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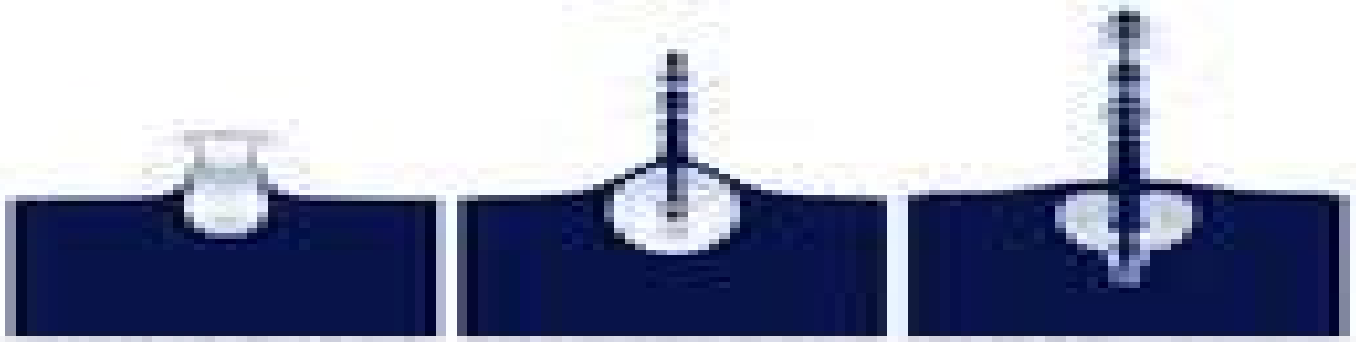
# NUMERICAL MODELING of EXPLOSIVES and PROPELLANTS



Charles L. Mader

CRC Press

# Numerical Modeling Of Explosives And Propellants

Clive Woodley,Ian Cullis

**Numerical Modeling Of Explosives And Propellants:**

**Numerical Modeling of Explosives and Propellants, Third Edition** Charles L. Mader,2008 Providing a complete overview of the rapidly emerging field of modeling for explosives and propellants this updated text imparts a thorough understanding of new computational methods and experimental measuring techniques The CD ROM contains FORTRAN and executable computer codes *Numerical Modeling of Explosives and Propellants, Second Edition* Charles L. Mader,1997-08-29 Charles Mader a leading scientist who conducted theoretical research at Los Alamos National Laboratory for more than 30 years sets a new standard with this reference on numerical modeling of explosives and propellants This book updates and expands the information presented in the author s landmark work Numerical Modeling of Detonations published in 1979 and still in use today Numerical Modeling of Explosives and Propellants incorporates the considerable changes the personal computer has brought to numerical modeling since the first book was published and includes new three dimensional modeling techniques and new information on propellant performance and vulnerability Both an introduction to the physics and chemistry of explosives and propellants and a guide to numerical modeling of detonation and reactive fluid dynamics Numerical Modeling of Explosives and Propellants offers scientists and engineers a complete picture of the current state of explosive and propellant technology and numerical modeling The book is richly illustrated with figures that support the concepts and filled with tables for quick access to precise data The accompanying CD ROM contains computer codes that are the national standard by which modeling is evaluated Dynamic material properties data files and animation files are also included There is no other book available today that offers this vital information Numerical Modeling of Explosives and Propellants Charles L. Mader,2007-10-18 Major advances both in modeling methods and in the computing power required to make those methods viable have led to major breakthroughs in our ability to model the performance and vulnerability of explosives and propellants In addition the development of proton radiography during the last decade has provided researchers with a major new experimental tool for studying explosive and shock wave physics Problems that were once considered intractable such as the generation of water cavities jets and stems by explosives and projectiles have now been solved Numerical Modeling of Explosives and Propellants Third Edition provides a complete overview of this rapidly emerging field covering basic reactive fluid dynamics as well as the latest and most complex methods and findings It also describes and evaluates Russian contributions to the experimental explosive physics database which only recently have become available This book comes with downloadable resources that contain FORTRAN and executable computer codes that operate under Microsoft Windows Vista operating system and the OS X operating system for Apple computers Windows Vista and MAC compatible movies and PowerPoint presentations for each chapter Explosive and shock wave databases generated at the Los Alamos National Laboratory and the Russian Federal Nuclear Centers Charles Mader s three pronged approach through text computer programs and animations imparts a thorough understanding of new computational methods and

experimental measuring techniques while also providing the tools to put these methods to effective use **Numerical Modeling of Detonations** Charles L. Mader,1979 Good No Highlights No Markup all pages are intact Slight Shelfwear may have the corners slightly dented may have slight color changes slightly damaged spine High Energy Materials Jai Prakash Agrawal,2015-11-20 Authored by an insider with over 40 years of high energy materials HEMs experience in academia industry and defense organizations this handbook and ready reference covers all important HEMs from the 1950s to the present with their respective properties and intended purposes Written at an attainable level for professionals engineers and technicians alike the book provides a comprehensive view of the current status and suggests further directions for research and development An introductory chapter on the chemical and thermodynamic basics allows the reader to become acquainted with the fundamental features of explosives before moving on to the important safety aspects in processing handling transportation and storage of high energy materials With its collation of results and formulation strategies hitherto scattered in the literature this should be on the shelf of every HEM researcher and developer **Materials Informatics III** Kunal Roy,Arkaprava Banerjee,2025-03-01 This contributed volume focuses on the application of machine learning and cheminformatics in predictive modeling for organic materials polymers solvents and energetic materials It provides an in depth look at how machine learning is utilized to predict key properties of polymers deep eutectic solvents and ionic liquids as well as to improve safety and performance in the study of energetic and reactive materials With chapters covering polymer informatics quantitative structure property relationship QSPR modeling and computational approaches the book serves as a comprehensive resource for researchers applying predictive modeling techniques to advance materials science and improve material safety and performance *Detonation Phenomena of Condensed Explosives* Shiro Kubota,2023-01-13 This book presents fundamental theory of shock and detonation waves as well as selected studies in detonation research in Japan contributed by selected experts in safety research on explosives development of industrial explosives and application of explosives It also reports detonation research in Japan featuring industrial explosives that include ammonium nitrate based explosives and liquid explosives Intended as a monographic style book it consistently uses technical terms and symbols and creates organic links between various detonation phenomena in application of explosives fundamental theory of detonation waves measurement methods and individual studies Among other features the book presents a historical perspective of shock wave and detonation research in Japan pedagogical materials for young researchers in detonation physics and an introduction to works in Japan including equations of state which are worthy of attention but about which very little is known internationally Further the concise pedagogical chapters also characterize this book as a primer of detonation of condensed explosives and help readers start their own research *Explosives* Rudolf Meyer,Josef Köhler,Axel Homburg,2016-05-09 The unrivaled definitive reference for almost 40 years this classic work on explosives is now in its seventh completely revised and updated edition Some 500 monographic entries arranged alphabetically consider the physicochemical properties production

methods and safe applications of over 120 explosive chemicals In addition 70 fuels additives and oxidizing agents are discussed as well as the corresponding test methods Trade company and military short names are provided for many of the materials listed while further key features include a combined index and glossary with terms and abbreviations in English French and German as well as conversion tables and many literature references Finally this indispensable source also contains safety data and transport regulations Scientific and Technical Aerospace Reports ,1995 **Energetic Compounds** Mohammad Hossein Keshavarz,Thomas M. Klapötke,2020-05-05 This book discusses methods for the assessment of energetic compounds through heat of detonation detonation pressure velocity and temperature Gurney energy and power The authors focus on the detonation pressure and detonation velocity of non ideal aluminized energetic compounds This 2nd Edition includes an updated and improved presentation of simple reliable methods for the design synthesis and development of novel energetic compounds *Ballistics 2011* Ernest Baker,Douglas Templeton,2011-09 Includes papers that were first presented at a September 2011 conference organized by the National Defense Industrial Association and the International Ballistics Society This title includes a CD ROM that displays figures and illustrations in articles in full color along with a title screen and main menu screen **Energy Research Abstracts** ,1993 **Explosive Effects and Applications** Jonas A. Zukas,William Walters,2013-12-01 This is a broad based text on the fundamentals of explosive behavior and the application of explosives in civil engineering industrial processes aerospace applications and military uses Hydrazine and Its Derivatives Eckart Walter Schmidt,2001 Shock Wave Science and Technology Reference Library, Vol.4 F. Zhang,2009-06-12 The fourth of several volumes on solids in this series the six extensive chapters here are more specifically concerned with detonation and shock compression waves in reactive heterogeneous media including mixtures of solid liquid and gas phases **The Properties of Energetic Materials** Mohammad Hossein Keshavarz,Thomas M. Klapötke,2021-10-25 For a chemist who is concerned with the synthesis of new energetic compounds it is essential to be able to assess physical and thermodynamic properties as well as the sensitivity of possible new energetic compounds before synthesis is attempted Various approaches have been developed to predict important aspects of the physical and thermodynamic properties of energetic materials including but not limited to crystal density heat of formation melting point enthalpy of fusion and enthalpy of sublimation of an organic energetic compound Since an organic energetic material consists of metastable molecules capable of undergoing very rapid and highly exothermic reactions many methods have been developed to estimate the sensitivity of an energetic compound with respect to detonationcausing external stimuli such as heat friction impact shock and electrostatic discharge This book introduces these methods and demonstrates those methods which can be easily applied Performance of Explosives and New Developments Bibhu Mohanty,Vinay Kumar Singh,2012-11-05 There is considerable scope for improving the outcome of any blasting operation through basic understanding and application of the principles of blasting science and technology The main objective of Performance of

Explosives and New Developments is to sensitize the practitioner to critically examine the various empirical approaches in blasting whi *30th International Symposium on Shock Waves 2* Gabi Ben-Dor,Oren Sadot,Ozer Igra,2017-08-01 These proceedings collect the papers presented at the 30th International Symposium on Shock Waves ISSW30 which was held in Tel Aviv Israel from July 19 to July 24 2015 The Symposium was organized by Ortra Ltd The ISSW30 focused on the state of knowledge of the following areas Nozzle Flow Supersonic and Hypersonic Flows with Shocks Supersonic Jets Chemical Kinetics Chemical Reacting Flows Detonation Combustion Ignition Shock Wave Reflection and Interaction Shock Wave Interaction with Obstacles Shock Wave Interaction with Porous Media Shock Wave Interaction with Granular Media Shock Wave Interaction with Dusty Media Plasma Magnetohyrdrodynamics Re entry to Earth Atmosphere Shock Waves in Rarefied Gases Shock Waves in Condensed Matter Solids and Liquids Shock Waves in Dense Gases Shock Wave Focusing Richtmyer Meshkov Instability Shock Boundary Layer Interaction Multiphase Flow Blast Waves Facilities Flow Visualization and Numerical Methods The two volumes serve as a reference for the participants of the ISSW30 and anyone interested in these fields **Molecular Modeling of the Sensitivities of Energetic Materials** Didier Mathieu,2022-04-05 Molecular Modeling of the Sensitivities of Energetic Materials Volume 22 introduces experimental aspects explores the relationships between sensitivity molecular structure and crystal structure discusses insights from numerical simulations and highlights applications of these approaches to the design of new materials Providing practical guidelines for implementing predictive models and their application to the search for new compounds this book is an authoritative guide to an exciting field of research that warrants a computer aided approach for the investigation and design of safe and powerful explosives or propellants Much recent effort has been put into modeling sensitivities with most work focusing on impact sensitivity and leading to a lot of experimental data in this area Models must therefore be developed to allow evaluation of significant properties from the structure of constitutive molecules Highlights a range of approaches for computational simulation and the importance of combining them to accurately understand or estimate different parameters Provides an overview of experimental findings and knowledge in a quick and accessible format Presents guidelines to implement sensitivity models using open source python related software thus supporting easy implementation of flexible models and allowing fast assessment of hypotheses **BALLISTICS 2016** Clive Woodley,Ian Cullis,2016-05-22 Presents high level research on various caliber guns cannon mortars drones warheads shells bullets drills and other launchers and penetrants as well as their impact effects on natural and designed materials including large scale targets and body armors Provides new modeling and test data on projectile design and guidance propellants charges and explosives for military aerospace and civil engineering applicationsOver 250 presentations in two printed volumes plus searchable CD This book makes available original ballistics technology from around the world on a wide variety of weapons and their effects including the design and trajectory stability control of dozens of projectiles ranging from shells to missiles The book s authors discuss the efficacy and development of

propellants munitions and igniters and offer new approaches for modeling and testing Also investigated in Volume 1 are shielding and protection strategies for individual persons and other targets Volume 2 offers research on the mechanical behavior of multiple types of explosives as well as impact and penetration data from projectile effects on surfaces ranging from natural phenomena such as water and soils to metallic plating and material engineered armors Papers in these volumes were presented at a conference organized by the National Defense Industrial Association NDIA with the International Ballistics Society

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