

Volume 14, Number 3
May–June 2020

ISSN 1990-7931



RUSSIAN JOURNAL OF PHYSICAL CHEMISTRY B

Focus on Physics

Editor-in-Chief
Anatoly L. Buchachenko

<http://pleiades.online>
<http://link.springer.com>



PLEIADES PUBLISHING

Distributed by  **Springer**

Contents

Vol. 14, No. 3, 2020

Structure of Chemical Compounds, Quantum Chemistry, Spectroscopy

Solving a Discrete Nonlinear Schrödinger Equation with a Trap

V. N. Likhachev, G. A. Vinogradov, and N. S. Erikhman 391

Combustion, Explosion, and Shock Waves

Numerical Study of the Effect of Hydrogen or Syngas Additions to *n*-Decane on the Harmful Substance Emission from a Homogeneous Combustion Chamber

V. E. Kozlov, N. S. Titova, and S. A. Torokhov 395

Combustion Study of Gas-Generating Compositions with Carbon Powder Additives

S. Tursynbek, V. E. Zarko, O. G. Glotov, A. B. Kiskin, M. A. Korchagin, Z. A. Mansurov, G. S. Surodin, and K. A. Umbetkaliev 407

Ignition of Hydrogen–Hydrocarbon (C₁–C₆)–Air Mixtures over the Palladium Surface at 1–2 Atm

A. P. Kalinin, N. M. Rubtsov, A. N. Vinogradov, V. V. Egorov, N. A. Matveeva, A. I. Rodionov, A. Yu. Sazonov, K. Ya. Troshin, G. I. Tsvetkov, and V. I. Chernysh 413

Physical Methods for Investigation of Chemical Reactions

Physicochemical Transformations of a Phenol Type Antioxidant during the Multiple Phase Transitions of Stabilized Polyethylene

E. V. Vorobyova 422

Joint Chemiluminescence of Lophine and Luminol in the Presence of Hydrogen Peroxide and Hemin

Yu. B. Tsaplev, R. F. Vasil'ev, V. D. Kancheva, and A. V. Trofimov 431

Chemical Physics of Biological Processes

Aggregation State of Tetraphenylporphyrin Derivatives in Polymer Films Based on Poly-*N*-Vinylpyrrolidone

I. V. Klimenko, M. A. Gradova, O. V. Gradov, S. B. Bibikov, and A. V. Lobanov 436

The Antineoplastic Properties and Mechanism of Interaction of an Antioxidant, Sodium 2-Carboxy-2-(*N*-Acetylamino)-3-(3,5-di-*tert*-Butyl-4-Hydroxyphenyl)Propionate, with Peptides in an Aqueous Environment According to the Data of the Calculation by Quantum Chemistry Methods

A. A. Volodkin, V. N. Erokhin, E. M. Mil, A. A. Albantova, and V. I. Binyukov 443

A Reflection on the Modern Fuel Cells Based on Chitosan and Alginate Reinforced Biomembranes

Sayan Basak 450

Intermediates of the Autocatalytic Reaction of the Formation of a Chromophore in a Green Fluorescent Protein

B. L. Grigorenko, M. G. Khrenova, A. M. Kulakova, and A. V. Nemukhin 457

Reconstruction of the Fluorescence Spectra of Bisretinoids and the Products of Their Photooxidation and Photodegradation from the Retinal Pigment Epithelium of the Human Eye

M. A. Yakovleva, A. Sh. Radchenko, A. A. Kostyukov, P. M. Arbukhanova, S. A. Borzenok, V. A. Kuzmin, T. B. Feldman, and M. A. Ostrovsky 462

Oxidative Modification of Coagulation Factor XIII: Structural and Functional Aspects <i>A. D. Vasilyeva, L. V. Yurina, V. B. Leonova, D. Yu. Azarova, A. E. Bugrova, T. S. Konstantinova, M. I. Indeykina, A. S. Kononikhin, E. N. Nikolaev, and M. A. Rosenfeld</i>	468
Extreme Kinetics of Chemiluminescence in the Initiated Oxidation of Vegetable Lipids <i>R. F. Vasil'ev, V. D. Kancheva, V. V. Naumov, A. K. Slavova-Kazakova, A. V. Trofimov, G. F. Fedorova, and O. I. Yablonskaya</i>	479
Novel Mass Spectrometric Utilities for Assisting in Oncological Surgery <i>D. G. Ivanov, S. I. Pekov, K. V. Bocharov, D. S. Bormotov, A. I. Spasskiy, E. S. Zhvansky, A. A. Sorokin, V. A. Elifirov, D. S. Zavorotnyuk, S. I. Tkachenko, I. G. Khaliullin, A. Yu. Kuksin, V. A. Shurkhay, A. S. Kononikhin, E. N. Nikolaev, and I. A. Popov</i>	483
Study of Phototoxic Properties of Retinal and Its Derivatives in a Photoreceptor Cell by the Method of Pulsed Photolysis <i>G. R. Kalamkarov, T. F. Shevchenko, P. V. Aboltin, T. S. Konstantinova, and P. P. Levin</i>	488

Chemical Physics of Environmental Processes

Sorption of Metal Ions from Aqueous Solutions by Crown Ethers <i>V. F. Gromov, G. N. Gerasimov, M. I. Ikim, E. Yu. Spiridonova, and L. I. Trakhtenberg</i>	492
Regulatory System of Lipid Peroxidation as a Basis for Ecological Testing <i>L. N. Shishkina, M. V. Kozlov, L. I. Mazaletskaia, A. Yu. Povkh, V. O. Shvydkiy, and N. I. Sheludchenko</i>	498

Chemical Physics of Polymer Materials

Polymer-Polymer Blends of Ultrahigh-Molecular-Weight Polyethylene and Low-Molecular-Weight High-Density Polyethylene: Synthesis, Morphology, and Properties <i>T. M. Ushakova, E. E. Starchak, S. S. Gostev, V. G. Grinev, V. G. Krashenninikov, A. Ya. Gorenberg, and L. A. Novokshenova</i>	504
Structure and Properties of Biocomposites Based on Keratin and Thermoplastic Polymers <i>R. S. Smykovskaya, O. P. Kuznetsova, V. G. Volik, and E. V. Prut</i>	510
Energy of Intramolecular Interactions and Structure of Metallophosphate Polycomplexes with Water Molecules and Nitrogen-Containing Compounds <i>R. A. Sakovich, A. Yu. Shaulov, E. M. Nechvolodova, and L. A. Tkachenko</i>	516
Recombination Kinetics of Radicals in Polymers: Magnetic Field Effects <i>P. P. Levin, A. F. Efremkin, and I. V. Khudyakov</i>	522
Structural and Thermodynamic Characteristics of Potato Starches Depending on the Plant Genotype and Conditions of Their Cultivation <i>L. A. Wasserman, A. V. Krivandin, A. G. Filatova, V. G. Vasil'ev, O. O. Kolachevskaya, V. F. Tarasov, I. G. Plashchina, and G. A. Romanov</i>	525
Biodegradable Composite Materials (Review) <i>A. A. Popov, A. K. Zykova, and E. E. Mastalygina</i>	533
Free Volume and the Rates of the Ozone Degradation of Vulcanizates' Statistical and Block Nitrile-Butadiene Rubbers <i>N. M. Livanova and A. A. Popov</i>	541

Chemical Physics of Nanomaterials

Electrical Stimulation of Catalytic Activity of Platinum Nanocoatings in CO oxidation <i>M. V. Grishin, A. K. Gatin, V. G. Slutskii, A. S. Fedotov, V. A. Kharitonov, and B. R. Shub</i>	547
Manganese Incorporated Eosin Y Dye/Graphene Nanocomposite: an Efficient Visible Light Active Photocatalyst <i>Ahmad Ali Kashmeri, Faisal Nawaz, Muhammad Yousaf, Ahsan Shameem, Muhammad Shabir Mahr, Javed Iqbal, Muhammad Shafique, and Muhammad Asif Javed</i>	552
Reaction on Surface	
AFM Research of Supramolecular Structures <i>L. I. Matienko, E. M. Mil, and V. I. Binyukov</i>	559