

1. Record Nr.	UNISA996466741303316
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Titolo	Multiscale mechanics of shock wave processes // Yurii Meshcheryakov
Pubbl/distr/stampa	Singapore : , : Springer, , [2021] ©2021
ISBN	981-16-4530-2
Descrizione fisica	1 online resource (196 pages)
Collana	Shock wave and high pressure phenomena
Disciplina	515.3535
Soggetti	Shock waves - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Description of the Proposed Book -- Contents -- Part I Multiscale Deformation Fundamentals -- 1 The Kinetic Theory of Continuously Distributed Dislocations -- 1.1 The Dislocation Velocity Distribution Function -- 1.2 The Diffusion Coefficients of the Fokker-Planck Equation -- 1.3 Transport Equations -- References -- 2 Decay of Sub-microsecond Stress Pulses -- 2.1 Introduction -- 2.2 Dislocation Kinetics and Structure of Shock Waves -- 2.3 Decay of Sub-microsecond Stress Pulses -- References -- 3 The Collectivisation of Dislocations and Formation of Mesoscale -- 3.1 Introduction -- 3.2 Formation of Dynamic Mesoscale Structures -- 3.3 Accounting for the Processes of Multiplication and Annihilation of Dislocations -- References -- 4 Concept of the Mesoscale in Quasistatics and Dynamics -- 4.1 Introduction -- 4.2 Quasistatics -- 4.3 Dynamics -- References -- 5 The Mesoscale Velocity Distribution and Change of Regime of Shock Wave Propagation -- 5.1 Introduction -- 5.2 The Change of Regime of Shock Wave Propagation -- 5.3 Irreversible Momentum Exchange -- 5.4 Resonance Interaction of Structures and Shock Waves -- 5.5 Discussion -- 5.6 Conclusions -- References -- 6 Multiscale Modelling of Steady Shock Wave Propagation -- 6.1 Introduction -- 6.2 Coupling Between the Strain Rate and the Mesoparticle Velocity Distribution -- 6.3 The Relaxation Model for a Steady Shock Wave -- 6.4 Account for the Mesoscopic Effects -- 6.5 Conclusions -- References -- 7 On the Chaotic and Translational Motions of Elementary Carriers of Deformation at the Mesoscale -- 7.1

Introduction -- 7.2 The Oscillating Regime of the Dynamically Deformed Heterogeneous Medium -- References -- Part II Mesoscale Approach to the Dynamic Properties of Materials -- 8 Experimental Techniques for Shock Loading -- 8.1 Introduction. 8.2 Shock Loading Under Uniaxial Strain Conditions -- 8.3 The Pulse Loading of Plane Targets with a High-Power Electron Beam -- 8.4 The Penetration of Elongated Hard Rods into Plane Target -- References -- 9 How to Measure the Parameters of Mesoscale -- 9.1 Introduction -- 9.2 Experimental Techniques -- 9.3 Analysis of the Velocity Interferometer Under Conditions of Mesoparticle Velocity Distribution. -- 9.4 Investigation of Shock Wave Processes Using the Interference Technique -- 9.5 A Two-Channel Velocity Interferometer -- 9.6 The Asymmetry of the Mesoparticle Velocity Distribution Function -- 9.7 The Determination of the Velocity Distribution at Mesoscale 2 by Using a Line Imaging Velocity Interferometer (LIV) and a Multi-Point VISAR Interferometer -- 9.8 The Specific Features of the Diagnostic Technique Used -- References -- 10 On the Kinetic Nature of Structural Instability and Localisation of Dynamic Deformation -- 10.1 Introduction -- 10.2 Interscale Momentum Exchange and the Kinetic Criterion for Transition into a Structurally Unstable State -- 10.3 On the Resonance Excitation of Mesoscale -- 10.4 Scenario 1: Quasi-Equilibrium Dynamic Deformation Below Critical Strain Rate to Non-Equilibrium Dynamic Deformation Transition -- 10.5 Scenario 2: The Shock-Induced Non-equilibrium Dynamic Deformation to Quasi-Equilibrium Dynamic Deformation Transition. Large-Scale Formations at Small Spatio-Temporal Scales -- 10.6 Structural Instability Under Dynamic Compression and Resistance to High-Velocity Penetration -- 10.7 The Effect of Velocity Non-uniformity on Penetration Depth -- References -- 11 Mesoscopic Criteria for the Dynamic Strength of Materials -- 11.1 Introduction -- 11.2 Mesoscale Criteria for Dynamic Strength -- 11.2.1 40CrNiMo Steel -- 11.3 Microstructural Investigations -- 11.3.1 38CrNi3MoV Steel -- 11.3.2 4340 Steel. 11.3.3 16Cr11Ni2V2MoV Steel -- 11.3.4 28Cr3CNiMoV Steel -- 11.4 Analysis of the Strength Behaviour of Steels -- 11.5 The Meso-macro-energy Exchange and Spallation -- 11.6 Conclusions -- 12 A Mesoscale Approach to Dynamic Recrystallisation -- 12.1 Introduction -- 12.2 The Reloading Regime as a Matter for Providing the Mesoscale Scenario for the Dynamic Recrystallisation -- 12.2.1 D-16 Aluminium Alloy -- 12.2.2 38CrNi3MoV -- 12.3 Regimes of Shock Wave Propagation and Dynamic Recrystallisation -- References -- 13 Multiscale Mechanisms of Dynamic Deformation Under High-Velocity Penetration -- 13.1 Introduction -- 13.2 Structural Instability and Spall Strength -- 13.3 The Structural Instability Threshold and High-Velocity Penetration -- 13.4 Resistance to High-Velocity Penetration and Velocity Defect -- 13.5 Spall Strength, Resistance to High-Velocity Penetration and Velocity Variance -- 13.6 Microstructural Investigations -- 13.7 Conclusions.

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