



Shock Detonation Waves

J.R. Asay, R.A. Graham, G.K. Struab



Shock Detonation Waves:

Excitation of Detonation by Shock Waves (Selected Portions). A. S. Derzhavets, FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH., 1972 Current theoretical views on the mechanism of excitation of detonation are first discussed Excitation by shock waves is then treated at length The effects of various parameters such as shock wave velocity temperature pressure duration of action distance and dimensions of passive charge etc on initiation of detonation are considered and appropriate formulas and relations are given The impulse initiation of detonation of explosives is characterized by 3 phases shock wave initiation of chemical reactions growth of this reaction in the solid explosive and appearance of the detonation wave Shock and Detonation Waves John G. Kirkwood, 1968 **Shock Waves Science and Technology Library, Vol. 6** F. Zhang, 2012-03-19 This book as a volume of the Shock Wave Science and Technology Reference Library is primarily concerned with the fundamental theory of detonation physics in gaseous and condensed phase reactive media The detonation process involves complex chemical reaction and fluid dynamics accompanied by intricate effects of heat light electricity and magnetism a contemporary research field that has found wide applications in propulsion and power hazard prevention as well as military engineering The seven extensive chapters contained in this volume are Chemical Equilibrium Detonation S Bastea and LE Fried Steady One Dimensional Detonations A Higgins Detonation Instability HD Ng and F Zhang Dynamic Parameters of Detonation AA Vasiliev Multi Scaled Cellular Detonation D Desbordes and HN Presles Condensed Matter Detonation Theory and Practice C Tarver Theory of Detonation Shock Dynamics JB Bdzil and DS Stewart The chapters are thematically interrelated in a systematic descriptive approach though each chapter is self contained and can be read independently from the others It offers a timely reference of theoretical detonation physics for graduate students as well as professional scientists and engineers Interaction of Oblique Shock and Detonation Waves Y. Sheng, Jean Pascal;. Sislian, 1982 **Shock and Detonation Waves** John Gamble Kirkwood, 1967 *Unsteady Interaction of Shock and Detonation Waves in Gases* Viktor Pavlovich Korobeinikov, 1989 **Dynamics of Shock Waves, Explosions, and Detonations** J. Raymond Bowen, 1984 **Shock Waves** Klaus Hannemann, Friedrich Seiler, 2009-04-01 The 26th International Symposium on Shock Waves in G ttingen Germany was jointly organised by the German Aerospace Centre DLR and the French German Research Institute of Saint Louis ISL The year 2007 marked the 50th anniversary of the Symposium which first took place in 1957 in Boston and has since become an internationally acclaimed series of meetings for the wider Shock Wave Community The ISSW26 focused on the following areas Shock Propagation and Reflection Detonation and Combustion Hypersonic Flow Shock Boundary Layer Interaction Numerical Methods Medical Biological and Industrial Applications Richtmyer Meshkov Instability Blast Waves Chemically Reacting Flows Diagnostics Facilities Flow Visualisation Ignition Impact and Compaction Multiphase Flow Nozzles Flows Plasmas and Propulsion The two Volumes contain the papers presented at the symposium and serve as a reference for the participants of the ISSW 26 and individuals interested in these

fields **History of Shock Waves, Explosions and Impact** Peter O. K. Krehl, 2008-09-24 This unique and encyclopedic reference work describes the evolution of the physics of modern shock wave and detonation from the earlier and classical percussion The history of this complex process is first reviewed in a general survey Subsequently the subject is treated in more detail and the book is richly illustrated in the form of a picture gallery This book is ideal for everyone professionally interested in shock wave phenomena **Shock Waves in Condensed Matter** Y. M. Gupta, 2012-12-06 The Fourth American Physical Society Topical Conference on Shock Waves in Condensed Matter was held in Spokane Washington July 22 25 1985 Two hundred and fifty scientists and engineers representing thirteen countries registered at the conference The countries represented included the United States of America Australia Canada The People's Republic of China France India Israel Japan Republic of China Taiwan United Kingdom U S S R Switzerland and West Germany One hundred and sixty two technical papers covering recent developments in shock wave and high pressure physics were presented All of the abstracts have been published in the September 1985 issue of the Bulletin of the American Physical Society The topical conferences held every two years since 1979 have become the principal forum for shock wave studies in condensed materials Both formal and informal technical discussions regarding recent developments conveyed a sense of excitement Consistent with the past conferences the purpose of this conference was to bring together scientists and engineers studying the response of condensed matter to dynamic high pressures and temperatures Papers covering experimental theoretical and numerical studies of condensed matter properties were presented A noteworthy feature of this conference was the participation by several leading scientists engaged in static high pressure research Donald Curran served as the Master of Ceremonies at the conference banquet which was attended by two hundred and seventy five conference participants and guests including Dr Samuel Smith the new President of Washington State University Dr Handbook of Shock Waves, Three Volume Set Gabi Ben-Dor, Ozer Igra, Tov Elperin, 2000-10-18 The Handbook of Shock Waves contains a comprehensive structured coverage of research topics related to shock wave phenomena including shock waves in gases liquids solids and space Shock waves represent an extremely important physical phenomena which appears to be of special practical importance in three major fields compressible flow aerodynamics materials science and astrophysics Shock waves comprise a phenomenon that occurs when pressure builds to force a reaction i.e. sonic boom that occurs when a jet breaks the speed of sound This Handbook contains experimental theoretical and numerical results which never before appeared under one cover the first handbook of its kind The Handbook of Shock Waves is intended for researchers and engineers active in shock wave related fields Additionally R D establishments applied science research laboratories and scientific and engineering libraries both in universities and government institutions As well as undergraduate and graduate students in fluid mechanics gas dynamics and physics Key Features Ben Dor is known as one of the founders of the field of shock waves Covers a broad spectrum of shock wave research topics Provides a comprehensive description of various shock wave related subjects First handbook ever

to include under one separate cover experimental theoretical and numerical results 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 **Shock Waves** Zonglin Jiang, 2010-05-30 The 24th International Symposium on Shock Waves ISSW24 was held at the Beijing Friendship Hotel during July 11 16 2004 in Beijing It was a great pleasure for the Local Organizing Committee to organize the ISSW in China for the first time because forty seven years have passed since the First Shock Tube Symposium was held in 1957 at Albuquerque The ISSW24 had to be postponed for one year because of the SARS outbreak in Beijing shortly before the Symposium was scheduled to be held in 2003 but it has achieved success due to the continuous support and kind understanding from all the delegates It is very heart warming to have had such an experience and I am very happy to have served as chairman for the Symposium I would like to thank all for the contributions and help that they have given us over the past three years without which we would not have had the Symposium A total of 460 abstracts were submitted to the ISSW24 Each of the abstracts was evaluated by three members of the Scientific Review Committee and the decision on acceptance was made based on the reviewers reports 195 oral papers including 9 plenary lectures were accepted to be presented in three parallel sessions and 135 poster papers in three dedicated poster sessions Topics discussed in these papers cover all aspects of shock wave research Simulation of Air Shocks with Detonation Waves Gerald P. D'Arcy, Robert O. Clark, 1966 Presented theoretically and experimentally are 1 the feasibility of simulating a nuclear blast environment by detonating a gas and 2 determination of the initial conditions of hydrogen oxygen mixtures to yield blast waves of the same pressure velocity relationship as that in air shock waves When the theory was derived by predicting the characteristics of the simulated blast waves a computer program was written Experimental data were used to adjust the computed data The experiments were conducted in a 13 inch diameter high pressure shock tube and yielded four mixtures of hydrogen and oxygen capable of simulating shock waves with overpressures of from 300 to 1 200 psi It was found that detonation waves may be substituted for air shock waves when the incident loading is important and that applications are generally limited to instances in which only one characteristic of an air shock is simulated Author

Irreversible Phenomena Kunio Terao, 2007-05-31 Ideals are simple and able to be easily understood but never exist in reality In this book a theory based on the second law of thermodynamics and its applications are described In thermodynamics there is a concept of an ideal gas which satisfies a mathematical formula $PV = RT$ This formula can approximately be applied to the real gas so far as the gas has not an especially high pressure and low temperature In connection with the second law of thermodynamics there is also a concept of reversible and irreversible processes The reversible process is a phenomenon proceeding at an infinitely low velocity while the irreversible process is that proceeding with a finite velocity Such a process with an infinitely slow velocity can really never take place and all processes observed are always

irreversible therefore the reversible process is an ideal process while the irreversible process is a real process According to the first law of thermodynamics the energy increase dU of the thermodynamic system is a sum of the heat dQ added to the system and work dW done in the system Practically however the mathematical formula of the law is often expressed by the equation or some similar equations derived from this formula is applied to many phenomena Such formulae are however theoretically only applicable to phenomena proceeding at an infinitely low velocity that is reversible processes or ideal processes

Shock Waves in Condensed Matter - 1983 J.R. Asay, R.A. Graham, G.K. Struab, 2012-12-02 Shock Waves in Condensed Matter 1983 covers the proceedings of the American Physical Society Topical Conference held in Santa Fe New Mexico on July 18-21 1983 The book focuses on the response of matter to dynamic high pressure and temperature The selection first elaborates on the review of theoretical calculations of phase transitions and comparisons with experimental results theoretical and experimental studies of shock compressed benzene and polybutene and theory of the iron equation of state and melting curve to very high pressures The text then ponders on nonhydrostatic effects in stress wave induced phase transformation of calcite Bauschinger effect model suitable for use in large computer codes and strain rate sensitivity prediction for porous bed compaction The manuscript takes a look at flaw nucleation and energetics of dynamic fragmentation shock loading behavior of fused quartz and aluminum damage simulation in high velocity impact Shock wave diagnostics by time resolved infrared radiometry and non linear Raman spectroscopy Raman scattering temperature measurement behind a shock wave and experiments and simulation on laser driven shock wave evolution in aluminum targets are also discussed The selection is a dependable reference for scientists and readers interested in the response of matter when exposed to dynamic high pressure and temperature Shock Wave Compression of Condensed Matter Jerry W Forbes, 2013-02-01 This book introduces the core concepts of the shock wave physics of condensed matter taking a continuum mechanics approach to examine liquids and isotropic solids The text primarily focuses on one dimensional uniaxial compression in order to show the key features of condensed matter's response to shock wave loading The first four chapters are specifically designed to quickly familiarize physical scientists and engineers with how shock waves interact with other shock waves or material boundaries as well as to allow readers to better understand shock wave literature use basic data analysis techniques and design simple 1 D shock wave experiments This is achieved by first presenting the steady one dimensional strain conservation laws using shock wave impedance matching which insures conservation of mass momentum and energy Here the initial emphasis is on the meaning of shock wave and mass velocities in a laboratory coordinate system An overview of basic experimental techniques for measuring pressure shock velocity mass velocity compression and internal energy of steady 1 D shock waves is then presented In the second part of the book more advanced topics are progressively introduced thermodynamic surfaces are used to describe equilibrium flow behavior first order Maxwell solid models are used to describe time dependent flow behavior descriptions of detonation shock waves in ideal and non ideal explosives are

provided and lastly a select group of current issues in shock wave physics are discussed in the final chapter *Viscous Profiles and Numerical Methods for Shock Waves* Michael Shearer, 1991-01-01 One strongly represented theme is the power of ideas from dynamical systems that are being adapted and developed in the context of shock waves *Toward Detonation Theory* Anatoly N. Dremin, 2012-12-06 It is known that the Chapman Jouguet theory of detonation is based on the assumption of an instantaneous and complete transformation of explosives into detonation products in the wave front Therefore one should not expect from the theory any interpretations of the detonation limits such as shock initiation of detonation and kinetic instability and propagation failure diameter The Zeldovich Von Neuman Doring ZND theory of detonation appeared in fact as a response to the need for a theory capable of interpreting such limits and the ZND detonation theory gave qualitative interpretations to the detonation limits These interpretations were based essentially on the theoretical notion that the mechanism of explosives transformation at detonation is a combustion of a layer of finite thickness of shock compressed explosive behind the wave shock front with the velocity of the front However some experimental findings turned out to be inconsistent with the theory A very small change of homogeneous liquid explosives detonation velocity with explosive charge diameter near the rather sizable failure diameter is one of the findings The elucidation of the nature of this finding has led to the discovery of a new phenomenon This phenomenon has come to be known as the breakdown BD of the explosive self ignition behind the front of shock waves under the effect of rarefaction waves **30th International Symposium on Shock Waves 1** Gabi Ben-Dor, Oren Sadot, Ozer Igra, 2017-08-09 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 Magnetohydrodynamics 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

Shock Detonation Waves Book Review: Unveiling the Magic of Language

In an electronic era where connections and knowledge reign supreme, the enchanting power of language has are more apparent than ever. Its power to stir emotions, provoke thought, and instigate transformation is really remarkable. This extraordinary book, aptly titled "**Shock Detonation Waves**," compiled by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound effect on our existence. Throughout this critique, we shall delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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