

# Contents

---

---

Vol. 15, No. 6, 2021

---

---

## Elementary Physical and Chemical Processes

A Hard Sphere Model for Bimolecular Recombination of Heavy Ions

*V. M. Azriel', V. M. Akimov, E. V. Ermolova, D. B. Kabanov,  
L. I. Kolesnikova, L. Yu. Rusin, and M. B. Sevryuk*

935

---

## Structure of Chemical Compounds, Quantum Chemistry, Spectroscopy

First-Principles Study of Electronic Structure And Physical Properties  
of M<sup>III</sup>N Semiconductors

*Haibin Wang, Zhongxiang Xie, Zheng Zhou, Yong Zhang, and Ke Zhu*

949

---

## Kinetics and Mechanism of Chemical Reactions, Catalysis

Nonlinear Kinetic Conservation Laws in Nonlinear Chemical Reactions

*N. I. Kol'tsov*

954

Oxidation with Molecular Oxygen of the Cyclohexene Epoxide–Copper(II)  
Chloride–Ionol Ternary System

*L. V. Petrov and V. M. Solyanikov*

960

Kinetics of Base Hydrolysis of Bis(2,2' : 6',2''-Terpyridine)Iron(II) Complex  
in the Water Pools of CTAB Reverse Micelles

*M. Padma, P. Shyamala, K. Bhargavi, and K. V. Nagalakshmi*

965

---

## Combustion, Explosion, and Shock Waves

Thermodynamic Evaluation of Noncatalytic Conversion of Natural Gas  
with the Production of Synthesis Gas

*E. A. Salgansky, M. V. Tsvetkov, A. Yu. Zaichenko,  
D. N. Podlesniy, and I. V. Sedov*

969

Detonation Initiation of Strong Shock Waves to Study the Radiation  
Characteristics of High-Temperature Gases

*I. E. Zabelinsky, P. V. Kozlov, Yu. V. Akimov, N. G. Bykova,  
G. Ya. Gerasimov, Yu. V. Tunik, and V. Yu. Levashov*

977

Scalability of Flame Propagation in a Channel

*A. D. Kiverin, A. V. Turnin, and I. S. Yakovenko*

984

Experimental Study of the Radiation Characteristics of a CO<sub>2</sub>–N<sub>2</sub> Mixture Behind  
the Front of a Strong Shock Wave

*P. V. Kozlov, I. E. Zabelinsky, N. G. Bykova, G. Ya. Gerasimov, and V. Yu. Levashov*

989

Numerical Simulation of the Thermal Conversion of Gaseous Products  
of Polypropylene Pyrolysis

*A. M. Tereza, G. L. Agafonov, E. K. Anderzhanov, A. S. Betev,  
S. P. Medvedev, S. V. Khomik, and G. N. Mokhin*

995

Calculation of Detonation Parameters of TKX-50 Explosives

*Ya. O. Inozemtsev, A. V. Inozemtsev, M. N. Makhov,  
A. B. Vorobiev, and Yu. N. Matyushin* 1005

---

**Physical Methods for Studying Chemical Reactions**

Induced Charge and Dissociation of Negative Ions on a Conducting Surface

*V. G. Lukin, O. G. Khvostenko, L. Z. Khatymova,  
G. M. Tuymedov, E. E. Tseplin, and S. N. Tseplina* 1008

---

**Chemical Physics of Biological Processes**

Destruction of the Shell of Influenza Viruses by Heteropoly Acids with Keggin Structure

*S. A. Kovalevskiy, O. A. Lopatina, E. A. Gushchina, E. I. Isaeva, I. T. Fedyakina,  
O. V. Baklanova, M. V. Mezentseva, E. M. Balashov,  
N. M. Ivashkevich, A. I. Kulak, and F. I. Dalidchik* 1019

Migration of 4-Hexylresorcinol Through *Escherichia coli* Cell Membranes

*E. V. Tereshkin, N. G. Loiko, K. B. Tereshkina, and Yu. F. Krupyanskii* 1026

Effect of Hypochlorite- and Hydrogen Peroxide-Induced Oxidation of Fibrinogen on its Thermal Denaturation

*L. A. Wasserman, L. V. Yurina, A. D. Vasilieva, and M. A. Rosenfeld* 1036

Biodegradation of Blends of Low-Density Polyethylene with Natural Rubber in Soil

*I. A. Var'yan, N. N. Kolesnikova, and A. A. Popov* 1041

Radiation-Chemical Effect of Ionizing Radiation on the Organism and Genotoxic Disorders of the Blood System

*I. I. Pelevina, A. V. Akleev, I. N. Kogarko, V. V. Petushkova, B. S. Kogarko,  
E. A. Pryakhin, E. A. Neifakh, O. V. Kiitorova, and S. S. Andreev* 1046

---

**Chemical Physics of Ecological Processes**

Space-Time Profiles of Contaminants' Concentrations in the Mobile and Stationary Phases of the Sorption Column

*I. V. Kumpanenko, M. V. Dyubanov, N. A. Ivanova, V. V. Novikov,  
V. I. Krivenko, and A. V. Roshchin* 1054

---

**Chemical Physics of Polymer Materials**

Effect of Synthesis Conditions on the Formation of Silver Nanoparticles in a Chitosan Succinamide Matrix under Microwave Radiation

*V. A. Aleksandrova and A. M. Futoryanskaya* 1062

Polymerization of Allyl Glycidyl Ether under the Action of the  $\text{BF}_3\text{-H}_2\text{O}$  Catalytic System

*T. V. Grinevich, M. L. Pridatchenko, and A. N. Shchegolikhin* 1068

---

**Chemical Physics of Nanomaterials**

Effect of Composition and Structure of Metal Oxide Composites Nanostructured on Their Conductive and Sensory Properties

*G. N. Gerasimov, V. F. Gromov, M. I. Ikim, and L. I. Trakhtenberg* 1072

Effect of the Method for Producing the  $\text{ZnO-In}_2\text{O}_3$  Composite on Its Sensor Activity in Hydrogen Detection

*V. F. Gromov, M. I. Ikim, G. N. Gerasimov, and L. I. Trakhtenberg* 1084

Effect of DNA on the Fluorescence of ZnO Composite Films Containing Nanosized Diamonds

*E. A. Boruleva, I. A. Nagovitsyn, G. K. Chudinova, and A. V. Lobanov* 1087

Sensing  $\text{C}_3\text{-C}_{10}$  Straight Chain Aldehydes Biomarker Gas Molecules: Density Functional Theory

*Samira Kaghazkonani and Sadegh Afshari* 1095

---

**Erratum**

Erratum to: Effect of Composition and Structure of Metal Oxide Composites Nanostructured on Their Conductive and Sensory Properties

*G. N. Gerasimov, V. F. Gromov, M. I. Ikim, and L. I. Trakhtenberg* 1102

---

---