

Table of Contents

Preface, Conference Organization and Sponsors

Chapter 1: Chemistry and Physics of Materials, Environmental Materials

Analysis of Structural Features of Humic Acids Fractions after Mechanochemical Modification

M.P. Mirzobekzoda, E.V. Maltseva and N.S. Shekhovtsova 3

Synthesis of Cobalt Nanopowder Using Surfactants of Different Nature

E. Kolesnikov, V. Levina, A. Godymchuk, D.V. Kuznetsov and N. Polushin 7

Microstructural Changes in Co Films Depending on MOCVD Conditions

R. Hairullin and S. Dorovskikh 12

Direct Synthesis of Propylene from Ethylene over Palladium Containing Catalysts: Influence of the Support Nature

L.F. Sayfulina, E.A. Buluchevskiy, A.V. Lavrenov, T.I. Gulyaeva, M.D. Trenikhin, O.V. Protasova, E.Y. Gerasimov, R.V. Gulyaev and V.A. Drozdov 17

Study of Phenol Oxidation Products over Glassy Carbon Electrode in Alkaline Solutions by Photoluminescence Spectroscopy

K. Alekseenko and V.N. Batalova 23

The Catalysts Synthesis Methanol for Direct Synthesis of Dimethyl Ether from Synthesis Gas

N. Kosova, O.Y. Vodorezova, I. Kurzina, L.N. Kurina, V.M. Vorobeve, N.V. Shtertser and A.Y. Godymchuk 29

Research of Formation Plasma-Chemical Process Particles of Oxides Metals with Specified Morphology

E.V. Obkhodskaya, V.I. Sachkov, A.S. Buynovskiy and E.M. Knyazeva 34

Synthesis of Silicon Carbide in Hypervelocity Plasma Jet

D.S. Nikitin, A.A. Sivkov, A.Y. Pak and I.A. Rakhmatullin 38

Determining the Degree of Nanopowders Hydrophilicity by the Ratio Fractal Dimension to the Specific Surface

L.S. Vikulina, A.V. Nomoev and A.Y. Godymchuk 44

Properties of Calcium-Phosphate Coatings Formed by Pulsed Laser Deposition

Y.D. Lenivtseva, I.N. Lapin, E.N. Bolbasov, S.I. Tverdokhlebov and V.A. Svetlichniy 50

Characterization of Electroexplosive Zinc Nanopowders in Aqueous Suspensions

A. Godymchuk, E. Yunda, D.V. Kuznetsov, A. Gusev and N. Kosova 54

Modification of the Titanium Surface Layer by the Yttrium

Y.F. Ivanov, N. Popova, M.P. Kalashnikov, V. Gromov, E. Budovskikh, A.D. Teresov and E.L. Nikonenko 63

Sorption of Cobalt(II) and Copper(II) Ions by Highly Cross-Linked Carboxyl Cation Exchangers from Natural Waters with High Salt Background

V.V. Zharkova, L. Bobkova, C.A. Bektimirova and V. Kozik 68

Glyoxylic Acid Separation from Products of Glyoxal Oxidation in the Form of its Calcium Salt

M.A. Pozdniakov, K.V. Rubtsov, L.A. Rasskazova and A. Filimoshkin 74

Al₂O₃/SiO₂ Materials with Bimodal Pore Size Distribution as Support for Heterogeneous Catalysts

N. Litvyakova, T. Bugrova and G. Mamontov 79

Morphology and Topology of Coherent Scattering Regions of the Fe-Mn-C Steel Fine Structure

A.P. Zykova, I. Kurzina, M.Y. Novomejsky and Y.D. Novomejsky 84

Investigation of Surface Phase Layers on GaAs after Selective Chemical Etching

O.N. Zarubina, G.M. Mokrousov, A.G. Touryanski, I.V. Pirshin and L.V. Maliy 91

Synthesis of TiO₂ and F-Doping TiO₂ Powders via "Reverse" Hydrolysis of Titanium Tetraisopropoxide

E. Fakhrutdinova, A.V. Shabalina and E. Sudareva 95

Sorption Selectivity of Rare-Earth Elements Ions by KB-2E Macroreticular Carboxylic Cation Exchanger L. Bobkova	101
Photodegradation of an Herbicide (2-methyl-4-chlorophenoxyacetic acid) in the Presence of “TiO₂, SnO₂, SnO₂/TiO₂ Nanoparticles – Polypropylene Fibrous Carrier” Systems I.A. Lysak, T.D. Malinovskaya, O.N. Tchaikovskaya, G.V. Lysak and V.R. Artyushin	107
Synthesis of the Hydroxyapatite-Silver Nanocomposite A.V. Abakshonok, A.N. Eryomin and V.E. Agabekov	113
Acid-Base and Photoinduced Processes on Magnesium-Containing Minerals and their Influence on the Troposphere Cleaning E.B. Daibova, T.S. Minakova, V.S. Zakharenko, N. Kosova, I.A. Kurzina and A.B. Zotova	119
Physicochemical and Photosorption Properties of Oxygen-Containing Calcium Compounds – Components of Tropospheric Aerosol E.B. Daibova, T.S. Minakova, V.S. Zakharenko, N. Kosova, I.A. Kurzina, M.E. Kirillova and L.Y. Minakova	124
Study of Calcium Aluminate Formation L.A. Selyunina and L.N. Mishenina	130
Surface Morphology of Titanium Oxide and Oxynitride Coatings Deposited by Reactive Magnetron Sputtering G.V. Arysheva, N.M. Ivanova, A.A. Pustovalova and M.E. Konischev	134
Tribological Properties and Microstructure of Gradient Nanocomposite Coatings on the Basis of Ti-Al-Cr-B-N O.V. Sergeev, V. Sergeev, M.V. Fedorischeva and A.V. Voronov	139
Experimental Comparison of 2-methylimidazole Nitration by Nitric Acid and Nitrate Salts of Alkali Metals M.V. Lyapunova and V.S. Malkov	143
Geochemical Trends of Trace Elements Concentration in Saline Lakes of Central Asia O. Gaskova, M. Kolpakova, V. Isupov, A. Vladimirov, S. Shvartsev and S. Ariunbileg	148
Development of a New Technology of Environmental Purification from Naphthalene L.V. Nechaev, O.N. Tchaikovskaya, E.V. Maltseva and N.V. Yudina	154
Photosensitized Reactions of Psoralen and Herbicides Revealed by the Pump-Probe Method N. Bryantseva, O.N. Tchaikovskaya, N.B. Sultimova, V.A. Svetlichnyi, I.N. Lapin and V.S. Kraiukhina	161
Hydromineral Resources of Saline Lakes of Mongolia and Russian Altai V. Isupov, A. Vladimirov, A. Sodov, M. Kolpakova, S. Shvartsev and N. Volkova	166
Synthesis of the Exfoliated Graphite from Graphite Oxide A. Bannov, A. Timofeeva, S. Yusin, K. Dyukova, E.A. Maximovskiy, A. Ukhina and A. Shibaev	171
Synthesis and Optical Properties of CdSe and CdSe/ZnS Core/Shell Quantum Dots P. Barik, A.R. Mandal, D.V. Kuznetsov and A.Y. Godymchuk	176
Synthesis of CdS Nanoparticles by Laser Ablation of Metallic Cadmium Target in Presence Different Precursors D.A. Goncharova, I.N. Lapin and V.A. Svetlichnyi	182
Effect of Microwave-Hydrothermal Synthesis on Tin (II) Oxide Properties A.A. Pichugina and S.A. Kuznetsova	187
Ti-Y Surface Alloy Formed by High-Energy Methods N.N. Morozova, K.V. Sosnin, E.A. Petrikova, A.D. Teresov and Y.F. Ivanov	192
Structural Analysis of B4C Bimodal Powder Mixture M.S. Petukevich, Y.F. Ivanov, O.L. Khasanov, E.S. Dvilis and A.A. Panina	197
Microstructure and Wear Resistance of Surface Layer of Copper Modified by N⁺ Ion High Fluencies Implantation V. Sergeev, A.R. Sungatulin, M.P. Kalashnikov, O.V. Sergeev and S.Y. Zharkov	201
Bimetallic Supported Pd-Ag Catalysts I.S. Bondarchuk, G.V. Mamontov, F.J. Cadete Santos Aires and I. Kurzina	205
Basic Stages of Magnet Production by Fluoride Technology A.S. Bujnovskij, V.L. Sofronov, V. Sachkov and A.V. Anufrieva	209
Electromagnetic Characteristics of Composites Based on Multiferroics Powders at Microwave Frequencies Y.V. Zhuravlyova and O. Dotsenko	214

Low Sulfur Fuel Distillates Obtaining from Vacuum Gasoil Y.O. Karpov, E.B. Krivtsov and A.K. Golovko	218
Development of Stand for Testing Electrochemical Permeation (STEP) of Hydrogen through Metal Foils V.N. Kudiiarov, N.S. Pushilina and S.Y. Harchenko	224
Advanced of Rare Earth Fluorides Technology T.D. Malinovskaya, R.A. Nefedov, O.B. Sambueva and V. Sachkov	229
Investigation of the Phase Composition of Lithium-Titanium Ferrites by Thermo-Magnetometric and X-Ray Analysis A.L. Astafyev, E.N. Lysenko and A.P. Surzhikov	233
Impact of Multi-Walled Carbon Nanotubes to Rye Seedlings A.A. Gusev, O.N. Zaytseva, O.A. Selivanova, O.V. Zakharova, A. Godymchuk, D.V. Kuznetsov and A.G. Tkachev	237

Chapter 2: Structure Materials, Mechanics and Dynamics of Materials

Cement Foam Concrete with Low Shrinkage A.I. Kudyakov and A.B. Steshenko	245
New Technique for Estimation of Fatigue Cracks in Concrete by the Parameters of Electric Response to Pulse Mechanical Excitation D.D. Dann, A.A. Demikhova, G.E. Utsyn and T.V. Fursa	250
Kinetic Analysis of Lithium-Zinc Ferrite Synthesis by Thermogravimetric Method E.V. Nikolaev, A.P. Surzhikov and E.N. Lysenko	255
Influence of Refractory Metal Oxide Ultrafine Particles on the Structure and Mechanical Properties of High-Manganese Steel A.P. Zykova, I. Kurzina, D.V. Lychagin, A.V. Chumaevsky and M.Y. Novomejsky	260
Acrylate Hydrogel Modification Using a Cross-Linking Agent for Increasing Multilayer Glazing Flame Resistance D. Litovchenko, I. Burmistrov, L. Panova, A.Y. Godymchuk and N. Kosova	265
Effect of High Intensity Pulsed Ion Beam of Carbon on Subsurface Layers of Zirconia Ceramics A. Surzhikov, I. Vasiliev, S.A. Ghyngazov, T. Frangulyan and A. Chernyavski	270
Grain Bending at Deformation of the Steel and Arrangement of Internal Stresses I. Gibert, S. Kiseleva, N.A. Popova, N. Koneva and E. Kozlov	276
Pressure and Temperature Effect on Hydrogen Sorption of Carbon Material L.V. Gulidova, N.A. Dubrova and A.M. Lider	280
Changing of the Structural-Phase State and Mechanical Properties of VT-23 Titanium Alloy under Surface Treatment by Intense Flux of Copper Ions V. Sergeev, M.P. Kalashnikov and V.V. Neufeld	284
Structural Phase State and Mechanical Properties of the Si-Al-N Coatings with Different Concentration Ratio of Al and Si V. Sergeev, M.V. Fedorischeva, M.P. Kalashnikov, I.A. Bozhko, A.V. Voronov, E.V. Ribalko and Y.P. Mironov	289
Influence of the Grain Size on the Dispersion Strengthening of VT1-0 Alloy Implanted with Aluminum Ions E.L. Nikonenko, N. Popova, M.P. Kalashnikov, E. Nikonenko and I. Kurzina	294
Features of Stress Changes in the Alloy $Ti_{50}Ni_{48,7}Mo_{0,3}V_1$ under Loading in a Wide Temperature Range V. Gyunter, G. Baigonakova, E. Marchenko and A.A. Klopotov	299
Structural Phase State of the Ceramic Layer of ZrO_2 O.S. Tolkachev, Y.F. Ivanov, A.A. Klopotov, V. Klopotov and Y.A. Abzaev	303
Investigation of the Influence of Ti-Nb Alloy Composition on the Structure of the Ingots Produced by Arc Melting Y.P. Sharkeev, Z.G. Kovalevskaya, Q.F. Zhu, M.A. Khimich and E.A. Parilov	307
Influence of Physical Properties of B_4C Powder on the Strength Properties of the Ceramics Manufactured by SPS Sintering O.L. Khasanov, E.S. Dvilis, Z.G. Bikbaeva, V.V. Polisadova, A.O. Khasanov, M.S. Petukevich and T.V. Milovanova	312

Control of Defects on the Parameters of the Electromagnetic Response under Pulsed Mechanical Excitation of the Sample P. Khorsov, N. Khorsov and V. Surzhikov	316
Recrystallization Features in Olivine from Dunites of the Tarlashkinsk Ultramafic Massif: New Data from the EBSD Analysis of Rock-Forming Grains A.S. Kulkov, A.I. Chernishov, D.V. Lychagin and P.A. Tishin	319
Methods for Producing of Cement Mixes Additives Based on Peat N.O. Kopanitsa, Y.S. Sarkisov and A.V. Kasatkina	324
Investigation of Defects Accumulation in the Process of Hydrogen Sorption and Desorption A.M. Lider, O.V. Husaeva, Y. Bordulev, R.S. Laptev and V.N. Kudiiarov	328
Eddy Current Analysis for Nuclear Power Materials V.V. Larionov, A.M. Lider and G.V. Garanin	335
Elastoplastic Invariant Relation for Deformation of Alkali-Halide Crystals S.A. Barannikova, M.V. Nadezhkin and L.B. Zuev	340
Drying Kinetics of the Selected Grass Fuels under Isothermal Condition A. Filkov, A. Simeoni and Y. Isaev	345
Wrinkling and Folding in Copper Single Crystals under Compression and Sliding D. Lychagin, S. Tarasov, A. Chumaevskii and E. Alfyorova	351

Chapter 3: Material Science in Biology and Medicine

Comparative Study of the Biological Efficacy of Titanium Dioxide Nano- and Microparticles V. Grigoryeva, O. Zaeva and N. Krivova	357
Dispersions of Engineered Nanoparticles in Physiological Liquids A. Godymchuk, E. Yunda, N. Kosova, E. Karepina, D. Kuznetsov, A. Gusev and E. Arzamastseva	363
<i>Opisthorchis felineus</i> Infection and Harmful Metals Bio-Concentration: A Pilot Study in Hamster Model S. Lezhava, A.G. Pershina, D. Kokova, E.A. Perina, I.P. Kaminskii, A.E. Sazonov and L.M. Ogorodova	370
Study of MWNTS Influence upon Liver Histological and Histochemical Parameters in Laboratory Mice: Preliminary Results I.A. Vasyukova, A.A. Gusev, A.Y. Ubogov and A. Godymchuk	376
Effect of Platinum Nanoparticles on Biological Activity of Humus-Accumulated Horizons I.V. Lushchaeva and Y. Morgalev	384
Influence of Slaked Lime Addition on Biotechnological Specification of Vermicultivation K.A. Petrochenko, A.V. Kurovsky, A.S. Babenko and Y.E. Yakimov	390
Bioactivity and Physico-Chemical Properties of Composites on Basis of Hydroxyapatite with Lactic and Glycolic Acids Oligomers L.A. Rasskazova, D. Lytkina, E. Shapovalova, V.V. Botvin, M.A. Pozdnyakov, I. Zhuk, A.G. Filimoshkin, N. Korotchenko and V. Kozik	394
Reduction of Locomotor and Brain Activity of Wistar Rats after Serial Administration of Titanium Dioxide M. Khodanovich, A. Zelenskaya, E. Gul, D. Sukhanov and E. Krutenkova	400
Circulating Matrix Metalloproteinases, Tissue Inhibitors, Natriuretic Peptides, and Rigidity of the Great Arteries in Patients with HFpEF in 12 Month after Myocardial Infarction V. Ryabov, E. Kravchenko and T. Suslova	406
Organ-Preserving Surgery Using Endografts from Superelastic Titanium-Nickelid-Based Alloy for Patients with Laryngeal Cancer E. Choyntonov, M. Mukhamedov, D. Kulbakin, M. Buldakov and V. Gyunter	414
Effect of Plasma-Based Chemical Modification on Wettability of Polymer Materials for Cardiovascular Surgery Y. Khodyrevskaya, Y. Kudryavtseva, G. Remnev and S. Tverdokhlebov	419
Stability of Disperse Systems during Bioassay of Nanoecotoxicity with Use of Aquatic Organisms S.Y. Morgalev, T.G. Morgaleva, Y. Morgalev and I.A. Gosteva	424

Study of Structural Features of Porous TINI-Based Materials Produced by SHS and Sintering	
S.G. Anikeev, V.N. Khodorenko, O.V. Kokorev, T.L. Chekalkin and V.E. Gunter	430
Development of a Method for Producing and Purifying N2-Carboxyethyl-2'-Deoxyguanosine for Molecular-Biological Research	
S. Krivoshechekov, A.O. Bogdanov, L.M. Ogorodova, N.B. Dementeva, I.V. Saltykova, R.D. Marchenko, V.V. Ivanov, O.A. Mayboroda and A.E. Sazonov	436
Implementation of Differential Scanning Calorimetry when Studying Polymerization of Compounds Based on Glycolic Acid Ether	
O. Babkina, E. Vaitulevich, O. Gordeeva, G. Sarycheva, A.L. Nemoykina and K. Alekseenko	441
Histopathologic, Immunohistochemical Features and Profile of Viral Antigens in Patients with Myocarditis	
Y. Rogovskaya, R. Botalov and V. Ryabov	447

Chapter 4: Mathematical Methods in Materials Science

Mass Determination Algorithms Using High Energy Digital Radiography	
S. Osipov, V.A. Klimenov, O.S. Osipov, V.D. Samigullin and A.M. Shtein	455
Study of Creep in Face-Centered Cubic Crystals under Constant Load and Constant Stress	
M. Semenov and S. Kolupaeva	460
Designing Fuzzy Systems to Predict Efficiency of the Non-Pharmacological Treatment	
I. Hodashinsky, A. Anfilofyev, R. Meshcheryakov and I. Gorbunov	465
Interconnections between the Polarization Current and the Electromagnetic Signal of Rock Samples under Loading	
L.V. Yavorovich, A.A. Bespal'ko, P.I. Fedotov and A.I. Popelyaev	471
Physicochemical Processes at Plasma Treatment of Quartz-Feldspar Raw Materials	
O. Volokitin, G.G. Volokitin and V. Shekhovtsov	474
Radiation Dose Measurement Technique of the X-Ray Source in the Process of Stabilization	
I. Miloichikova, S. Stuchebrov, A. Krasnykh and A. Wagner	478
Mathematical Models Describing the Absorption Mechanism of Cadmium Ions on the Modified Peat Sorbent	
L.B. Naumova, N.P. Gorlenko, E.B. Chernov, Y.S. Sarkisov, A.V. Zhuykova and V.P. Dmitrienko	482
Numerical Simulation of Impact Loading on Solid Propellant within an Orthotropic Shell	
P. Radchenko, A. Radchenko and S. Batuev	486
Simple Model of Intermetallic Formation in Surface Layer during Ion Implantation	
K. Asfandyar and A.G. Knyazeva	492
Angular Distribution of XPS Peaks by Layers of a Finite Thickness	
V. Afanas'ev and A. Gryazev	496
Influence of Placement Gas Infrared Emitters on the Energy-Effectiveness of their Application	
V. Maksimov and T. Nagornova	502
Using Mathematical Models to Provide Reliability of Transport Facilities	
S.V. Efimenko, A.V. Sukhorukov and O.V. Konyayeva	507