectra for SixOy Molecular Clusters using Density Functional Theory Descriptive Note : Technical Report Title : Nanotechnology for the Solid Waste Reduction of Military Food Packaging Descriptive Note : Technical Report,01 Apr 2008,01 Jan 2015 Title : Magneto-Electric Conversion of Optical Energy to Electricity Descriptive Note : Final performance rept. 1 Apr 2012-31 Mar 2015 Title : Surface Area Analysis Using the Brunauer-Emmett-Teller (BET) Method: Standard Operating Procedure Series: SOP-C Descriptive Note : Technical Report,30 Sep 2015,30 Sep 2016 Title : Stabilizing Protein Effects on the Pressure Sensitivity of Fluorescent Gold Nanoclusters

Descriptive Note : Technical Report Title : Theory-Guided Innovation of Noncarbon Two-Dimensional Nanomaterials Descriptive Note : Technical Report, 14 Feb 2012, 14 Feb 2016 Title : Detering Emergent Technologies Descriptive Note : Journal Article Title : The Human Domain and the Future of Army Warfare: Present as Prelude to 2050 Descriptive Note : Technical Report Title : Drone Swarms Descriptive Note : Technical Report, 06 Jul 2016, 25 May 2017 Title : OFFSETTING TOMORROW'S ADVERSARY IN A CONTESTED ENVIRONMENT: DEFENDING EXPEDITIONARY ADVANCE BASES IN 2025 AND BEYOND Descriptive Note : Technical Report Title : A Self Sustaining Solar-Bio-Nano Based Wastewater Treatment System for Forward Operating Bases Descriptive Note : Technical Report, 01 Feb 2012, 31 Aug 2017 Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics Descriptive Note : Technical Report, 26 Sep 2011, 25 Sep 2015 Title : Modeling and Experiments with Carbon Nanotubes for Applications in High Performance Circuits Descriptive Note : Technical Report Title : Radiation Hard and Self Healing Substrate Agnostic Nanocrystalline ZnO Thin Film Electronics (Per5 E) Descriptive Note : Technical Report, 01 Oct 2011, 28 Jun 2017 Title : High Thermal Conductivity Carbon Nanomaterials for Improved Thermal Management in Armament Composites Descriptive Note : Technical Report Title : Emerging Science and Technology Trends: 2017-2047 Descriptive Note : Technical Report Title : Catalysts for Lightweight Solar Fuels Generation Descriptive Note : Technical Report, 01 Feb 2013, 31 Jan 2017 Title : Integrated Real-Time Control and Imaging System for Microbiorobotics and Nanobiostructures Descriptive Note : Technical Report, 01 Aug 2013, 31 Jul 2014

**Applications of Turbulent and Multiphase Combustion** - Kenneth Kuan-yun Kuo 2012-07-26

A hands-on, integrated approach to solving combustion problems in diverse areas. An understanding of turbulence, combustion, and multiphase reacting flows is essential for engineers and scientists in many industries, including power generation, jet and rocket propulsion, pollution control, fire prevention and safety, and material processing. This book offers a highly practical discussion of burning behavior and chemical processes occurring in diverse materials, arming readers with the tools they need to solve the most complex combustion problems facing the scientific community today. The second of a two-volume work, *Applications of Turbulent and Multiphase Combustion* expands on topics involving laminar flames from Professor Kuo's bestselling book *Principles of Combustion, Second Edition*, then builds upon the theory discussed in the companion volume *Fundamentals of Turbulent and Multiphase Combustion* to address in detail cutting-edge experimental techniques and applications not covered anywhere else. Special features of this book include: Coverage of advanced applications such as solid propellants, burning behavior, and chemical boundary layer flows. A multiphase systems approach discussing basic concepts before moving to higher-level applications. A large number of practical examples gleaned from the authors' experience along with problems and a solutions manual. Engineers and researchers in chemical and mechanical engineering and materials science will find *Applications of Turbulent and Multiphase Combustion* an indispensable guide for upgrading their skills and keeping up with this rapidly evolving area. It is also an excellent resource for students and professionals in mechanical, chemical, and aerospace engineering.

**Nanomaterials in Rocket Propulsion Systems** - Qi-Long Yan 2018-10-16

*Nanomaterials in Rocket Propulsion Systems* covers the fundamentals of nanomaterials and examines a wide range of innovative applications, presenting the current state-of-the-art in the field. Opening with a chapter on nano-sized energetic materials, the book examines metal nanoparticles-based fuels, ballistic modifiers, stabilizers and catalysts as the components of rocket propellants. Hydrogen storage materials for rocket propulsion based on nanotubes are then discussed, as are nanoporous materials and metal organic frameworks, nano-gelled propellants, nano-composite ablators and ceramic nano-composites. Other applications examined include high thermal conductivity metallic nano-composite nozzle liners, nano-emitters for Coulomb propulsion of spacecrafts, and highly thermostable nano-ceramics for rocket motors. The book finishes with coverage of combustion of nano-sized rocket fuels, nano-particles and their combustion in micro- and nano-electromechanical systems (MEMS/NEMS), plasma propulsion and nano-scale physics. Users will find this to be a valuable resource for academic and government institutions, professionals, new researchers and

graduate students working in the application of nanomaterials in the aerospace industry. Provides a detailed overview of different types of nanomaterials used in rocket propulsion, highlighting different situations in which different materials are used. Demonstrates the use of new nanomaterial concepts, allowing for an increase in payload capacity or a decrease in launch mass. Explores a range of applications using metal nanopowders, presenting a panorama on cutting-edge, technological developments.

*Chemistry of High-Energy Materials* - Thomas M. Klapötke 2022-08-01

The 6th revised edition expands with new research developments, including new melt casts, reactive structure materials, a computational study on the detonation velocity of mixtures of solid explosives with non-explosive liquids, calculation of craters after explosions. This work is of interest to advanced students in chemistry, materials science and engineering, as well as to all those working in military and defense technology.

*Ballistics* - Donald E. Carlucci 2018-03-15

With new chapters, homework problems, case studies, figures, and examples, *Ballistics: Theory and Design of Guns and Ammunition, Third Edition* encourages superior design and innovative applications in the field of ballistics. It examines the analytical and computational tools for predicting a weapon's behavior in terms of pressure, stress, and velocity, demonstrating their applications in ammunition and weapons design. New coverage in the Third Edition includes gas-powered guns, and naval ordinance. With its thorough coverage of interior, exterior and terminal ballistics, this new edition continues to be the standard resource for those studying the technology of guns and ammunition.

**Fluid Structure Interaction and Moving Boundary Problems IV** - Subrata Kumar Chakrabarti 2007

Publishing papers presented at the Fourth International Conference on Fluid Structure Interactions, this book features contributions from experts specialising in this field on new ideas and the latest techniques. A valuable addition to this successful series and will be of great interest to mechanical and structural engineers, offshore engineers, earthquake engineers, naval engineers and any other experts involved in topics related to fluid structure interaction. Topics covered include: Hydrodynamic Forces; Response of Structures including Fluid Dynamic; Offshore Structure and Ship Dynamics; Fluid Pipeline Interactions; Structure Response to Serve Shock and Blast Loading; Vortex Shedding and Flow Induced Vibrations; Cavitations Effects in Turbo Machines and Pumps; Wind Effects on Bridges and Tall Structures; Mechanics of Cables, Rivers and Moorings; Building Biofluids and Biological Tissue Interaction Problems in CFD; Experimental Studies and Validation; Vibrations and Noise; Free Surface Flows and Moving Boundary Problems.

*Solid Propellant Chemistry Combustion and Motor Interior Ballistics 1999* - Vigor Yang 2000

**Propellants and Explosives** - Naminosuke Kubota 2007-02-27

This second edition of the classic on the thermochemistry of combustion now features five new chapters and updated coverage of significant recent developments in the field. Addressing both experimental as well as theoretical aspects, the book covers the thermochemical and combustion characteristics of all important types of energetic materials, such as explosives, propellants, and the new class of pyrolants, as well as related phenomena. It presents the fundamental bases of the energetics of materials, deflagration and detonation, thermochemical process of decomposition and combustion, plus combustion wave structures. The book also goes on to discuss the combustion mechanisms of various types of energetic materials, propellants, and explosives, based on the heat transfer process in the combustion waves. The burning rate models are also presented as an aid to understanding the rate-controlling steps of combustion processes, thus demonstrating the relationships of burning rate versus pressure and initial temperature. As a major topic new to this edition, new propulsion methods such as duct rockets, ramjets, pulse motors and thrusters are described in detail, while appendices on flow field dynamics and shock wave propagation have been added.

*Fundamentals of Solid Propellant Combustion* - K. K. Kuo 1995

*Rocket Propulsion Elements* - George P. Sutton 2011-09-09

The definitive text on rocket propulsion—now revised to reflect advancements in the field. For sixty years, Sutton's *Rocket Propulsion Elements* has been regarded as the single most authoritative sourcebook on rocket propulsion technology. As with the previous edition, coauthored with Oscar Biblarz, the Eighth Edition of *Rocket Propulsion*

Elements offers a thorough introduction to basic principles of rocket propulsion for guided missiles, space flight, or satellite flight. It describes the physical mechanisms and designs for various types of rockets' and provides an understanding of how rocket propulsion is applied to flying vehicles. Updated and strengthened throughout, the Eighth Edition explores: The fundamentals of rocket propulsion, its essential technologies, and its key design rationale The various types of rocket propulsion systems, physical phenomena, and essential relationships The latest advances in the field such as changes in materials, systems design, propellants, applications, and manufacturing technologies, with a separate new chapter devoted to turbopumps Liquid propellant rocket engines and solid propellant rocket motors, the two most prevalent of the rocket propulsion systems, with in-depth consideration of advances in hybrid rockets and electrical space propulsion Comprehensive and coherently organized, this seminal text guides readers evenhandedly through the complex factors that shape rocket propulsion, with both theory and practical design considerations. Professional engineers in the aerospace and defense industries as well as students in mechanical and aerospace engineering will find this updated classic indispensable for its scope of coverage and utility.

**Progress In Astronautics and Aeronautics** - G. G. Chernyi 2002

Metal Nanopowders - Alexander A. Gromov 2014-05-19

Written with both postgraduate students and researchers in academia and industry in mind, this reference covers the chemistry behind metal nanopowders, including production, characterization, oxidation and combustion. The contributions from renowned international scientists working in the field detail applications in technologies, scale-up processes and safety aspects surrounding their handling and storage.

**Physical and Chemical Processes in Gas Dynamics****physical and Chemical Kinetics and Thermodynamics** - G. G. Chernyi 2004

*Propellants and Explosives* - Naminosuke Kubota 2015-04-23

This third edition of the classic on the thermochemical aspects of the combustion of propellants and explosives is completely revised and updated and now includes a section on green propellants and offers an up-to-date view of the thermochemical aspects of combustion and corresponding applications. Clearly structured, the first half of the book presents an introduction to pyrodynamics, describing fundamental aspects of the combustion of energetic materials, while the second part highlights applications of energetic materials, such as propellants, explosives and pyrolants, with a focus on the phenomena occurring in rocket motors. Finally, an appendix gives a brief overview of the fundamentals of aerodynamics and heat transfer, which is a prerequisite for the study of pyrodynamics. A detailed reference for readers interested in rocketry or explosives technology.

**Dynamics of Heterogeneous Materials** - Vitali Nesterenko 2013-03-09

This monograph deals with the behavior of essentially nonlinear heterogeneous materials in processes occurring under intense dynamic loading, where microstructural effects play the main role. This book is not an introduction to the dynamic behavior of materials, and general information available in other books is not included. The material herein is presented in a form I hope will make it useful not only for researchers working in related areas, but also for graduate students. I used it successfully to teach a course on the dynamic behavior of materials at the University of California, San Diego. Another course well suited to the topic may be nonlinear wave dynamics in solids, especially the part on strongly nonlinear waves. About 100 problems presented in the book at the end of each chapter will help the reader to develop a deeper understanding of the subject. I tried to follow a few rules in writing this book: (1) To focus on strongly nonlinear phenomena where there is no small parameter with respect to the amplitude of disturbance, including solitons, shock waves, and localized shear. (2) To take into account phenomena sensitive to materials structure, where typical space scale of material parameters (particle size, cell size) are presented in the models or are variable in experimental research.

**Explosives** - Rudolf Meyer 2008-01-08

This world-famous reference work has been enlarged and updated without tampering with its tried and tested format. Around 500 alphabetically ordered, monographic entries consider the physicochemical properties, production methods and safe applications of over 120 explosive chemicals; discuss 70 fuels, additives and oxidizing agents; and describe test methods. The extensive thermodynamic data have been thoroughly updated and for the first time are also provided in electronic format. The included CD-ROM was compiled by the

Fraunhofer Institute of Chemical Technology (Pfinztal, Germany) and represents an excerpt from the ICT Thermodynamical Database. Not only additional thermodynamic data, and references to further reading, but also enhanced search facilities are provided. Other key features include: the 1500-entry combined index and glossary (comprising terms and abbreviations in English, French and German), conversion tables and many literature references. This book is suitable for explosive experts and also for translators, public authorities and patent lawyers. From reviews of previous editions: '... This wealth of information and an index that comprises some 1500 keywords and several conversion tables make this a unique source of knowledge for anybody working with explosives.'

(Propellants, Explosives, Pyrotechnics)

*Computational Ballistics III* - C. A. Brebbia 2007

Containing the proceedings of the Third International Conference on Computational Ballistics, this book presents new ideas and advanced developments in the field of study of Computational Ballistics. Ballistic studies include applications as varied as the study of the structural and control behavior of rockets and communication satellites; bird strike effects on commercial aircraft, terrorist attacks and automobile crack worthiness modelling. Many basic problems of ballistics are similar to those in other fields of applications, such as combustion, heat conduction, in-flight structural behaviour, trajectory related issues, contact, impact, penetration, structural response to shock waves and many others. A valuable contribution to its field, this text will be of interest to researchers involved in the different areas of computational ballistics and their relationship between computational methods and experiments. Notable topics include: Systems and Technolog; Combustion and Heat Transfer; Propellants; Fluid Dynamics; Fluid Flow and Aerodynamics; In-Flight Structural Behaviour and Material Response; Guidance and Control; Perforation and Penetration Mechanics; Fluid-structure Interaction; Experimental Mechanics/ballistic and Field Testing; High Rate Loads; Composite Material; Shock and Impact.

*Aerospace Materials and Material Technologies* - N. Eswara Prasad 2016-11-11

This book is a comprehensive compilation of chapters on materials (both established and evolving) and material technologies that are important for aerospace systems. It considers aerospace materials in three Parts. Part I covers Metallic Materials (Mg, Al, Al-Li, Ti, aero steels, Ni, intermetallics, bronzes and Nb alloys); Part II deals with Composites (GLARE, PMCs, CMCs and Carbon based CMCs); and Part III considers Special Materials. This compilation has ensured that no important aerospace material system is ignored. Emphasis is laid in each chapter on the underlying scientific principles as well as basic and fundamental mechanisms leading to processing, characterization, property evaluation and applications. This book will be useful to students, researchers and professionals working in the domain of aerospace materials.

**Fundamentals of Rocket Propulsion** - DP Mishra 2017-07-20

The book follows a unified approach to present the basic principles of rocket propulsion in concise and lucid form. This textbook comprises of ten chapters ranging from brief introduction and elements of rocket propulsion, aerothermodynamics to solid, liquid and hybrid propellant rocket engines with chapter on electrical propulsion. Worked out examples are also provided at the end of chapter for understanding uncertainty analysis. This book is designed and developed as an introductory text on the fundamental aspects of rocket propulsion for both undergraduate and graduate students. It is also aimed towards practicing engineers in the field of space engineering. This comprehensive guide also provides adequate problems for audience to understand intricate aspects of rocket propulsion enabling them to design and develop rocket engines for peaceful purposes.

**Advances in Hybrid Rocket Technology and Related Analysis Methodologies** - Carmine Carmicino 2020-12-07

The book is an amazing collection of technical papers dealing with hybrid rockets. Once perceived as a niche technology, for about a decade, hybrid rockets have enjoyed renewed interest from both the propulsion technical community and industry. Hybrid motors can be used in practically all applications where a rocket is employed, but there are certain cases where they present a superior fit, such as sounding rockets, tactical missile systems, launch boosters and the emerging field of commercial space transportation. The novel space tourism business, indeed, will benefit from their safety and lower recurrent development costs. The subjects addressed in the book include the cutting edge technology employed to push forward this relatively new propulsion concept, spanning systems to improve fuel regression rate, control of the

mixture ratio to optimize performance, computational fluid dynamics applied to the simulation of the internal ballistics, and some other novel system applications.

[The Chemistry and Technology of Solid Rocket Propellants \(A Treatise on Solid Propellants\)](#) - T.L. Varghese 2017-01-03

The book is a treatise on solid propellants in nine chapters, covering the history, chemistry, energetics, processing and characterization aspects of composite solid propellants, internal ballistics, advanced solid propellants, safety, quality and reliability and homogenous or double base propellants. The book also traces the evolution of solid propellant technology in ISRO for launch vehicles and sounding rockets. There is a detailed table of contents, expanded index, glossary, exhaustive references and questions in each chapter. It can be used as a textbook for science and engineering students, as a reference book for researchers and as a companion to scientists and engineers working in the research, development and production areas of solid propellants.

**Innovative Energetic Materials: Properties, Combustion Performance and Application** - WeiQiang Pang 2020-07-04

This book focuses on the combustion performance and application of innovative energetic materials for solid and hybrid space rocket propulsion. It provides a comprehensive overview of advanced technologies in the field of innovative energetic materials and combustion performance, introduces methods of modeling and diagnosing the aggregation/agglomeration of active energetic metal materials in solid propellants, and investigates the potential applications of innovative energetic materials in solid and hybrid propulsion. In addition, it also provides step-by-step solutions for sample problems to help readers gain a good understanding of combustion performance and potential applications of innovative energetic materials in space propulsion. This book serves as an excellent resource for researchers and engineers in the field of propellants, explosives, and pyrotechnics.

**Mechanics and Chemistry of Solid Propellants** - 1967

**Boron-Based Fuel-Rich Propellant** - WeiQiang Pang 2019-04-09

Boron-Based Fuel-Rich Solid Rocket Propellant Technology is a professional book that systematically introduces the latest research progress for boron-based fuel-rich solid propellants. It covers surface modifications, coating and agglomerating techniques, granulation, and characterization of amorphous boron powders, and its application to fuel-rich solid rocket propellants. Technologies for controlling the processing methods and combustion performance of fuel-rich propellants are examined, and the book concludes with a summary of the research progress in boron-based fuel-rich solid propellants and a look forward to the foreseeable development trends of military applications.

[Energetic Materials](#) - 2003-11-21

This volume provides an overview of current research and recent advances in the area of energetic materials, focusing on explosives and propellants. The contents and format reflect the fact that theory, experiment and computation are closely linked in this field. The challenge of developing energetic materials that are less sensitive to accidental stimuli continues to be of critical importance. This volume opens with discussions of some determinants of sensitivity and its correlations with various molecular and crystal properties. The next several chapters deal in considerable detail with different aspects and mechanisms of the initiation of detonation, and its quantitative description. The second half of this volume focuses upon combustion. Extensive studies model ignition and combustion, with applications to different propellants. The final chapter is an exhaustive computational treatment of the mechanism and kinetics of combustion initiation reactions of ammonium perchlorate. Overall, this volume illustrates the progress that has been made in the field of energetic materials and some of the areas of current activity. It also indicates the challenges involved in characterizing and understanding the properties and behaviour of these compounds. The work is a unique state-of-the-art treatment of the subject, written by pre-eminent researchers in the field. - Overall emphasis is on theory and computation, presented in the context of relevant experimental work - Presents a unique state-of-the-art treatment of the subject - Contributors are preeminent researchers in the field

**Solid Propellant Grain Structural Integrity Analysis** - United States. National Aeronautics and Space Administration 1973

**Toxicological Profile for Perchlorates** - 2005

*Nanoenergetic Materials* - Djalal Trache 2021-03-25

This highly informative and carefully presented book discusses the

preparation, processing, characterization and applications of different types of nanoenergetic materials, as well as the tailoring of their properties. It gives an overview of recent advances of outstanding classes of energetic materials applied in the fields of physics, chemistry, aerospace, defense, and materials science, among others. The content of this book is relevant to researchers in academia and industry professionals working on the development of advanced nanoenergetic materials and their applications.

[Solid Propellant Rocket Research](#) - Martin Summerfield 2013-11-11

Solid Propellant Rocket Research

**Chemical Rocket Propulsion** - Luigi T. De Luca 2016-08-19

Developed and expanded from the work presented at the New Energetic Materials and Propulsion Techniques for Space Exploration workshop in June 2014, this book contains new scientific results, up-to-date reviews, and inspiring perspectives in a number of areas related to the energetic aspects of chemical rocket propulsion. This collection covers the entire life of energetic materials from their conceptual formulation to practical manufacturing; it includes coverage of theoretical and experimental ballistics, performance properties, as well as laboratory-scale and full system-scale, handling, hazards, environment, ageing, and disposal. Chemical Rocket Propulsion is a unique work, where a selection of accomplished experts from the pioneering era of space propulsion and current technologists from the most advanced international laboratories discuss the future of chemical rocket propulsion for access to, and exploration of, space. It will be of interest to both postgraduate and final-year undergraduate students in aerospace engineering, and practicing aeronautical engineers and designers, especially those with an interest in propulsion, as well as researchers in energetic materials.

[Overviews of Recent Research on Energetic Materials](#) - Robert W Shaw 2005-08-02

' Few books cover experimental and theoretical methods to characterize decomposition, combustion and detonation of energetic materials. This volume, by internationally known and major contributors to the field, is unique because it summarizes the most important recent work, what we know with confidence, and what main areas remain to be investigated. Most chapters comprise summaries of work spanning decades and contain expert commentary available nowhere else. Although energetic materials are its focus, this book provides a guide to modern methods for investigations of condensed and gas-phase reactions. Although these energetic reactions are complex and difficult to study, the work discussed here provides readers with a substantial understanding of the behavior of materials now in use, and a predictive capability for the development of new materials based on target properties.

Contents:Connecting Molecular Properties to Decomposition, Combustion and Explosion Trends (T B Brill)Thermal Decomposition Processes of Energetic Materials in the Condensed Phase at Low and Moderate Temperatures (R Behrens)Study of Energetic Material Combustion Chemistry by Probing Mass Spectrometry and Modeling of Flames (O P Korobeinichev)Optical Spectroscopic Measurements of Energetic Material Flame Structure (T Parr & D Hanson-Parr)Transient Gas-Phase Intermediates in the Decomposition of Energetic Materials (P J Dagdigian)Role of Excited Electronic States in the Decomposition of Energetic Materials (E R Bernstein)Gas-Phase Kinetics for Propellant Combustion Modeling: Requirements and Experiments (W R Anderson & A Fontijn)Gas-Phase Decomposition of Energetic Molecules (D L Thompson)Modeling the Reactions of Energetic Materials in the Condensed Phase (L E Fried et al.)Multi-Phonon Up-Pumping in Energetic Materials (D D Dlott)Applications of Theoretical Chemistry in Assessing Energetic Materials for Performance or Sensitivity (B M Rice)Combustion and Ignition of Nitramine Propellants: Aspects of Modeling, Simulation, and Analysis (E S Kim & V Yang)Burning-Rate Models and Their Successors, A Personal Perspective (M S Miller)Ideas to Expand Thinking About New Energetic Materials (J Bottaro)

Readership: Researchers studying fast chemical reactions and materials behavior under extreme conditions. Experts and beginners in energetic decomposition, combustion and detonation research. Keywords: Energetic Materials; Combustion; Thermal Decomposition; Combustion Model; Materials Design; Flames; Explosive; Propellant; Computational Chemistry; Detonation Key Features: Summarizes the known knowns (the most important recent work) and lists the known unknowns (what remains to be investigated) Provides expert commentary on the complex behavior of materials Reviews: "This book nicely covers the application of many experimental and theoretical tools to study the difficult problem of ignition and combustion of many traditional energetic materials. It could

be a valuable resource to the researchers in the field."Journal of the American Chemical Society '

**Chemical Rockets** - Subramaniam Krishnan 2019-10-10

The purpose of this book is to discuss, at the graduate level, the methods of performance prediction for chemical rocket propulsion. A pedagogical presentation of such methods has been unavailable thus far and this text, based upon lectures, fills this gap. The first part contains the energy-minimization to calculate the propellant-combustion composition and the subsequent computation of rocket performance. While incremental analysis is for high performance solid motors, equilibrium-pressure analysis is for low performance ones. Both are detailed in the book's second part for the prediction of ignition and tail-off transients, and equilibrium operation. Computer codes, adopting the incremental analysis along with erosive burning effect, are included. The material is encouraged to be used and presented at lectures. Senior undergraduate and graduate students in universities, as well as practicing engineers and scientists in rocket industries, form the readership.

*Combustion of Energetic Materials* - Kenneth K. Kuo 2002

This edited book contains state-of-the-art information associated with energetic material combustion. There are twelve topical areas, including: Reaction Kinetics of Energetic Materials (Solid, Liquid, and Gel Propellants); Recycling of Energetic Materials; Combustion Performance of Hybrid and Solid Rocket Motors; Ignition and Combustion of Energetic Materials; Energetic Material Defects and Rocket Engine Flowfields; Metal Combustion; Pyrolysis and Combustion Processes of New

Ingredients and Applications; Theoretical Modeling and Numerical Simulation of Combustion Processes of Energetic Materials; Combustion Diagnostic Techniques; Propellant and Rocket Motor Stability; Commercial Applications of Energetic Materials (Airbags, Gas Generators, etc.); and Thermal Insulation and Ablation Processes.

**Explosives** - Rudolf Meyer 2008-02-08

This world-famous work has been enlarged and updated without tampering with its tried and tested format. Around 500 alphabetically ordered, monographic entries consider the physicochemical properties, production methods and safe applications of over 120 explosive chemicals, while discussing 70 fuels, additives and oxidizing agents and describing the relevant test methods. The extensive thermodynamic data has been thoroughly updated and now also provided on a CD-ROM compiled by the Fraunhofer Institute of Chemical Technology. This excerpt from the ICT Thermodynamical Database not only includes additional thermodynamic data, and references to further reading, but also features enhanced search facilities. Other key features include a 1,500-entry combined index and glossary with terms and abbreviations in English, French and German, conversion tables and numerous literature references. A handy reference for explosive experts and also for translators, public authorities and patent lawyers. From reviews of previous editions: '... This wealth of information and an index that comprises some 1500 keywords and several conversion tables make this a unique source of knowledge for anybody working with explosives.' (Propellants, Explosives, Pyrotechnics)