

Contents

PART ONE: KINETICS AND ELEMENTARY PROCESSES	1
Fast Singlet Oxygen Quenching Effect in O/O ₂ /O ₃ System	
<i>M. V. Zagidullin, P. A. Mikheyev, A. A. Pershin, A. P. Torbin, and V. N. Azyazov</i>	3
Quantum Chemical Analysis of Structure of Al _n C _m Clusters	
<i>B. I. Loukhovitski, A. S. Sharipov, S. A. Torokhov, and A. M. Starik</i>	10
Elementary Reactions in Al-AlO-H ₂ O ₂ System: Theoretical Study	
<i>A. S. Sharipov and A. M. Starik</i>	17
Kinetics of Singlet Oxygen Emission Induced by Collisions in the Temperature Range 90–315 K	
<i>M. V. Zagidullin, A. S. Insapov, M. I. Khvatov, and M. I. Svistun</i>	23
On Mechanisms of Charged Particle Formation Behind a Shock Wave Propagating in Dusted Atmosphere	
<i>I. V. Arsentiev, A. M. Saveliev, and A. M. Starik</i>	30
Calculation of Enthalpies of Formation for Complex Salt Compounds with Energetic Ligands	
<i>T. S. Kon'kova, Y. N. Matyushin, E. A. Miroshnichenko, and A. V. Inozemtsev</i>	38
Energies of Bonds, Enthalpies of Formation, and Reorganization of Radicals	
<i>E. A. Miroshnichenko, T. S. Kon'kova, Y. N. Matyushin, A. B. Vorob'ev, and A. A. Berlin</i>	44
Influence of Alcohol Additions on Soot Formation in Shock Tube Pyrolysis of Benzene	
<i>A. V. Eremin, E. V. Gurentsov, and E. Yu. Mikheyeva</i>	50
Stochastic Model of Nanostructure Formation in SiC/Mo Under Implantation of Ions	
<i>G. I. Zmievskaya and A. L. Bondareva</i>	59

PART TWO: PLASMA	67
Physics and Gasdynamics of Plasma Actuators <i>P. Leyland, G. Plyushchev, R. Geuns, and S. Goekce</i>	69
The Phenomenon Of Ionic-Cluster Excitation of Argon Levels in Molecular Gas Mixtures <i>V. Gh. Madirbaev, A. E. Zarvin, and N. G. Korobeishchikov</i>	76
Vacuum Ultraviolet Radiation Analyses for Ablation–Radiation Coupling <i>P. Leyland, J. Mora-Monteros, E. Fahy, E. Papadopoulou, B. Duval, N. Banerji, U. Sheikh, T. McIntyre, S. Loehle, and T. Hermann</i>	83
Size and Vaporization Temperature of Mo Nanoparticles Formed by Laser Photodissociation of Mo(CO) ₆ <i>E. V. Gurentsov and M. V. Yurishev</i>	91
The Structure of the Radiating Thermal Wake of a Supersonic Air Flow with Optical Pulsing Discharge <i>A. N. Malov, A. M. Orishich, and Ya. S. Terentjeva . . .</i>	98
Excitation of Spectra of Metals During Discharge in Electrolyte <i>R. N. Medvedev, I. A. Zarubin, and A. D. Shokolov . . .</i>	106
Nonequilibrium Kinetic Processes in Heterophase Plasma of Lead Azide Detonation Products <i>I. A. Izmailov, V. V. Naumov, and A. M. Starik</i>	112
Tunable Diode-Laser Spectroscopy for Metastables Number Density Measurements in Rare Gases <i>P. A. Mikheyev, A. K. Chernyshov, N. I. Ufimtsev, and E. A. Vorontsova</i>	114
Continuous Generation of Electron Beams in Medium Pressure Gases <i>V. S. Voiteshonok, A. I. Golovin, A. V. Turkin, and A. I. Shloydo</i>	122
PART THREE: COMBUSTION	127
Regimes of Hydrogen Jet Fire in an Enclosure with Two Vents <i>V. Molkov and V. Shentsov</i>	129

High-Speed Imaging of Premature Ignition in Rapid Compression Machine <i>P. N. Krivosheyev, V. V. Leschevich, O. G. Penyazkov, and S. Yu. Shimchenko</i>	137
Thermal Explosion in Semibatch Reactors <i>N. G. Samojlenko, B. L. Korsunskiy, J. N. Finaeva, and L. V. Kustova</i>	148
Gas Combustion in Water <i>V. S. Teslenko, A. P. Drozhzhin, and R. N. Medvedev</i>	156
The Role of Heat Radiation in Combustion of Chemically Active Gas Suspensions <i>M. F. Ivanov, A. D. Kiverin, and M. A. Liberman</i>	162
Numerical Simulation of Ethylene Combustion in Supersonic Flow <i>A. A. Firsov, D. A. Yarantsev, and S. B. Leonov</i>	171
Measurements of Specific Impulse of Solid Rocket Propellants <i>A. Korotkikh, V. Arkhipov, A. Kiskin, V. Zarko, and S. Yankovskiy</i>	179
Combustion Regimes of Hydrogen-Based Mixtures in Gas-Fueled Reciprocating Engines <i>M. F. Ivanov, A. D. Kiverin, and A. E. Smygalina</i>	184
PART FOUR: DETONATION	191
Combustion of Syngas–Air Mixtures in the Continuous Detonation Regime <i>F. A. Bykovskii, S. A. Zhdan, E. F. Vedernikov, and A. N. Samsonov</i>	193
Continuous Spin Detonation of a Hydrogen–Oxygen Mixture in a Plane–Radial Combustor <i>F. A. Bykovskii, S. A. Zhdan, E. F. Vedernikov, A. N. Samsonov, and A. S. Zintsova</i>	200
Deflagration-to-Detonation Transition in Oxygen-Diluted Heptane/Air Mixtures in a Pulsed Combustor <i>M. S. Assad, O. G. Penyazkov, and K. L. Sevrouk</i>	209

Hydrogen-Fueled Continuous Detonation Combustors of Different Scale: Three-Dimensional Simulations and Experiments <i>S. M. Frolov, V. S. Aksenov, A. V. Dubrovskii, V. S. Ivanov, S. N. Medvedev, and I. O. Shamshin</i>	214
Numerical Modeling of Thin Structure of a Dispersing Cylindrical Detonation Wave <i>V. Yu. Gidashev and N. S. Severina</i>	228
Numerical Analysis of Characteristics of Hydrogen-Fueled Model Combustor with Rotating Detonation Wave <i>D. I. Babushenko, P. S. Kazarin, V. I. Kopchenov, N. S. Titova, and A. M. Starik</i>	232
Modeling of Shock-Induced Combustion and Detonation Wave Formation in Hydrogen–Air Mixture <i>A. V. Khvostov, A. A. Sobur, D. I. Babushenko, and V. I. Kopchenov</i>	239
The Role of Compression Waves in Transient Combustion Regimes <i>A. D. Kiverin, I. S. Yakovenko, and M. F. Ivanov</i>	247
On the Theory of Detonation in Turbulent Flow <i>E. G. Yakubovskiy</i>	256

**PART FIVE: POLLUTANTS
AND ATMOSPHERE** 259

Applications of Iodine and Bromine Atomic Resonance Spectra Sources for Atmosphere Research <i>A. Ubelis, A. Saiz-López, J. Blahins, A. Apsitis, and U. Gross</i>	261
Study of Nitrogen Oxides Formation in a Combustion System of a Turbofan Engine of Next Generation and Optimization of Combustor Performance Through Computations and Experiments <i>A. M. Sipatov, T. V. Abramchuk, L. Yu. Gomzikov, M. S. Khryashchikov, A. I. Bulatov, and A. Yu. Pleskan</i>	267

Nonequilibrium Processes of Nitric Oxides Formation in Plasma-Assisted Waste Gasification: Modeling Study <i>I. V. Arsentiev, A. M. Starik, V. A. Zhovtyansky, and Yu. A. Honcharuk</i>	272
Problems at Satisfying ICAO 2020–2030 Levels on NOx Emission at High Turbofan Engine Cycle Parameters <i>V. F. Goltsev, I. I. Gomzyakova, and S. A. Shchepin</i>	278
Human Activity and Earth Atmosphere <i>K. V. Khodataev</i>	284
The Use of Satellite Based Sciamachy Data to Study Pollution Events <i>A. Ladstaetter-Weissenmayer</i>	290
PART SIX: COMBUSTION AND PLASMA-BASED TECHNOLOGIES 291	
Combustion Synthesis of Catalytically-Active Membranes <i>V. I. Uvarov, I. P. Borovinskaya, and V. E. Loryan</i>	293
Ecologically Pure Processing and Utilization of Industrial, Domestic, and Radioactive Wastes by Combustion Processes <i>V. I. Uvarov, V. E. Loryan, I. P. Borovinskaya, M. A. Ponomarev, and A. R. Kachin</i>	297
Synthesis of Submicron Aluminum Nitride Particles in Combustion Mode <i>V. V. Zakorzhevsky and I. P. Borovinskaya</i>	304
Combustion Synthesis of Molybdenum, Tungsten, and Composite Powder Silicides <i>V. I. Vershinnikov, T. I. Ignat'eva, and I. P. Borovinskaya</i>	307
Method to Calculate the Temperature of Gas in the Channel of the Plasmatron Based on the Known Electronic Temperature <i>A. Gerasimov, A. Kirpichnikov, and L. Rachevskiy</i>	312
Author Index	318
Color Plates	I