

Table of Contents

Preface and Conference Organization

Chapter 1: Materials Science and Technologies

Analysis of Magnetron-Deposited Titanium Oxynitride Coatings by Scanning Electron Microscopy and Raman Scattering

G.V. Arysheva, N.M. Ivanova, M.E. Konishchev, A.A. Pustovalova and V.S. Sypchenko 3

Behavior of TiO₂-B System under Mechanical Activation

D.G. Demyanyuk, O.Y. Dolmatov, D.S. Isachenko, M.S. Kuznetsov, A.O. Semenov and S.S. Chursin 7

Changes in the Spectral Characteristics of Aluminum Films Deposited under Assisting Argon Ion Beam

S.P. Umnov, O.K. Asainov, S.N. Popova and A.N. Lemachko 11

Eddy Current Method for Testing of Metals under Simultaneous Exposure to Radiation and Hydrogenation

V.V. Larionov, A.M. Lider and Y.S. Bordulev 16

Effect of Hydrogen on Conductivity of Metals

V.V. Larionov, S.P. Xu, K. Shi and M.X. Kroning 21

Formation of Shear Zone's Defect Structure in F.C.C. Metals

V.A. Starenchenko, D.N. Cherepanov, O.V. Selivanikova and E.A. Barbakova 26

Influence of Carbon Pulse Ion Beam on Titanium Alloy

P.A. Beloglazova, I.P. Chernov, Y.P. Cherdantsev and N. Pushilina 30

Investigation of Multilayered Film Structure Properties for Creation of Hydrogen Selective Membrane

A. Ryabchikov, V. Golovkov, D. Sivin and V. Sokhoreva 34

Investigation of ZrO₂ and TiO₂ Coatings Influence on Hydrogen Sorption Behavior by Zirconium Alloy Zr1%Nb at Saturation from Gas Atmosphere

I.P. Chernov, N.S. Pushilina, V.N. Kudiarov, E.V. Bereznayeva, A.N. Nikolaeva and O.V. Krysina 38

Laws of Radiation Grafting of Styrene to PVDF Films and Characterization of the Grafted Polymer

V. Sokhoreva, V. Golovkov, N.A. Dubrova and D. Sidko 42

Methods of Uranium Hexafluoride Purification

A.A. Orlov and R. Malyugin 46

Obtaining Hydrogen and Carbon Materials from Hydrocarbonic Gas in Microwave Plasma Discharge at Atmospheric Pressure

A.G. Zherlitsyn, V.P. Shiyan and N.N. Zyablova 50

Study on the Spatial Structure of Ultrafine-Grained Light Alloys by Microtomography

A. Batranin, V.A. Skripnyak, V.V. Skripnyak, S. Chakhlov, S. Stuchebrov and K. Keltsiyeva 54

Technology of Synthesis of Opal Matrix Metamaterials

A. Bagdasarian, M. Samoylovich, A. Mkrtchyan, A. Rinkevich, A. Belyanin, S. Bagdasarian, A. Mkrtchyan and A. Afanasieva 58

Temperature Effect on the Rate of Hydrogen Desorption by Carbon Materials

L.V. Gulidova, N.A. Dubrova and A.M. Lider 61

UHF-Properties of Nanocomposites: Magnetic Resonance

A. Bagdasarian, M. Samoylovich, A. Mkrtchyan, A. Rinkevich, A. Belyanin, S. Bagdasarian, A. Mkrtchyan and N. Vasilevskaya 66

Simulation of the Uranium Crystallization Process Using Cellular Automata

A.O. Ochoa Bique and A.G. Goryunov 72

Development of a Thermal Model of the Experimental Electrolyzer

E.M. Gladyr, A.A. Denisevich and N.V. Demyanenko 77

Fluoride Technology of Processing Oxides of Rare Earth Elements

A.Y. Swarovski, A.I. Soloviev, A.L. Kalashnikov, V.M. Malyutina, A.S. Sitnikov, O.L. Vasilyeva and S.V. Shalyapin 82

Chapter 2: Plasma, Microwave, Ion, Electron and Isotope Technologies

Development of Impurities Determination Method in Isotopically Enriched Preparations	89
A.I. Skorikov, V.G. Baskov, A.V. Kidyamkin, U.M. Marochkina and E.E. Popovtsev	
Carbon and Oxygen Atoms Distribution along Low-Temperature Plasma Torch in the Magnetic Field	93
V.F. Myshkin, D.A. Izhoykin, E.V. Bespala and I.A. Ushakov	
Cluster Structure of Salt Solutions in Polar Dielectric Liquids	97
I. Shamanin, M. Kazaryan and D. Sidko	
Control over Hard X-Ray Parameters Using External Temperature Gradient	107
V. Kocharian, A. Mkrtchyan, A. Gogolev, S. Khlopuzyan and P. Grigoryan	
Determination of Optimal Parameters of the X-Ray Source on the Basis of Compact Electron Accelerators	111
Y. Cherepennikov, A. Gogolev, A. Wagner and A. Yuzhakov	
Diffusion of Hydrogen in Steel by Electron Irradiation	115
V.V. Larionov, Y.I. Tyurin, N.N. Nikitenkov and A.S. Dolgov	
Dosimetry Equipment for the Pulsed X-Ray Source Parameters Investigation	121
I. Miloichikova, S. Stuchebrov, G. Zhaksybayeva and A. Wagner	
Excitation of Electromagnetic Waves in a Vircator by Radially Diverging Beam	125
V.P. Grigoriev, T.V. Koval, A.G. Zherlitsyn, V. Verkhoturova and G.G. Kanaev	
Features of the Distribution Process of the Electromagnetic Field Frequency Components in the High-Frequency Torch Discharge Plasma	129
Y. Lutsenko, I. Miskun and E. Zelenetskaya	
First Principle Calculations of Diffusion Barriers for Hydrogen in α-Zirconium	133
L.A. Svyatkin, Y.M. Koroteev and I.P. Chernov	
Form-Factors of Relativistic Electron Bunches in Polarization Radiation	138
G.A. Naumenko	
Manifestation of the Spin in the Isotope Effects	147
V.G. Plekhanov, V.F. Myshkin, V.A. Khan and D.A. Izhoykin	
Nonlinear Electrodynamic Effects of the Torch Discharge Argon Plasma	152
Y. Lutsenko, I. Miskun and E. Zelenetskaya	
Plasma Module Based on High Frequency Torch Plasmatron for the Research of the Processes of Plasma Utilization and Immobilization of Closed NFC Wastes	158
A.G. Karengin, A.A. Karengin, I.Y. Novoselov and N.V. Tundeshev	
Portable Gamma-Ray Spectrometer for High Intensity Beam Measuring	162
A. Vukolov, A. Gogolev, Y. Cherepennikov, A. Ogrebo and A. Egioya	
Spontaneous Radiation and Quantum Dynamics of Biological Plasma	168
V. Lasukov, T. Lasukova, V. Novoselov and E. Moldovanova	
Calculation and Optimization of Plasma Processes of Utilization and Immobilization of Silts in Low Radioactive LRW Storage Pools	173
A. Karengin, A. Karengin, I. Novoselov and N. Tundeshev	
Calculation and Optimization of Plasma-Based Utilization Process of Inflammable Wastes after Reprocessing of Spent Nuclear Fuel of Closed Nuclear Cycle	178
A. Karengin, A. Karengin, I. Novoselov and N. Tundeshev	
Determination of Characteristics of the Torch Discharge Plasma Burning in a Mixture of Atomic and Molecular Gases	183
Y. Lutsenko and I. Miskun	
Features of the Evolution of ${}^4\text{He}^+$ Ion Flux in Yttrium Iron Garnet in the Channeling Mode	187
V.M. Malyutin, D.A. Karpov and Y.Y. Kryuchkov	
Laser Activation of Isotope Selective Processes in a Magnetic Field	191
V.F. Myshkin, V.G. Plekhanov, E.V. Bespala, V.A. Khan, I.A. Ushakov and E.A. Baranov	
Low Pressure Discharge Characteristics in a Large Sized Hollow Cathode	196
T.V. Koval, I.V. Lopatin, B.H. Nguen and A.S. Ogorodnikov	
The Possibility of Quasi-Bound State Formation of η-Meson with Helium Isotopes	200
V.A. Tryasuchev and A.V. Isaev	
Coherent Radiation of Relativistic Electrons in Dielectric Fibers	205
G.A. Naumenko, V.V. Bleko and V.V. Soboleva	

Coherent Transition Radiation from Wire Metamaterials	213
G.A. Naumenko, V.V. Bleko, V.V. Soboleva and A.O. Shumeyko	
Coherent X-Rays Generated by Relativistic Electrons in a Tungsten Monocrystal	217
Y. Adischev, V. Zabaev, V. Kaplin, S. Kuznetsov, S. Uglov and V. Ivanov	
Development of New Ion and Plasma Surface Modification Methods	221
A. Ryabchikov, D. Sivin and I. Stepanov	
Generation of Mechanical Waves in Metals under the High Power Ion Beam Irradiation	225
V.I. Boyko, Y.V. Daneykin, V.I. Lisov and E.Y. Pimenov	
Features of Edge Effect of Coherent Synchrotron Radiation of Relativistic Electrons	234
G.A. Naumenko, V.V. Bleko and V.V. Soboleva	
Features of Valence Electron Density Distribution in Zr-H and Zr-He	241
O.V. Lopatina, L.A. Svyatkin, Y.M. Koroteev and I.P. Chernov	
Polarization Bremsstrahlung by Relativistic Electrons in Backscattering Geometry for Diagnosing Atomic Structure of Polycrystals	246
V.I. Alekseev, A.N. Eliseev, E.F. Irribarra, I.A. Kishin, A.S. Kubankin, V.S. Levina, I.S. Nikulin, R.M. Nazhmuдинов and V.I. Sergienko	
Monochromatic X-Ray Source for Dual-Wave X-Ray Absorptiometry	252
A. Gogolev, Y. Cherepennikov, R. Rezaev and A. Ogrebo	
Formation of Pulses with Adjustable Parameters in a Resonant Microwave Pulse Compressor	256
A.S. Shlapakovski, S.N. Artemenko, P.Y. Chumerin and Y.G. Yushkov	
High Power Microwave Compressor with Two Output Units for Synchronous Energy Extraction	262
V.A. Avgustinovich, S.N. Artemenko, S.A. Gorev, V.S. Igumnov, V.L. Kaminsky, S.A. Novikov and Y.G. Yushkov	
Superconducting Cavities in Systems of the Resonant Microwave Pulse Compression	266
S.N. Artemenko, V.L. Kaminsky, G.M. Samoylenko and B.A. Alekseev	

Chapter 3: Nuclear Engineering and Fuel Cycles

Advantages of Thorium Nuclear Fuel for Thermal-Neutron Reactors	275
I. Shamanin, S. Bedenko and I. Gubaydulin	
Angular Distributions of EUV Generated by Electrons with 5.7 MeV Energy in a Multilayer Mo/Si Structure	280
S.R. Uglov, L.G. Sukhikh, A.V. Vukolov and I.R. Fateev	
Conceptual Approach to Handling Irradiated Nuclear Fuel in Storage Systems	285
I. Shamanin, S. Bedenko, I. Gubaydulin, N. Novikova and M. Plevaka	
Degradation of Beryllium Reflector Properties on the IRT-T Reactor	289
A. Naymushin, Y. Chertkov, V. Varlachev, M. Anikin, A. Chuyukina and Y. Ermakova	
Determining Reactor Graphite Lifespan from Thermal Properties Degradation	294
D. Baybakov, A. Naymushin, V. Nesterov, S. Savanuk and I. Shamanin	
Facilities for Neutron Capture Therapy at IRT MEPhI Nuclear Reactor	298
I.N. Sheino, V.F. Khokhlov, P.V. Izhevskiy, V.K. Sakharov, A.A. Portnov and A.A. Wagner	
Feasibility Study of Using New Fuel Composition in IRT-T Research Reactor	306
A.G. Naymushin, Y.B. Chertkov, V.V. Kurganov, I.I. Lebedev, S.A. Mongush and N.V. Daneikina	
Formation of the Irradiation Zone for Neutron Transmutation Doping Using the Pool-Type Research Reactor	309
V.A. Varlachev, A.V. Golovatsky, E.G. Emets and Y.A. Butko	
Influence of the Graphite's Lifespan on the Design Value of Fuel Burnup in High Temperature Gas-Cooled Reactors	313
D.F. Baybakov, A.V. Golovatsky, A.G. Naymushin, V.N. Nesterov, S.N. Savanyuk and I.V. Shamanin	
Preparation of ¹⁸⁸W from Unenriched Targets in Middle Flux Nuclear Reactors	317
A.O. Pavluk, E.V. Chibisov, D.V. Kabanov, V.V. Zukau and V.G. Merkulov	
Reactor Model for Plasma Utilization of Dispersed Water-Organic Compositions Based on a Closed Nuclear Fuel Cycle Inflammable Wastes	322
A.G. Karengin, A.A. Karengin, I.Y. Novoselov and N.V. Tundeshev	

Research of Possibility of Sludge Complex Recycling in Low Radioactive LRW Storage Pools

A.G. Karengin, N.V. Tundeshev, I.Y. Novoselov and E.A. Oreshkin 327

Technology for Silicon NTD Using Pool-Type Research Reactors

V.A. Varlachev, E.G. Emets and Y.A. Butko 333

Way to Obtain Uranium Hexafluoride

A.A. Orlov and R. Malyugin 338

X-Ray Absorption Coefficient Behavior Depending on Disposition of Diffraction Vector and Temperature Gradient Vector

K. Hayrapetyan, S. Noreyan, V. Margaryan and V. Kocharyan 342

Chapter 4: Radiation Technologies in Medicine

Application of Digital Auskultometer in Radiotherapy

A.N. Aleinik, R.K. Kusainov and N.D. Turgunova 349

Application of NANOColloid Materials Labeled by Radionuclides in Medicine

V.S. Skuridin, E.S. Stasyuk, A.S. Rogov, V.L. Sadkin, N.V. Varlamova and E.A. Nesterov 352

Biological Dosimetry of the Irradiation Emitted by NG-12I Neutron Generator

E. Kandakova, A. Vazhenin, S. Kiryushkin, E. Pryakhin and A. Akleev 357

Breast Scintigraphy with ^{199}TI in Diagnosis of Breast Cancer

A. Titskaya, V. Chernov, E. Slonimskaya, I. Sinilkin and R. Zelchan 361

Combined Modality Treatment Including Neutron Therapy for Tumors of the Nasal Cavity and Paranasal Sinuses

V. Novikov, L. Musabaeva and O. Gribova 365

Development of the Binary Technologies for Radiation Therapy of Malignant Tumors – Current State and Problems

I.N. Sheino, V.F. Khokhlov and P.V. Izhevskiy 369

Diagnostic Efficiency of Single-Photon Emission Computed Tomography with $^{99\text{m}}\text{Tc-MIBI}$ in Visualization of Malignant Tumors of the Larynx and Laryngopharynx

R. Zelchan, V. Chernov, A. Titskaya, I. Sinilkin, S. Chizhevskaya and Y.T. Choynzonov 373

Dynamic Renoscintigraphy with $^{99\text{m}}\text{Tc-DTPA}$ in the Evaluation of Renal Function in Patients with Chronic Heart Failure

Z.V. Vesnina and Y.B. Lishmanov 377

Electroporation Application as an Alternative to Radiation Therapy

A.N. Aleinik, M.R. Muhamedov, N.D. Turgunova, R.G. Babaev and N.I. Karpovich 381

Evaluation of Functional Factors and Life Quality of Patients with Parotid Gland Cancer after Multimodal Treatment Including Radiation Therapy

E.L. Choynzonov, M.V. Avdeenko, L.N. Balatskaya and V.V. Verkhoturova 384

Experimental Investigation of $^{99\text{m}}\text{Tc-Nanotech}$ Used for Lymph Nodes Visualization

I. Sinilkin, V. Chernov, A. Titskaya, R. Zelchan and N. Daneikina 389

Immediate and late Clinical Outcomes in Patients with Head and Neck Cancer Treated at the Ural Neutron Center

A. Kuznetsova, A. Vazhenin, O. Golykov, E. Kandakova, Z. Munasipov, I. Vazhenin and G. Bobkova 393

Methods of Synthesis of Radiopharmaceuticals Based on Fatty Acids Marked with $^{99\text{m}}\text{Tc}$ and Perspectives of their Application

M.L. Belyanin, E.V. Stepanova, S.M. Minin, Y.B. Lyshmanov and V.D. Filimonov 400

Multimodality Treatment of Locally-Advanced Breast Cancer Using 6.3 MeV Fast Neutrons and Quality of Life in Patients in Long-Term Follow-Up

Z. Startseva, L. Musabaeva and V. Lisin 406

Neutron and Neutron-Photon Therapy for Head and Neck Cancer

O. Gribova, L. Musabaeva, E. Choynzonov and V. Novikov 409

Non-Invasive Tissue Injury Monitoring Using Bioimpedance Spectroscopy

A.N. Aleinik, N.D. Turgunova, V.V. Velikaya, L.I. Musabaeva, Z.A. Startseva and M.R. Mukhamedov 413

Possibilities of Cardiac Scintigraphy with $^{123}\text{I-Iodophen}$ in Patients with Various Forms of Cardiomyopathies

Y.B. Lishmanov, S.M. Minin, Y.V. Saushkina and M.O. Gulya 417

Possibilities of Radionuclide-Tomo-Ventriculography with Labeled 99m Technetium of Sodium Diphosphate Decahydrate in Assessing Mechanical Dyssynchrony of Myocardium and Intracardiac Hemodynamics in Ventricular Arrhythmias in Children	422
K.V. Zavadovskij, V.V. Saushkin and Y.B. Lishmanov	
Possibility for Application of 99mTc-Methoxyisobutylisonitrile in Assessing the Efficiency of Chemotherapy Cardiotoxicity Prevention	426
V. Chernov, T. Kravchuk, R. Zelchan, D. Podoplekin and V. Goldberg	
Possibility of Using 99mTc-Labeled Macro-Aggregates of Serum Albumin and Diethylene Triamine Pentaacetic Acid in the Assessment Lung Ventilation and Perfusion in Patients with Chronic Obstructive Pulmonary Disease and Coronary Artery Disease	430
N.G. Krivonogov, T.S. Ageeva, S.P. Mishustin, K.V. Zavadovsky, V.V. Saushkin and Y.B. Lishmanov	
Possibility of Using Nuclear Track Membrane for Ophthalmology	434
E. Bosykh, V. Pichugin and V. Sokhoreva	
Possibility of Using 99mTc-HMPAO in Estimating Long-Term Prognosis of Cerebral Complications of Coronary Artery Bypass Graft	438
Y.B. Lishmanov, N.Y. Efimova, V.I. Chernov, I.Y. Efimova and S. Akhmedov	
Possibility to Use the Radiopharmaceutical Based on the Gamma-Aluminum Oxide Labeled with 99mTc to Identify Sentinel Lymph Nodes in the Experiment	443
V. Chernov, A. Titskaya, I. Sinilkin, R. Zelchan and N.V. Varlamova	
Prevention and Treatment of Local Breast Cancer Recurrence Using 6.3 MeV Fast Neutrons	447
V. Velikaya, L. Musabaeva, V. Lisin and Z. Startseva	
Production of Meta-Iodobenzilguanidine, 123I Preparation for Medical Diagnostics	451
I.E. Slamkulov, V.S. Skuridin, A.S. Semenov and A.A. Garapatsky	
Radiocardiopulmonography with 99mTc-Pertechnetate in the Study of Pulmonary and Myocardial Hemodynamics in Patients with Chronic Heart Failure	456
Z.V. Vesnina, N.G. Krivonogov and U.A. Smirnova	
Radionuclide Diagnosis of Breast Cancers	460
A. Titskaya, V. Chernov, E. Slonimskaya, I. Sinilkin and R. Zelchan	
Reactor Neutrons in Multimodality Treatment of Locally Advanced Breast Carcinoma	464
Y.S. Mardynsky, I.A. Gulidov, G.G. Aminov, Y.A. Ragulin, I.I. Kotuchov and K.B. Gordon	
Response of Resistant Malignant Tumors to Neutron Therapy	467
L.I. Musabaeva and V.A. Lisin	
Single-Photon Emission Computed Tomography and 99mTc-Methoxy-Isobutyl-Isonitrile in the Detection and Forecast of Cardiotoxicity of Chemotherapeutic Agents	471
V.I. Chernov, T.V. Kravchuk, R.V. Zelchan, D.M. Podoplekin and V.E. Goldberg	
Single-Photon Emission Computed Tomography with 199Tl in Diagnostics of Malignant Tumors of the Larynx and Laryngopharynx	476
R. Zelchan, V. Chernov, A. Titskaya, I. Sinilkin, S. Chizhevskaya and E.T. Choynzonov	
SPECT with 99mTc-HMPAO and Cognitive Function in Patients with Arterial Hypertension: Impact of Antihypertensive Therapy	479
I.Y. Efimova, N.Y. Efimova, S.V. Triss and N.N. Zyablova	
Therapy of Malignant Tumor with 6.3 MeV Fast Neutrons	483
L.I. Musabaeva and V.A. Lisin	
Use of 99mTc-HMPAO in Estimating the Antihypertensive Therapy Impact on the Cerebral Perfusion in Patients with Arterial Hypertension Associated with Diabetes Mellitus Type 2	487
I.Y. Efimova, N.V. Belokopytova, N.Y. Efimova and Y.B. Lishmanov	
Use of 99mTc-HMPAO Brain SPECT in Patients with Arterial Hypertension: Correlation with Cognitive Function	492
I.Y. Efimova, N.Y. Efimova, S.V. Triss and Y.B. Lishmanov	
Use of 99mTc-HMPAO for Scintigraphic Evaluation of Cerebral Microcirculation in the Patients with Persistent Atrial Fibrillation	496
N.Y. Efimova, V.I. Chernov, I.Y. Efimova and S.V. Popov	
Use of 99mTc-HMPAO in Evaluating Cerebrovascular Events in the Patients with Metabolic Syndrome: Relationship to Cognitive Function	501
N.Y. Efimova, V.I. Chernov, I.Y. Efimova and Y.B. Lishmanov	
Use of 99mTc-HMPAO in Evaluating the Results of Cerebral Hypoperfusion Prevention in the Patients with Coronary Heart Disease after Coronary Artery Bypass Grafting	506
N.Y. Efimova, V.I. Chernov, I.Y. Efimova, S. Akhmedov and Y.B. Lishmanov	

Use of Autoleukocyte, Labelled with ^{99m}Tc-Exametazine for Evaluation of Inflammatory Changes in Myocardium	511
S.I. Sazonova, Y.B. Lishmanov, Y.N. Ilyushenkova, R.E. Batalov and Y.V. Rogovskaya	
Use of Pulse Oximetry in Radiotherapy	515
N.I. Martemyanova, N.D. Turgunova and A.N. Aleinik	
Use of Single Photon Emission Computed Tomography (SPECT) with ^{99m}Tc-MIBI for Evaluation of Neoadjuvant Chemotherapy Effectiveness of Larynx and Laryngopharynx Cancer Treatment	519
R. Zelchan, V. Chernov, A. Titskaya, I. Sinilkin, S. Chizhevskaya and E.T. Choynzonov	
Use of SPECT with ^{99m}Tc-Pyrophosphate Combined with a Perfusion Myocardium Scintigraphy in the Evaluation of Inflammatory Changes of the Heart in Patients with Persistent Atrial Fibrillation	523
S.I. Sazonova, Y.B. Lishmanov, J.N. Ilyushenkova, R.E. Batalov and J.V. Rogovskaya	
Use of Technetium-99m-Labeled Lipophilic Complex of Methoxy-Isobutyl-Isonitrile and Iopromide Radiopaque Substance to Assess the Severity of Coronary Atherosclerosis in Patients with Coronary Heart Disease at Mild Disorders of Myocardial Perfusion	527
K.V. Zavadovsky, M.O. Gulya, Y.B. Lishmanov and V.V. Verkhoturova	
Use of Technetium-99m-Labeled Methoxy-Isobutyl Isonitrile and Iodine 123-Labeled Phenyl-Methyl-Pentadecanoic Acid in the Diagnosis and Prognosis of Patients with Dilated Cardiomyopathy	532
Y.B. Lishmanov, K.V. Zavadovsky, M.O. Gulya, S.M. Minin and D.I. Lebedev	
Use of Technetium-99m-Labelled Sodium Diphosphate Decahydrate to Assess Right Ventricle Dysfunction in Patients with Pulmonary Embolism	536
K.V. Zavadovsky, N.G. Krivonogov and Y.B. Lishmanov	
Using Nanotech Radiopharmaceutical for the Visualization of Sentinel Lymph Nodes in Patients with Cervical Cancer	540
I. Sinilkin, V. Chernov, A. Chernishova, L. Kolomiets, A. Titskaya and R. Zelchan	
Using Nanotech Radiopharmaceutical for the Visualization of Sentinel Lymph Nodes in Patients with Larynx and Hypopharynx Cancer	545
I. Sinilkin, V. Chernov, E.T. Choynzonov, S. Chijevskaya, A. Titskaya and R. Zelchan	
Development of Magnetic-Resonance Contrast Composition Based on Disodium Salt of Gd-DTPA	549
V.S. Skuridin, E.S. Stasyuk and V.I. Chernov	
New Porphyrins/Calf Thymus DNA Complexes - Their Thermostability	554
L. Aloyan, Y. Dalyan and A. Gogolev	
Potential for Therapeutic Gain - 29 MeV Neutrons versus 6 MeV Neutrons	559
J. Slabbert and A. Vral	
Obtaining Technetium-99m-Labeled Glucose Derivatives	567
V.S. Skuridin, E.S. Stasyuk, E.A. Ilyina and A.S. Rogov	
Polimer Gafchromic EBT3 Films in Clinical Dosimetry	572
E. Sukhikh, L. Sukhikh and E. Malikov	
Possibility of Nanocolloid Radiopharmaceutical Using for the Visualization of Sentinel Lymph Nodes in Patients with Gastric Cancer	577
I. Sinilkin, V. Chernov, S. Afanas'ev, A. Titskaya and R. Zelchan	
Preparation Technique of Technetium-99m-Labeled Nanoparticles of Fe@C with Modified Surface	582
V.S. Skuridin, E.S. Stasyuk, A.S. Rogov, N.V. Varlamova, E.A. Nesterov, V.L. Sadkin and P.S. Postnikov	
Stimulation of Bone Tissue Reparative Regeneration by Implants with Bioactive Coating for Diaphyseal Fractures	587
A.V. Popkov, D.A. Popkov, N.A. Kononovich, E.N. Gorbach and S.I. Tverdokhlebov	
Thermal Desorption of Iodine-123 from Tellurium-122 Oxide Irradiated by Deuterons	593
V.S. Skuridin, A. Garapatski, I. Slamkulov, A. Semenov and Y. Ermakova	
Dose Rate Spatial Distribution Produced by the Pulsed X-Ray Source in the Radiographic Examination	598
I. Miloichikova, S. Stuchebrov, A. Krasnykh and A. Wagner	
Application of Cold Atmospheric Pressure Plasmas for Biological Tissue Treatment	602
A.N. Aleinik, A.N. Baykov, G.T. Dambaev and E.V. Semichev	

Chapter 5: Computation, Automation, Information Technologies and Safety Systems in Nuclear Industry

Analysis of Interaction Peculiarities in the System “OUTSIDER – PHYSICAL PROTECTION SYSTEM” for Nuclear Facility	
A. Godovsky, M. Parepko and B. Stepanov	609
Application of Void-Free Filling Technology for Additional Safety Barriers Creation during Uranium-Graphite Reactors Decommissioning	
A. Izmestiev, A. Pavliuk and S. Kotlyarevsky	613
Approaches to Modeling UF₆ Desublimation Process	
A.A. Orlov and R. Malyugin	620
Assessing the Feasibility of Complex Recycling of SNF Reprocessing Waste Using RF Torch Air Plasma	
A.G. Karengin, I.Y. Novoselov and N.V. Tundeshev	625
Capacity Pump Control by Dual-Channel Adaptive System with Throttle and Frequency Control	
A.G. Goryunov, K.A. Ivanov and I.S. Nadezhdin	630
Closed Loop Identification by Optimization Method	
V.F. Dyadik, N.S. Krinitsyn and V.A. Rudnev	636
Computer Simulator of Separation Production	
A.A. Orlov, S.N. Timchenko and V.S. Sidorenko	642
Control Model of the Synthesis of Binary Systems under Loading Reactive Additives into the Mixture	
D.G. Demyanyuk, O.Y. Dolmatov, D.S. Isachenko, M.S. Kuznetsov, A.O. Semenov and S.S. Chursin	647
Development and Creation of Software and Information Environment for Simulation of Nuclear Facility	
A. Godovsky and B. Stepanov	652
Harmonization Values of Downloads and Operating Modes of Interconnected Devices Production of Uranium Hexafluoride	
I.S. Nadezhdin and N.S. Krinitsyn	655
Hybrid Automatic Control System of the Cascade of Centrifugal Extractors	
E.P. Zelenetskaya and A.G. Goryunov	661
Mathematic Simulation of Crystallization Refining Process of Spent Nuclear Fuel Reprocessing Desired Products in Linear Crystallizer	
S. Veselov, V. Volk, V. Kasheev, T. Podimova and E. Posenitskiy	666
Mathematical Model of Non-Stationary Hydraulic Processes Occurring in Gas Centrifuges for Uranium Enrichment	
A.A. Orlov, S.N. Timchenko and V.S. Sidorenko	673
Mathematical Model of Pressure and Flow Distribution on Fluorine Production Lines	
O.P. Savitsky, V.F. Dyadik and O.P. Kabrysheva	678
Mean-Square Convergence of Recursive Kernel Estimators of Non-Homogeneous Poisson Process Intensity Function and its Derivative	
A.V. Kitaeva and M.V. Kolupaev	684
Model of Emergency Shutdown System of TOKAMAK KTM	
P. Pokrovsky and V. Kudryavtsev	689
Performance Evaluation of Micro-CT Scanners as Visualization Systems	
A. Batranin, D. Ivashkov and S. Stuchebrov	694
Radiation Burden Decline to the Objects in the X-Ray Investigation	
S. Stuchebrov, A. Batranin, A. Krasnykh, I. Miloichikova and A. Wagner	698
Radiation Portal Monitors: Problems and Development Prospects	
A.V. Dudkin	702
Spatial Distribution of Potential Created by an External Perturbation in Pd and PdH	
V.M. Silkin, V.U. Nazarov and I.P. Chernov	708
The Intensity of Ion Formation in Soil within the 30-Kilometer Zone of Fukushima Daiichi Nuclear Power Plant	
G.A. Kolotkov	713

Validation and Uncertainty Analysis of the Thermal Hydraulics Module of SOCRAT-BN Code on the Rod Bundle Experiment	
Y. Vinogradova, N. Ryzhov and R. Chalyy	717
Bioindication of the Area of Heavy Metal Deposition for Point Sources of Pollution	
N.K. Ryzhakova, A.L. Borisenko, E.A. Pokrovskaya, D.V. Kabanov and V.O. Babicheva	722
Control Model of SH-Synthesis for Two-Component Systems	
D.G. Demyanyuk, O.Y. Dolmatov, D.S. Isachenko, M.S. Kuznetsov, A.O. Semenov and S.S. Chursin	728