

Table of Contents

Preface and Committees

Chapter 1: Advanced Materials and Nanotechnology

| | |
|---|-----|
| Antistatic Composite Coatings on the Basis of Powder Paints S. Panin, S.Y. Yazykov and B. Ovechkin | 3 |
| Application of Polymer Gel-Electrolytes for Cleaning and Restoration of Steel Objects O.V. Dubinina, G.V. Lyamina and G.M. Mokrousov | 8 |
| Design and Investigation of Hard Metal Composites Modified by Nanoparticles Y.I. Gordeev, A.K. Abkaryan, A.S. Binchurov and V.B. Yasinski | 13 |
| Development of New Ni-Al Porous Alloys for Metal-Supported Solid Oxide Fuel Cells A. Kirdyashkin, V.D. Kitler, A.S. Maznoy, A.A. Solov'ev, A.N. Kovalchuk and I.V. Ionov | 19 |
| Effect of Thermomechanical Treatment on Superelasticity in Ni₅₄Fe₁₉Ga₂₇ Single Crystals A. Tagil'tsev, E. Timofeeva, E. Panchenko and Y. Chumlyakov | 24 |
| Electromagnetic Properties of W – Hexaferrites Composites with Magnetic Texture D.V. Wagner, O. Dotsenko and O.A. Ulyanova | 29 |
| Electrophysical Characteristics of Metal-Insulator-Semiconductor Structures Comprising CdHgTe-Based Quantum Wells A.V. Voitsekhovskii and D.I. Gorn | 34 |
| Evaluation of Physical and Mechanical Properties of Structural Components of Ti-Nb Alloy Z.G. Kovalevskaya, M.A. Khimich, A.V. Belyakov and I.A. Shulepov | 39 |
| Formation of Coatings on Titanium Substrates Obtained from Mixtures of Tungsten and Cobalt Salts Using Shaped-Charge Explosion J. Li, S. Kulkov, A.A. Kozulin, S.A. Kinelovskii and S.N. Kulkov | 43 |
| High Temperature Uranium Nitride Decomposition V.V. Mikhalechik, A.V. Tenishev, V.G. Baranov and R.S. Kuzmin | 47 |
| Influence of Surfactants on the Structure and Wear Resistance of Copper Alloyed Hypereutectoid Steel N. Stepanova, A. Razumakov, E. Lozhkina, I. Zhil'tsov and V. Kuznetsov | 53 |
| Investigation of Product Aluminum - Water Reaction L.N. Shiyani, N.A. Yavorovskii, A.V. Pustovalov and E.N. Gryaznova | 59 |
| Investigation of Genotoxicity of Gold Nanoparticles Prepared by the Electric Spark Dispersion Method E. Plotnikov, S.P. Zhuravkov, A. Gapeyev, V. Plotnikov and D. Martemiyarov | 65 |
| Magnetic Structure of Nanosized Ferrimagnetic Particle Depending on External Parameters V.A. Rodionov and E.P. Naiden | 70 |
| Materials of New Generation in Nuclear Power Industry I. Shamanin, S. Bedenko, I. Gubaydulini and N. Novikova | 74 |
| Mineral Carriers for Nanoscale Additives in Bituminous Concrete S.S. Inozemtcev and E.V. Korolev | 80 |
| Model of Polycrystalline Inelastic Deformation with Grain Boundary Sliding Description P.V. Trusov, A.I. Shveykin, E.R. Sharifullina and N.S. Kondratev | 86 |
| Molecular Dynamic Simulation of Carbon Nanostructures Formation D.A. Tatarnikov and A.V. Godovykh | 92 |
| Morphological, Physical and Chemical Characteristics of Biocompatible Nano-Sized Carbonate-Substituted Hydroxyapatite M.A. Trubitsyn, D.V. Dat, V.T. Le, N.G. Gabruk, I.I. Oleynikova and T.A. Shuteeva | 97 |
| Nonlinearity of Dependence of Integral Friction Index of Tribosystem from Hydrophilic Properties of Surface-Modified Metal Fillers E.A. Nazarova, A.G. Syrkov and V.N. Brichkin | 103 |
| Numerical Simulation of Severe Plastic Deformation of Titanium Specimens under Dynamic Channel Pressing V.A. Krasnoveikin, V. Skripnyak, A.A. Kozulin and O. Senatova | 107 |

| | |
|--|-----|
| On Technological Uses of Local Strain Patterns of the Commercial Zr-Nb Alloys L.B. Zuev, I. Žykov and S.A. Barannikova | 113 |
| Orientation Dependence of Cycle Stability of Superelasticity Response in Quenched and Aged Ferromagnetic Co₃₅Ni₃₅Al₃₀ Single Crystal A.S. Eftifeeva, E.Y. Panchenko and Y. Chumlyakov | 119 |
| Polymer Composite Materials Based on Ultra High Molecular Weight Polyethylene Matrix Filled by Alumina Powders O.V. Kovalevskaia, Y.I. Gordeev and A.K. Abkaryan | 124 |
| Production and Quality Assessment of Superelastic Ti-Nb-Based Alloys for Medical Application A.S. Konopatsky, Y.S. Zhukova and M.R. Filonov | 130 |
| Radioabsorbing Materials Based on Polyurethane with Carbon Fillers V.I. Suslyaev, T.D. Malinovskaya, S.V. Melentyev and K.V. Dorozkin | 137 |
| Research of Electromagnetic Properties of Composite Materials on the Basis of MWNTs in Microwave Range V.I. Suslyaev, V.L. Kuznetsov, S.I. Moseenkov, E.Y. Korovin and D.V. Krasnikov | 142 |
| Role of Micro- and Nanofillers in Abrasive Wear of Composites Based on Ultra-High Molecular Weight Polyethylene S. Panin, L. Kornienko, N.X. Thuc, L.R. Ivanova and S.V. Shilko | 148 |
| Sintering of NiO/YSZ Anode Layers for Metal-Supported Solid Oxide Fuel Cell A.A. Solovyev, I.V. Ionov, A.N. Kovalchuk, A.I. Kirdyashkin, A.S. Maznoy and V.D. Kitler | 155 |
| Structure and Properties of Multilayered Composite Materials “Nickel - Nickel Aluminide” Obtained Using SPS Method T. Sameyshcheva, V. Mali, A. Anisimov, M. Korchagin, L.I. Shevtsova and S. Bysyina | 161 |
| Structure and Tribotechnical Properties of Al-Sn Alloys Prepared by the Method of Liquid-Phase Sintering N.M. Rusin, A.L. Skorentsev and E.A. Kolubaev | 166 |
| Study of Tungsten and Molybdenum Nanopowders Interaction with Sulphur in SHS Conditions and Synthesized Product Properties Y. Irtegov and V. An | 171 |
| Technical and Economical Efficiency for Application of Nanomodified High-Strength Lightweight Concretes A.S. Inozemtcev and E.V. Korolev | 176 |
| The Development of Photocatalytic Systems Entitled Titanium Dioxide Nanoparticles Attached to Polypropylene Fibrous Carrier for Freshwater Disinfection I.A. Lysak, G.V. Lysak, T.D. Malinovskaya and A.S. Ruhov | 183 |
| The Effect of Anisotropy in Polymeric Matrices on Compositional Properties at Various Temperatures S.A. Bochkareva, N.Y. Grishaeva, B.A. Ljukchin, P.A. Ljukchin, S. Panin, O.A. Senatova and Y.A. Reutov | 188 |
| The Fe-Core/Carbon-Shell Ultrafine Nanopowders as Platform for Biomolecules Grafting N.S. Surgutskaya, P.S. Postnikov, A.G. Pershina, A.I. Galanov, M.E. Trusova and A.E. Sazonov | 194 |
| The Use of Alumina Nanoparticles as Modifiers of Galvanic Binder of Diamond Tools N.I. Polushin, M.S. Ovchinnikova and A.L. Maslov | 199 |
| Transport of Reactants in Ultrathin Channels during the Etching Reaction V. Petranovskii, M.Á.H. Espinosa, E. Kolobova and A. Pestryakov | 202 |
| Tribotechnical Properties of HA Nanocomposite Based on UHMWPE under Dry Sliding and Lubrication N. Sonjaitham and N. Puangmalee | 208 |
| Tribotechnical Properties of UHMWPE Based Composite Filled with HA Microparticles under Dry Sliding and Lubrication N. Sonjaitham and N. Puangmalee | 213 |
| Kinetics Flash Cathodoluminescence in Crystals with Nonstationary Defectiveness V.M. Lisitsyn, Z. Karipbayev, S. Stepanov, L. Trefilova, A. Dauletbekova, E.F. Polisadova and S. Omelkov | 218 |
| Copper Alloys Structure Parameters N.V. Martyushev | 225 |
| Fractographic Regularities in Fatigue Failure of 17Mn1Si Steel P. Maruschak, S. Panin, I. Vlasov, I. Danyliuk and R. Bishchak | 230 |

| | |
|---|-----|
| Improving Characteristics of Austenitic Steels by Modification S.N. Fedoseev, D.V. Lychagin and A.S. Sharafutdinova | 236 |
| Influence of Nanopowders on Corrosion Resistance of Welded Joints M. Kuznetsov, E. Zernin, S.P. Zhuravkov and N. Yavorovsky | 241 |
| Investigation of the Properties of Alumina-Zirconia Ceramics A.S. Ivashutenko, A.V. Kabyshev, N.V. Martyushev and I.G. Vidayev | 245 |
| Research into the Causes of the Cracking of Large Workpieces Low Carbon Steel by Pressure Treatment D.V. Valuev, V.I. Danilov, A. Serikbol and A.V. Valueva | 250 |

Chapter 2: Chemical Technologies

| | |
|---|-----|
| 2-NSA, 1,5-NDSA Application and Sodium Naphtionate as Fluorescent Indicators at Oil Field A.A. Bilyalov, M.A. Gavrilenko and N.A. Gavrilenko | 259 |
| New Effective and Environmental Friendly Method for the Hydrodediazonation of Arenediazonium Tosylates Using Fe-Core/Carbon-Shell Nanoparticles M.A. Morozova, M.E. Trusova, K.V. Kutonova and V.D. Filimonov | 263 |
| Activation of Synthesis and Sintering of Mullite Aluminosilicate Ceramics Based on Natural Raw Materials T.V. Vakalova, L.P. Govorova, A.A. Reshetova, A.Y. Tokareva and E.V. Shvagrjukova | 268 |
| Ceramic Pigments with the Diortosilicate Structure Based on the Dicalcium Silicate M. Sedelnikova, Y.I. Pautova, V.M. Pogrebenkov and A.S. Shulzhenko | 272 |
| Decomposition and Preconcentration Methods for the Determination of Pt, Pd, Re in Mineral Raw Materials Y.A. Oskina, E. Pakrieva, E.M. Ustinova and A. Kryazhov | 278 |
| Determination of Au, Pb, Ni, Co in Silicate Rocs and Ores by Atomic Absorption Spectroscopy with Graphite Furnace A. Kryazhov, S. Panova, E. Pakrieva and Y.A. Oskina | 282 |
| Development of Radioactive Sources on the Basis of Bioinert Ceramic Materials for Medical Applications and their Pre-Clinical Testing T. Khabas, E. Kulinich, V. Merkulov, C. Roesli and M. Martusevich | 286 |
| Electrochemical Determination of Heparin in Pharmaceuticals with Using Malachite Green D.A. Vishenkova, E.I. Korotkova and E.V. Dorozhko | 292 |
| Electrochemical Response of Gold Nanoparticles at a Graphite Electrode D. Perevezentseva and E.V. Gorchakov | 297 |
| Features of Processing of Ceramic Materials by an Electromagnetic Field A. Klishin, A. Kovancev, S. Rudnev, A. Zakutaev and V. Vereshchagin | 303 |
| Grafting of the Organic Functional Groups to the Iron Nanoparticles Surface via Arenediazonium Tosylates O.A. Guselnikova, M.V. Gromov and A.I. Galanov | 309 |
| Heat-Insulating Materials Obtaining from Dispersive Screenings of Construction Sand O. Kazmina, M. Dushkina, S. Volland and E. Lebedeva | 314 |
| Investigation of Lactobacilli Properties E.V. Bulycheva, E.I. Korotkova and O.A. Voronova | 319 |
| Liquid Phase Petroleum Resin Oxidation by Systems Based on Hydrogen Peroxide O.S. Kukurina, O.I. Slavgorodskaya and Y.P. Ustimenko | 323 |
| Liquid-Phase Oxidative Degradation of the Damaged or Expired Medicinal Products T. Volgina, V.T. Novikov and O.Y. Fedorova | 327 |
| One-Pot Synthesis of Gelatinized Maize Starch-Graft-Polyacrylic Acid Films M. Edeleva, A. Grekova and V. Khlestkin | 331 |
| p-Nitrotoluene Bromination Using Barium Fluorobromate Ba(BrF₄)₂ V. Sobolev, V. Radchenko, R. Ostvald, V.D. Filimonov and I. Zherin | 337 |
| Processes of Ultra- and Nanofiltration for Cleaning Solutions from Iron Colloid Substances K. Machekhina and L.N. Shiyan | 342 |
| Products of Reaction between Barium Chloride and Sodium Hyrdosilicates: Examination of Composition A.N. Grishina, E.V. Korolev and A.B. Satyukov | 347 |

| | |
|--|-----|
| Radiation-Protective Composite Binder Extended with Barium Hydrosilicates A.N. Grishina, E.V. Korolev and A.B. Satyukov | 351 |
| Research of Water-Alcohol Solution Permittivity at Phase Transition by Radiophysics Method T.D. Kochetkova and A.A. Pavlova | 356 |
| Some Peculiarities of Spin Manifestation in Isotope Effects V.F. Myshkin, V.G. Plekhanov, D.A. Izhoykin and V.A. Khan | 360 |
| Study of Mechanical Activation Processes of Mica Bearing Rocks V.M. Pogrebenkov, K.S. Kostikov, Y.P. Azhel and K.S. Kamyshnaya | 367 |
| Study of the Effect of Butylenes Content in Butane Fraction on Butane Dehydrogenation Process L.Z. Kasyanova, E.K. Karimov, O.K. Karimov and Y.K. Dmitriev | 372 |
| Study of the Graphite Electrode Surface with In and Pt Deposits E.M. Ustinova, A.Y. Pshenichkin and N.A. Kolpakova | 376 |
| Study of the Hydrodesulphurization Process of Hydrogenate of Shubarkol Coal A.T. Ordabaeva, M.G. Meiramov, V.A. Khrupov and J.S. Akhmetkarimova | 382 |
| Suppressing the Hydrogen Sulfide and Sulfur Dioxide Emission from Sulfur-Bituminous Concrete V.A. Gladkikh and E.V. Korolev | 387 |
| Synthesis and Characteristics of Melamine Formaldehyde Composites Y. Visurkhanova, N. Ivanova, G. Tusupbekova and D. Izbastenova | 393 |
| Synthesis of Highly Dispersed Pt Catalysts on MWCNTs via Hydrolytic Deposition without Preliminary Modification of the Support I.I. Ovchinnikov, M.A. Shuvaeva, V.L. Kuznetsov and A.S. Lisitsyn | 399 |
| Synthesis of Silica Gel with Surface Layer of Transition Metals 8-Oxyquinolates for Gas Chromatography A. Makarycheva and Y.G. Slizhov | 405 |
| Synthesis of Substituted Semicarbazone, Thiosemicarbazone and Aminoguanidine S.K. Mukhametzhanova, V.V. Shtrykova and V.U. Kuksenok | 410 |
| Synthesis of Trans- or Cis- Ethyl 5-Chloropent-4-Enoates A.S. Sunagatullina | 414 |
| Synthesis of β-SiAlON Porous Ceramics by Filtrational Combustion of Reactive Foams in Nitrogen Flow A.S. Maznoy, A. Kirdyashkin and R. Gabbasov | 418 |
| The Synthesis of Iodbenzimidazoles and Iodbenzoxazoles via Iodination of Arenediazonium Tosylates N.T.T. Hong and M.E. Trusova | 423 |
| Performance Evaluation of Plasma Sulphate Disposal Lignin A.G. Karengin, A.A. Karengin, I.Y. Novoselov and K.G. Pionova | 429 |
| Calculation and Optimization of Plasma Utilization Process of Inflammable Wastes after Spent Nuclear Fuel Recycling A.G. Karengin, A.A. Karengin, I.Y. Novoselov and N.V. Tundeshev | 433 |
| Sorption of Rhodamine into Polymer Block Matrix M.A. Gavrilenko, M.S. Burmetieva and N.A. Gavrilenko | 437 |
| Combustion-Synthesized Porous Ni-Al Materials for Radiative Porous Burners A. Kirdyashkin, A.N. Guschin, A.S. Maznoy, S.S. Minaev and F.S. Paleskiy | 442 |
| Sol-Gel Synthesis of Chelate Containing Materials for Gas Chromatography M.A. Gavrilenko, Y.G. Slizhov, Z.V. Faustova, T.A. Kasymova and N.A. Gavrilenko | 448 |

Chapter 3: Simulation of Physical and Chemical Processes

| | |
|--|-----|
| Crystal Plasticity Modeling of Duplex Steels at High Temperatures P.V. Trusov and N.S. Kondratev | 455 |
| Development of Coupled Model of SHS-Extrusion I.V. Mekhanich | 461 |
| Dynamics of Diffusion and Mechanical Waves Interaction under Conditions of Metal Surface Treatment with Particle Fluxes E.S. Parfenova, A.G. Knyazeva and Y.P. Azhel | 466 |

| | |
|--|-----|
| External Extreme Impacts on NPP Constructions – Methodology of Computational Simulation | |
| A.M. Belostotskiy, S.I. Dubinsky, I.N. Afanasyeva, F.M. Kotov, V.V. Vershinin, S.V. Scherbina, S.O. Petryashev and N.O. Petryashev | 472 |
| Math Modeling of Vacuum Conductive Timber Drying | |
| M. Goreshnev and E. Litvishko | 478 |
| Mathematical Model of Iron Reduction with Aluminothermic Method | |
| D.A. Potianikhin and O.N. Komarov | 484 |
| Mathematical Modeling of Dispersed Condensed Substance Ignition by Local Energy Source | |
| D.O. Glushkov, V. Maksimov and P.A. Strizhak | 489 |
| Mathematical Modeling of Pulsed Electro Contact Sintering of Carbide Powder Composition | |
| S.N. Sorokova, A.G. Knyazeva, A. Pobol and G. Goranskyi | 495 |
| Mathematical Modeling of the Solid Phase Sintering of Ti and Cu Powders in the Controlled Heating Conditions | |
| S.N. Sorokova | 500 |
| Model of the Oxygen Cutting Taking into Account the Melting of Metal | |
| M.A. Anisimova and A.G. Knyazeva | 504 |
| Modeling of Gas Multistage Separation to Increase Stock Tank Oil | |
| A.A. Khamukhin and E.V. Nikolayev | 508 |
| Modeling of Physical and Chemical Processes of Anodic Bonding Technology | |
| N.S. Pshchelko and M.P. Sevryugina | 513 |
| Modeling of the Heat and Kinetic Phenomena Accompanying the Different Material Joining Using Solid-Phase Synthesis | |
| K.A. Aligozhina and A.G. Knyazeva | 519 |
| Modeling of the Sulfur-Bituminous Concrete Mix Compaction | |
| V. Gladkikh, E.V. Korolev and V.A. Smirnov | 525 |
| Numerical Comparison of Gas Flows through Plane Porous Heat-Evolutional Object with Axisymmetric one when Object's Outlet is Partially Closed | |
| N.A. Lutsenko | 529 |
| Numerical Research of Heat and Mass Transfer Processes in Water Vapors and Gaseous Thermal Decomposition Products Mixture above the Combustible Wood on the Conditions of Chemical Reaction Termination in it | |
| A.O. Zhdanova, G.V. Kuznetsov and P.A. Strizhak | 535 |
| Numerical Research of Physical and Chemical Processes at Polymeric Material Ignition by Several “Hot” Particles | |
| D.O. Glushkov, G.V. Kuznetsov and P.A. Strizhak | 541 |
| Numerical Research on the Influence of Autonomous Power Plant Condenser Design on Two-Phase Stream Parameters | |
| O.V. Vysokomornaya, G.V. Kuznetsov and P.A. Strizhak | 547 |
| Numerical Study of the Heat Radiation from the Porous Cylindrical Burner with Radiative Heat Exchange | |
| F.S. Paleskiy, R.V. Fursenko and S.S. Minaev | 553 |
| Parallel Algorithm for Modeling of Dynamic Processes in Porous Media | |
| G. Tarasov, K. Gyrnik and D. Leontev | 559 |
| Phase Distribution and Stresses in the Coating Deposited from Plasma | |
| S.A. Shanin and A.G. Knyazeva | 565 |
| Quasi-Static Loading of Single Crystal Plasticity Analysis | |
| A.Y. Yanz and L.A. Teplyakova | 571 |
| Residual Meso Stresses in Multilevel Crystal Plasticity Models | |
| P.S. Volegov, P.V. Trusov and D.S. Gribov | 576 |
| Simulation and Modeling Software in Chemical Technology: Polymerization of Vinyl Chloride | |
| E.A. Shulaeva, Y.F. Kovalenko and N.S. Shulaev | 581 |
| Some Aspects of Computer Approaches to Simulation of Bimodal Sphere Packing in Material Engineering | |
| L. Burtseva, A. Pestryakov, R. Romero, B. Valdez and V. Petranovskii | 585 |

| | |
|---|-----|
| Structure Formation of Sulfur-Based Composite: The Model D.G. Kiselev, E.V. Korolev and V. Smirnov | 592 |
| Surface Layer Composition Change under Irreversible Conditions of Particle Beam Action K. Asfandyar and A.G. Knyazeva | 596 |
| The Influence of Thermal Diffusion on the Redistribution of Alloying Element between the Coating and Base under Surface Heating O.N. Kryukova and M. Chepak-Gizbrekht | 602 |
| Thermal-Diffusive Stability of Counterflow Premixed Flames at Low Lewis Numbers S. Mokrin, R.V. Fursenko and S.S. Minaev | 608 |
| Two Phase Model of Diffusion in Polycrystalline Material M. Chepak-Gizbrekht and E.V. Shvagrakova | 614 |
| Two-Temperature Two-Dimensional Model of Underground Shale Heating by Electromagnetic Field S.M. Martemyanov and A.L. Maslov | 620 |
| Viscoelastoplastic Model of FCC Monocrystals Deformation: Identification of Parameters D.S. Gribov and P.S. Volegov | 625 |

Chapter 4: Applied and Computational Mechanics

| | |
|--|-----|
| Modeling the Dynamics of 3-D Elastic Anisotropic Solids Using Boundary Element Method L.A. Igumnov, I. Markov and Y.Y. Rataushko | 633 |
| Heat and Mass Transfer in Viscous Fluid Flows in Open Cavities with Moving Boundaries under Cooling the External Contour A.V. Krainov, E.N. Pashkov and P.G. Yurovskiy | 638 |
| Evaluation of Gravitational Force Effect on Balancing Processes in Liquid-Type Autobalancing Devices E.N. Pashkov, N.V. Martyushev and I.A. Masson | 642 |
| The Asymptotic Analysis of the Nonstationary Problem of Variable Shear Loading on the Boundary of an Incompressible Solid V.E. Ragozina and Y.E. Ivanova | 646 |
| Self-Similar Reflection of Longitudinal Shock Wave from Free Boundary in Elastic Medium D.A. Potyanikhin and O.V. Dudko | 652 |
| Dynamic Substructures Analysis of Combined Systems "Foundation - Structure - Equipment - Pipelines" A.M. Belostotsky, P.A. Akimov, A.L. Potapenko, V.V. Vershinin and S.V. Scherbina | 658 |
| Correct Multilevel Discrete-Continual Finite Element Method of Structural Analysis P.A. Akimov, A.M. Belostosky, M.L. Mozgaleva, M. Aslami and O.A. Negrozov | 664 |

Chapter 5: Engineering of Machines and Mechanisms

| | |
|---|-----|
| An Apparatus for Implementing the Thermal Cycle for Plasma Surfacing of Metallurgical Equipment D.V. Valuev, A.V. Valueva and A. Serikbol | 673 |
| Features of the Power Characteristics of the Vibration Isolators E.G. Gurova, M.G. Gurov, S.V. Makarov and A. Sergeev | 678 |
| Investigation of the Influence of Hydroimpulsive Mechanism Design Parameters on the Formed Impulse M. Tsygankova | 682 |
| Novel Techniques of Ceramic Shell Molds Production with Lost-Wax Method I.G. Sapchenko, S.G. Zhilin and O.N. Komarov | 686 |
| On the Classification of Three-Link Mechanisms M.G. Popugaev and L.T. Dvornikov | 690 |
| Passenger Transport System of a Trestle Type for City Electric Transport I.E. Zhizhkina | 694 |
| Rational Designing Two-Stage Anvil Block of Impact Mechanisms I.A. Zhukov and V.V. Molchanov | 699 |

| | |
|--|-----|
| Stress State and its Definition in Hardfacing Heat-Resistant Steel Cold Rolling Mill Rollers D.V. Valuev and A. Serikbol | 703 |
| The Balanced Two-Satellite Planetary Gear with the Equal Distribution of Loading on Satellites Y.A. Andreeva | 708 |
| Transformation of the Urban Electric Transport System when Using Autonomous Energy Sources E.Y. Abramov, A.A. Stang and S.A. Enkudinov | 714 |

Chapter 6: Technologies of Electrophysical Methods of Materials Treatment

| | |
|---|-----|
| Effect of Magnetic Field Configuration of Dual Magnetron on Carbon Based Films Properties Y.N. Yurjev, D.A. Zaitcev, D.V. Sidelev and O.S. Tupikova | 721 |
| Partial Discharges Characteristics in Oil Shale of Various Deposits I.A. Koryashov, V.V. Lopatin, A.A. Bukharkin and S.M. Martemyanov | 726 |
| Plasma Processing in Industry of Building Materials M.G. Bruyako, V.A. Glukhoedov, D.V. Kravtsova, V. Smirnov and V.A. Ushkov | 730 |
| Plasmodynamic Synthesis of Nanodispersed Silicon Carbide D.S. Nikitin, A.A. Sivkov, A.Y. Pak and I.A. Rakhmatullin | 735 |
| The Analysis of Shale Thermal Destruction Paths under Electrophysical Treatment A. Ivanov, V.V. Lopatin, S.M. Martemyanov, A.A. Bukharkin and I.A. Koryashov | 740 |
| The Polarization of Silver Azide in Electric Field A.P. Rodzevich, E.G. Gazenaur, L.V. Kuzmina and V.I. Krasheninina | 744 |
| The Reactive Deposition of TiO_x Thin Films D.V. Sidelev and Y.N. Yurjev | 748 |
| Change of Structure and Mechanical Properties of R6M5 Steel Surface Layer at Electrolytic-Plasma Nitriding M. Skakov, B. Rakhadilov, E. Batyrbekov and M. Scheffler | 753 |
| Corrosion Resistance of Multilayer Ti-Ta Coatings Obtained by Electron Beam Cladding in the Atmosphere A. Ruktuev, M. Golkovski, V. Samoilenko, P. Komarov, I. Bataev and A. Bataev | 759 |
| Influence of Laser Beam Machining Strategy at SLS Synthesis E.A. Ibragimov, A.A. Saprykin and E.V. Babakova | 764 |
| Layer-by-Layer Laser Sintering of Powders Irradiated by Gamma Quanta Co⁶⁰ A.V. Gradoboev, E.V. Babakova, A. Saprykin and E.A. Ibragimov | 768 |
| Spark Plasma Sintering of Mechanically Activated Ni and Al Powders L.I. Shevtsova, M.A. Korchagin, A. Thömmes, V.I. Mali, A.G. Anisimov and S.Y. Nagavkin | 772 |
| Structure and Properties of Coatings Obtained by Electron-Beam Cladding of Ti+C and Ti+B₄C Powder Mixtures on Steel Specimens at Air Atmosphere D. Mul, D.S. Krivezhenko, D.B. Lazurenko, O.G. Lenivtseva and A. Chevakinskaya | 778 |
| Structure and Properties of Surface Layers Obtained by Atmospheric Electron Beam Cladding of Graphite-Titanium Powder Mixture onto Titanium Substrate O.G. Lenivtseva, E. Golovin, V.V. Samoilenko, D. Mul and D. Golovin | 784 |
| The Application of Radio Frequency Magnetron Sputtering for Fluoropolymer Surface Modification A.I. Malchikhina, E.N. Bolbasov and S.I. Tverdokhlebov | 790 |
| The Influence of Radio Frequency Magnetron Sputtering on Biodegradable Polymers Surface Properties A.I. Malchikhina, E.N. Bolbasov and S.I. Tverdokhlebov | 795 |
| The Structural Particularities of Multilayered Metal-Intermetallic Composites Fabricated by the Spark Plasma Sintering Technology D.B. Lazurenko, V.I. Mali, A.G. Anisimov, P.S. Yartsev, D.I. Lagereva and L.I. Shevtsova | 800 |
| Influence of Layer-by-Layer Laser Sintering Modes on the Thickness of Sintered Layer of Cobalt-Chromium-Molybdenum Powder A. Saprykin, N. Saprykina, D.V. Dudikhin and S.M. Emelyanenko | 805 |

| | |
|---|-----|
| Research of Steel Structure after Laser Treatment O.V. Lobankova, I. Zykov and A. Melnikov | 809 |
| Effect of Gaseous Medium Pressure on Plasmadynamic Synthesis Product in the C-N System with Melamine I.I. Shanenkov, A. Sivkov, A.Y. Pak and Y.L. Kolganova | 813 |
| Magnetic Pulse Compaction of Oxide Powders of the (ZrO₂ – Y₂O₃) – Al₂O₃ System A.S. Ivashutenko, N.V. Martyushev and I.G. Vidayev | 819 |
| Surface Modification by Zr⁺ Ion Beam Irradiation of 12Cr1MoV and 30CrMnSiNi2 Steels for Improving Fatigue Durability I. Vlasov, S. Panin, V. Sergeev, V. Naidfeld and P. Maruschak | 824 |
| Sources with Different Spectra Radiation Influence on Plants Growth and Development A.N. Yakovlev, S.B. Turanov, I.N. Kozyreva and D.V. Starodubtseva | 830 |

Chapter 7: Materials Processing Technologies in Mechanical Engineering

| | |
|--|-----|
| Investigating the Influence of the Power Supply Type upon the Properties of the Weld Joints under Manual Arc Welding D.P. Il'yaschenko, D.A. Chinakhov and Y.M. Gotovschik | 837 |
| Influence of Technological Factors on Structure and Properties of Alumina-Zirconia Ceramics A.S. Ivashutenko, N.V. Martyushev, I.G. Vidayev and K.S. Kostikov | 845 |
| Gas-Dynamic Impact of a Shielding Gas Jet on the Drop Transfer when Welding with a Consumable Electrode D.A. Chinakhov, A.V. Zuev and A.G. Filimonenko | 850 |
| Features of Steel Mouldings Production in Graphitic Shell Molds I.G. Sapchenko, O.N. Komarov and S.G. Zhilin | 854 |
| Efficiency of Balancing by Liquid-Type Automatic Balancing Devices E.N. Pashkov, N.V. Martyushev and A.V. Ponomarev | 858 |
| Distribution Regularities of Shear Deformations in Incompressible Nonlinear Elastic Solids A.A. Lapteva and O.V. Dudko | 864 |
| A Decrease of Residual Stresses in the Elastic-Plastic-Creep Medium at Temperature Influence M.V. Polonik and E.E. Rogachev | 870 |
| Conjugate Heat Transfer in the Interaction of the Viscous Liquid with Technological Elements of Energy Systems in Conditions of their Internal Contour Moving A.V. Krainov, E.N. Pashkov and A.V. Ponomaryov | 876 |
| Boundary-Element Modeling of 3-D Poroelastic Half-Space Dynamics L.A. Igumnov, S. Litvinchuk, A. Petrov and A.A. Belov | 881 |
| Automatic Balancing Time of any Rotors at Full Speed E.N. Pashkov, A.M. Bogdan and I.A. Masson | 886 |
| Engineering Analysis of Structural Variants of Corrugated Aperture in the Environment MSC.Patran/MSC.Marc V. Koltsov, E. Popova and V. Rakitskaya | 892 |
| Numerical Modeling of Forming a Preform under High Temperature Creep E.E. Rogachev, M.V. Polonik, O.V. Dudko and E.V. Murashkin | 898 |
| Stationary Rotation of the Partially Liquid-Filled Unbalanced Rotor under External Friction Force Action E.N. Pashkov, N.V. Martyushev and P.G. Yurovsky | 903 |
| The Study of Boroaluminizing in Pastes under Thermocycling and Laser Heating I. Sizov, I. Polyansky and U. Mishigdorzhyn | 907 |
| Evaluation of the Resource Efficiency of Foundry Technologies: Methodological Aspect I.B. Ardashkin, A.N. Yakovlev and N.V. Martyushev | 912 |
| Principal Indicators for Efficiency Assessment of Resource Management in Foundry Production I.G. Vidayev, N.V. Martyushev, T.V. Sidorenko and A.S. Ivashutenko | 917 |

Chapter 8: Sensors, Measurements and Non-Destructive Control

| | |
|--|-----|
| Colorimetric Sensor Based on Silver Nanoparticle – Embedded Polymethacrylate Matrix N.A. Gavrilenko, N.V. Saranchina and M.A. Gavrilenko | 923 |
| Computer Simulation of Cardiac Electrical Activity Using an Electrocardiograph on Nanosensors M. Grigoriev and N.V. Turushev | 928 |
| Closure Welds Identification by Means of Ultrasonic Testing M. Kroening, Y. Salchak and D. Sednev | 933 |
| Heavy-Loaded Components Quality Assurance by Means of Non-Destructive Testing M. Kroening, D. Sednev and Y. Salchak | 937 |
| Investigation of Sensitivity of Aluminum Foil Based Strain Sensors at Fatigue Damage Evaluation of CFRP M.V. Burkov, S. Panin, P.S. Lyubutin and A.V. Eremin | 943 |
| Development of a Parallel Fast Fourier Transform-Based Algorithm for Digital Hologram Reconstruction T.R. Vuyets and V.A. Ovchinnikov | 949 |
| Development of Fiber Optic Current Sensor M.G. Grigoriev and N.V. Turushev | 954 |
| Acoustic Field Simulation of an Antenna Array at Scanning by the SPA Method for Modern Ultrasonic Testing Technologies I.O. Bolotina, H.M. Kroening, K.G. Kvasnikov, D. Sednev and O.V. Sumtsova | 959 |
| Predictive Modelling of the Warming up Times for Thermoelectric Converters Y.K. Atroshenko, I.P. Ozerova and P.A. Strizhak | 965 |
| Increasing the Efficiency of Using Hardware Resources for Time-Frequency Correlation Function Computation V.V. Avramchuk, E.E. Luneva and A.G. Cheremnov | 969 |
| Preprocessing of Coefficients for Reusable Continuous Wavelet Transform A.A. Khamukhin and A.A. Khamukhin | 975 |
| Radiation Detection System D.A. Tatarnikov and A.V. Godovykh | 980 |