

International Conference on Physics and Chemistry
of Combustion and Processes in Extreme Environments
dedicated to the 300th anniversary of the Russian Academy of Sciences
(Samara, Russian Federation, July 2-6, 2024)

TECHNICAL PROGRAM
AND
BOOK OF ABSTRACTS

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A 35

Edited by V.N. Azyazov & A.M. Mayorova

A 35 International Conference on Physics and Chemistry of Combustion and Processes in Extreme Environments (Samara, Russia, 2-6 July 2024):

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This collection presents the program and abstracts of presentations at the 3d International Conference on Physics and Chemistry of Combustion and Processes in Extreme Environments (ComPhysChem'24) dedicated to the 300th anniversary of the Russian Academy of Sciences held at Samara on July 2-6, 2024. The presentations covered a wide range of fundamental and applied topics in physics and chemistry related to combustion and processes occurring in extreme environments. These included fundamental physical-chemical processes, reaction kinetics and dynamics, quantum chemical studies of the potential energy surfaces of chemical reactions in flames and interstellar media, as well as waves and oscillations in solar, stellar, and interstellar plasma. Other topics covered included the kinetics and dynamics of elementary processes, the mathematical modeling of combustion processes, laser and optical diagnostics, the chemical, plasma, and laser initiation of combustion, the structure, formation, and destruction of polycyclic aromatic hydrocarbons (PAHs), soot, graphene, carbonaceous nanoparticles, and chromatography and measurement techniques related to combustion.

Intended for graduate students in the fields of physical chemistry, chemical physics, combustion science and technology, astrochemistry, and astrophysics, as well as for researchers and university professors.

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Conference Venue: ComPhysChem'24 is held in the "Univer Studia" of the Samara University.
Address: 151, Molodogvardeyskaya str., Samara, 443001, Russia.

TECHNICAL PROGRAM

2 July, Tuesday (Samara time UTC +4)

10.00-10.20 Opening and Welcome Remarks

Session 1.1 Chair: Nicolay N. Smirnov (Lomonosov Moscow State University, FSC “Scientific Research Institute for System Analysis of RAS”)

10.20-11.00 Andrey Shmakov¹, D. Knyazkov^{1,2}, T. Bolshova¹, I. Gerasimov¹, K. Osipova^{1,2}, A. Dmitriev^{1,2} (¹Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, ²Novosibirsk State University, Novosibirsk, Russia) **Study of the flame structure of CH₄/H₂ mixtures at elevated pressure and development of reduced reaction mechanism** (*Plenary*)

11.00-11.25 Vladimir Gubernov, (P.N. Lebedev Physical Institute of RAS, Moscow, Russia) **On the role of low temperature reactions in burner stabilized and propagating flames** (*Invited*)

11.25-11.45 Coffee Break

Session 1.2 Chair: Alexander Eremin (Joint Institute for High Temperatures of the RAS)

11.45-12.00 Stanislav Trubachev¹, O. Korobeinichev¹, A. Karpov³, A. Paletsky¹, E. Sosnin^{1,2}, A. Shaklein³, I. Kulikov¹, A. Sagitov^{1,2}, A. Shmakov¹, A. Chernov¹, O. Tuzhikov⁴, Xin Wang⁵ (¹Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, ²Novosibirsk State University, Novosibirsk; ³Udmurt Federal Research Center, Izhevsk, ⁴Volgograd State Technical University, Volgograd, Russia, ⁵ State Key Laboratory of Fire Science, USTC, P.R. China) **The influence of flame retardants on the combustion of fiber-reinforced epoxy resin**

12.00-12.15 Evgenii Sereshchenko, V. Gubernov, S. Minaev (P.N. Lebedev Physical Institute of Russian Academy of Sciences, Moscow, Russia) **Dynamics of sporadic combustion waves and single ball-like flame in straight channels**

12.15-12.30 Vladimir Kislov, M. Tsvetkov, Yu. Tsvetkova, M. Salganskaya, A. Zaichenko, E. Salgansky, D. Podlesniy (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia) **Neutralization of sulfur compounds by calcium-based additives in the filtration combustion processes**

12.30-12.45 Denis Kasymov¹, V. Perminov², E. Golubnichiy¹ (¹Tomsk State University, ²Tomsk Polytechnic University, Tomsk, Russia) **Firebrand Generation and Transport During Forest Fires: Experimental Approach**

12.45-13.00 Tatyana Bolshova, V. Shvartsberg, A. Shmakov (Voevodsky Institute of Chemical Kinetics and Combustion, Novosibirsk, Russia) **Regularities of the combustion chemistry of PMMA in the oxidizer flow in microgravity**

13.00-13.15 Andrey Cherepanov^{1,2}, D. Knyazkov^{1,2}, K. Osipova^{1,2}, V. Kiselev^{1,2}, A. Dmitriev^{1,2}, A. Shmakov^{1,2} (¹Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, ²Novosibirsk State University, Novosibirsk, Russia) **Ion chemistry in ammonia-hydrogen-oxygen flames**

13.15-14.45 LUNCH

Session 1.3 Chair: Vladimir V. Gubernov (P.N. Lebedev Physical Institute of RAS, Moscow)

14.45-15.10 Vitaly Kiselev,^{1,2,3} M. Gorn,^{1,2} Sh. Vaddypally,⁴ M.J. Zdilla⁴ (¹Institute of Chemical Kinetics and Combustion SB RAS, ²Novosibirsk State University, Novosibirsk, Russia, ³Semenov Federal Research Center for Chemical Physics RAS, Moscow, Russia ⁴Temple University, United States) **Thermal stability and unusual rearrangements of nitrogen-rich energetic compounds: New insights from predictive electronic structure calculations** (*invited*)

15.10-15.35 Ksenia Osipova, A. Shmakov (Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, Novosibirsk, Russia) **Kinetics of oxidation and combustion processes of ammonia-based fuel blends** (*invited*)

15.35-15.50 Vadim Dorokhov, G. Nyashina, D. Romanov, K. Vershinina (Heat and Mass Transfer Laboratory, National Research Tomsk Polytechnic University, Tomsk, Russia) **Combustion of pellets from biomass and refused derived fuel**

3 July, Wednesday (Samara time UTC +4)

Session 2.1 Chair: Valery N. Azyazov (Lebedev Physical Institute of RAS, Samara Branch)

9.15-09.40 Ivan Antonov (Lebedev Physical Institute (Samara Branch), Samara National Research University, Samara, Russia) **Recent progress in the building of the Cryogenic Surface Processes apparatus: chemistry of interstellar methane ices** (*invited*)

9.40-10.20 Vladimir Feldman (Lomonosov Moscow State University, Moscow, Russia) **Modeling of cold astrochemical processes through matrix isolation: extremely hot chemistry at extremely low temperatures** (*plenary*)

10.20-10.45 Dmitri Wiebe (Institute of Astronomy of the RAS, Moscow, Russia) **Cosmic rays as an astrochemical factor** (*invited*)

10.45-11.10 Maria Murga, (Institute of astronomy of Russian academy of sciences, Moscow, Russia) **Evolution of carbonaceous particles from AGB stars to planetary nebulae: observations and theory** (*invited*)

11.10-11.30 Coffee Break

Session 2.2. Chair: Vladimir I. Feldman (Lomonosov Moscow State University, Moscow)

11.30-11.55 Igor I. Zinchenko (Federal Research Center A.V. Gaponov-Grekhov Institute of Applied Physics of RAS, Nizhny Novgorod, Russia) **Molecular inventory of the interstellar medium** (*invited*)

11.55-12.10 Dmitry Riashchikov^{1,2}, N. Molevich^{1,2}, D. Zavershinskii^{1,2}, E. Scoptsova¹ (¹Samara National Research University, ²Lebedev Physical Institute, Samara Branch, Samara, Russia) **Propagation features of acoustic-gravity waves in a medium with thermal misbalance**

12.10-12.25 Ekaterina Borshcheva¹, A. Vasyunin² (¹ Institute of Astronomy of RAS, Moscow, Russia, ² Ural Federal University, Yekaterinburg, Russia) **Formation of complex organic molecules in prestellar cores: the role of non-diffusive grain chemistry**

12.25-12.40 Dmitry Zavershinskii^{1,2}; N. Molevich ^{1,2}; D. Riashchikov; S. Belov² (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **Dynamics of slow magnetoacoustic and entropy modes in flaring coronal loops**

12.40-12.55 Oleg Kuznetsov, M. Evseev, V. Azyazov (Lebedev Physical Institute, Samara Branch, Samara, Russia) **Experimental investigation of naphtalene growth via HACA mechanism**

12.55-13.10 Sergey Derteev, M. Sapraliev, N. Shividov, B. Mikhalyaev (Kalmyk state university named after B.B. Gorodovikov, Elista, Russia) **Quasi-periodic pulsations in active regions of the solar corona**

13.10-14.40 LUNCH

Session 2.3 Chair: Maria Murga (Institute of Astronomy of the RAS, Moscow)

14.40-15.20 Valery Nakariakov (University of Warwick, Coventry, United Kingdom) **Solar corona as active MHD media (plenary) (online)**

15.20-15.45 Gleb Fedoseev^{1,2} (¹ Xinjiang Astronomical Observatory, Chinese Academy of Sciences, ² Xinjiang Key Laboratory of Radio Astrophysics, Urumqi, China) **Laboratory investigation of interstellar ice analogues in view of the newest open data from JWST observatory (invited) (online)**

15.45-16.10 Anton Vasyunin¹, Ekaterina Borscheva^{2,1}, Alexey Mozhegorov^{1,3}, Anna Punanova, Maxim Ozhiganov¹, Mikhail Medvedev¹, Varvara Karteeva¹, Ruslan Nakibov¹ (¹ Ural Federal Institute, Yekaterinburg, ²Institute of Astronomy of the RAS, Moscow, Ekaterinburg Theological Seminary, Yekaterinburg, Russia) **Modeling the Composition of Interstellar Ices observed with the James Webb Space Telescope (invited)**

16.10-16.30 Coffee Break

16.30-18.30 Poster Session

P1. Nikita Bystrov, A. Emelianov, A. Eremin, P. Yatsenko (Joint Institute for High Temperatures of the Russian Academy of Sciences, Moscow, Russia) **Measurements of the oxygen dissociation rate constant with verification of modern models of hydrocarbon combustion**

P2. Artëm Dmitriev, D. Knyazkov, A. Shmakov (Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, ² Novosibirsk State University, Novosibirsk, Russia) **Chemical structure of laminar hydrogen flames with the addition of tetraethoxysilane**

P3. A. Eremin, Egor Khodyko, R. Kolotushkin, (Joint Institute for High Temperatures of the RAS, Moscow, Russia) **Investigation of the soot growth process in a flame by the 2D-LII method**

- P4. A.V. Eremin¹, M. R. Korshunova¹, E. Yu. Mikheyeva¹, V.N. Zolotarev^{1,2} (¹ Joint Institute for High Temperatures of the RAS, ² Moscow Institute of Physics and Technologies, Moscow, Russia) **Investigation of soot and PAHs formation during hydrocarbons pyrolysis with kinetic modeling and optical density measurements in UV-VIS range**
- P5. Alina Ponomareva^{1,2}, A. Moroshkina¹, E. Sereshchenko¹, V. Mislavskii¹, V. Gubernov¹ (¹Lebedev Physical Institute of RAS, Moscow, ²ITMO University, Saint Petersburg) **Activation energy of lean methane-hydrogen-air mixtures**
- P6. Eugene Salgansky, A. Zaichenko, D. Podlesniy, M. Salganskaya, M. Tsvetkov, Yu. Tsvetkova (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia) **Thermodynamic assessment of the composition of mixed solid fuel for the gas generator of a high-speed flying vehicle**
- P7. M. Tsvetkov¹, D. Podlesniy¹, M. Salganskaya¹, Yu. Tsvetkova¹, A. Glukhov¹, E. Latkovskaya², A. Zaichenko¹, Eugene Salgansky¹ (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia, ²Sakhalin State University, Yuzhno-Sakhalinsk, Russia) **Characteristics of algae biomass-derived biochars**
- P8. Vladimir Kislov, M. Tsvetkov, Yu. Tsvetkova, M. Salganskaya, A. Zaichenko, E. Salgansky, D. Podlesniy (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia) **Thermal decomposition of sulfur brown coal at different heating rates**
- P9. Vladimir Kislov, M. Tsvetkov, Yu. Tsvetkova, M. Salganskaya, A. Zaichenko, E. Salgansky, D. Podlesniy (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia) **The dynamics of sulfur compounds release investigation at combustion and its absorption by the calcium-based additives**
- P10. Raphael Kryev, A.M. Korobkov, E.G. Belov, S.V. Mikhailov, A.A. Yagofarov (Kazan National Research Technological University, Kazan, Russia) **Energy-saturated materials based on silicon and halogen-containing polymers**
- P11. V. Arkhipov¹, Nikolay Zolotarev^{1,2} (¹ National Research Tomsk State University, Tomsk, Russia, ² Kutateladze Institute of Thermophysics of the Siberian Branch of the RAS, Novosibirsk, Russia) **Influence of aluminum powder additives on the acoustic conductivity of the burning surface of solid propellant**
- P12. Denis Davydov, E. Umerov, V. Novikov (Samara State Technical University, Samara, Russia) **Preparation of Ti₃SiC₂ and Ti₃AlC₂ MAX phases from TiSi₂-C and TiAl-C by SHS in river sand shield**
- P13. Denis Davydov, A. Amosov (Samara State Technical University, Samara, Russia) **Synthesis of porous MAX phases Ti₃SiC₂ and Ti₃AlC₂ by combustion in air and river sand**
- P14. V. Perminov¹ Denis Kasymov² (¹Tomsk Polytechnic University, ²Tomsk State University, Tomsk, Russia) **Mathematical and physical modeling of forest fire spread in the presence of firebreaks**
- P15. Alexey Chichinin (Institute of Chemical Kinetics and Combustion, Siberian Branch RAS, Novosibirsk, Russia) **Astropolarimetry: reduced form of statistical equilibrium equations**
- P16. Ivan Pomelnikov^{1,2}, D. Riashchikov^{1,2}, N. Molevich^{1,2} (¹ Lebedev Physical Institute, Samara Branch, ² Samara National Research University, Samara, Russia) **Study of clumps in atomic zones of photodissociation regions**

- P17. Elizaveta Scoptsova¹, D. Riashchikov^{1,2}, D. Zavershinskii^{1,2} (¹Samara National Research University, ²Lebedev Physical Institute, Samara Branch, Samara, Russia) **Impact of non-adiabatic heating and cooling on the gravitational stratification of the solar atmosphere**
- P18. Maksim Ozhiganov, U. Sapunova, M. Medvedev, V. Karteeva, R. Nakibov, A. Vasyunin (Ural Federal University, Yekaterinburg, Russia) **The effect of N₂ presence on the interstellar ice analogs infrared spectra**
- P19. Anna Astashova^{1,2}, M. Evseev¹, E. Bashkirov² (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **Synthesis of the simplest alcohols and nitrogen-substituted PAHs in the interstellar medium**
- P20. Mikhail Evseev¹, A. Astashova^{1,2} (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **Radical substitution reactions between light alkanes and their radicals**
- P21. Anatoliy Nikolayev^{1,2}, V. Azyazov^{1,2}, A. Mebel^{2,3} (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia, ³Florida International University, Miami, Florida, USA) **Gas-phase synthesis of phenylacetylene in the reaction of 1,3-butadiene with the butadiynyl radical**
- P22. Vladislav Krasnoukhov¹, A. Mebel^{2,3} (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia, ³Florida International University, Miami, Florida, USA) **Gas-phase Formation of Phenanthrene and Dibenzofulvene via the Reaction of Fluorenyl and Methyl Radicals**
- P23. Sergey Tuchin, E. Batrakova, D. Trufanov, I. Antonov (Lebedev Physical Institute, Samara Branch, Samara National Research University, Samara, Russia) **Experimental optimization of the time-of-flight mass spectrometer of the cryogenic surface processes: mass spectrum of butadiene**
- P24. Evgeniya Batrakova, S. Tuchin, D. Trufanov, I. Antonov (Lebedev Physical Institute, Samara Branch, Samara National Research University, Samara, Russia) **Reactions in cryogenic methane films initiated by ultraviolet vacuum radiation**
- P25. Danila Trufanov, E. Batrakova, S. Tuchin, I. Antonov (Lebedev Physical Institute, Samara Branch, Samara National Research University, Samara, Russia) **Numerical simulation of the time-of-flight mass spectrometer of the cryogenic surface processes apparatus: influence of the inhomogeneity of the source region field**
- P26. Alina Kuznetsova, D. Porfiriev, V. Azyazov (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **Theoretical study of 1-acenaphthyl oxidation with molecular oxygen**
- P27. Lubov Krikunova, D. Porfirev, V. Azyazov (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **The Acetobenzene with methyldiyne potential energy surface**
- P28. Mehdi Abbasi, A. Nateghi (University of Tehran, Tehran, I.R. Iran) **Further Development of Multi-component Diesel Surrogate Model on Naphthanes for High Temperature Combustion**
- P29. Aleksei Torbin^{1,2}, A. Chernyshov¹, P. Mikheyev¹ (¹Lebedev Physical Institute, Samara Branch, ²Samara National Research University, Samara, Russia) **NO₂ production in a dielectric barrier discharge in air-CH₄ mixtures**

- P30. Ruslan Kuramshin^{1,2}, A. Torbin^{1,2}, A. Chernyshov¹ (¹Lebedev Physical Institute, Samara Branch, ² Samara National Research University, Samara, Russia) **Measuring gas temperature in Ar-He plasma using diode laser absorption spectroscopy**
- P31. Ekaterina Sidorova¹, A. Shtyrlov¹, P. Strizhak², D. Antonov², I. Zubrilin¹ (¹ Samara National Research University, Samara, ² Energy Engineering School, National Research Tomsk Polytechnic University, Tomsk, Russia) **Methodology for plotting a distillation curve for multicomponent fuels with the addition of ethers**
- P32. Andrey Golenko¹, A. Savchenkova¹, I. Chechet¹, S. Matveev¹, A. Konnov², A. Mebel^{1,3} (¹Samara National Research University, Samara, Russia, ²Lund University, Lund, Sweden, ³Florida International University; Miami, USA) **Rate constants for the interaction of para-pyridyl with O₂: Theoretical study**
- P33. Anna S. Savchenkova, A. M. Golenko, I.V. Chechet, S.G. Matveev, A.A. Konnov, A.M. Mebel (Samara National Research University, Samara, Russia) **Interaction of pyridine radicals with molecular oxygen: Theoretical study**
- P34. Aleksandr Semenikhin, A. Savchenkova, S. Matveev, A. Mebel (Samara National Research University, Samara, Russia) **Singlet potential energy surface of C₃H₂+O₂ interaction**
- P35. Vladislav Anisimov, I. Chechet, O. Kolomzarov, M. Anisimov, D. Bobkova (Samara National Research University, Samara, Russia) **The efficiency of combustor perforated plate**
- P36. Nikita Gurakov, A. Popov, S. Matveev, S. Matveev, D. Idrisov, S. Gilyazova (Samara National Research University, Samara, Russia) **Calculation method for lean flame blowout limit of CH₄/H₂/air combustion considering laminar flame speed values**
- P37. Sergey Matveev, D. Idrisov, N. Gurakov, A. Litarova, R. Ivanov (Samara National Research University, Samara, Russia) **Numerical and experimental study of NO_x formation during hydrogen combustion in a model combustion chamber with a cluster microflame burner device**
- P38. Dmitry Idrisov, S. Matveev, V. Abrashkin, S. Lukachev, A. Litarova, D. Kutcher (Samara National Research University, Samara, Russia) **Development of a method for determining the flashback limits when using methane-hydrogen fuel in the combustion chambers of gas turbine engines**
- P39. Maksim Labaev, I. Platonov, I. Muhanova, A. Saltanova (Samara National Research University, Samara, Russia) **Solid-phase extraction of synthetic dyes from wastewater and their analysis by HPLC**
- P40. Aleksandr Bryksin, I. Platonov (Samara National Research University, Samara, Russia) **Testing of monolithic chromato-desorption systems with organic solvents under extreme conditions**
- P41. Igor Liskov, B. Aduiev, D. Nurmukhametov (The Federal Research Center of Coal and Coal-Chemistry of Siberian Branch of the RAS, Kemerovo, Russia) **Ignition of carbon microparticles by continuous laser radiation of various wavelengths**
- P42. Denis Nurmukhametov, B. Aduiev, G. Belokurov (The Federal Research Center of Coal and Coal-Chemistry of Siberian Branch of the RAS, Kemerovo, Russia) **Ignition of microparticles of coals of different ash content by laser pulses**

P43. Boris P. Aduiev, D.R. Nurmukhametov, I.Y. Liskov (The Federal Research Center of Coal and Coal-Chemistry of Siberian Branch of the Russian Academy of Sciences, Kemerovo, Russia)
Features of laser ignition of carbon particles by laser radiation (overview)

4 July, Thursday (Samara time UTC +4)

Session 3.1

Chair: Andrey G. Shmakov (Voevodsky Institute of Chemical Kinetics and Combustion SB RAS)

09.15-09.40 Denis Knyazkov, A. Cherepanov, V. Kiselev, A. Dmitriev, A. Shmakov, (Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, Novosibirsk, Russia) **A comprehensive chemical kinetic model for the evolution of charged species naturally occurring in non-sooting flames of hydrocarbons** (*Invited*)

09.40-10.20 Nickolay N. Smirnov (Moscow Lomonosov State University, Federal Science Center “Scientific Research Institute for System Analysis of Russian Academy of Sciences”, Moscow, Russia) **Control of detonation propagation by chemical physics methods** (*Plenary*)

10.20-11.00 Alexander Eremin (Joint Institute for High Temperatures of the Russian Academy of Sciences, Moscow, Russia) **Passive and active laser methods for studying the kinetics of high-temperature reactions in shock tubes** (*Plenary*)

11.00-11.20 **Coffee Break**

Session 3.2

Chair: Denis A. Knyazkov (Voevodsky Institute of Chemical Kinetics and Combustion SB RAS)

11.20-11.45 Leonid L. Fershtat¹, Nikita V. Muravyev² (¹ N.D. Zelinsky Institute of Organic Chemistry, ² N.N. Semenov Federal Research Centre for Chemical Physics, Russian Academy of Sciences, Moscow, Russia) **Polynitrogen Heterocycle-based Energetic Materials: Synthesis and Properties** (*Invited*)

11.45-12.00 Aleksandr P. Amosov, I. Uvarova, Yu. Titova (Samara State Technical University, Samara, Russia) **Combustion synthesis of highly dispersed powder composition AlN-SiC using sodium azide and polytetrafluoroethylene**

12.00-12.15 Yulia Titova, G. Belova, A. Yakubova (Samara State Technical University, Samara, Russia) **Application of combustion of Ti-Si-NaN₃-Na₂SiF₆-C powder mixture for the synthesis of highly dispersed Si₃N₄-TiC ceramic composition**

12.15-12.30 Alexander Shevchenko^{1,2}, M. Frolov², V. Blatov² (¹ Lebedev Physical Institute, Samara Branch, ² Samara State Technical University, Samara, Russia) **Crystallochemical approach to high-throughput screening of potential ionic electrides**

12.30-12.45 Eugene Salgansky, A. Zaichenko, D. Podlesniy, M. Salganskaya, M. Tsvetkov, Yu. Tsvetkova (Federal Research Center of Problems of Chemical Physics and Medicinal Chemistry RAS, Chernogolovka, Russia) **Experimental study of low-temperature gasification of urotropine at different flux of filtering gas with obtaining combustible gaseous products**

12.45-13.00 D. Romanov^{1,2}, P. Strizhak^{1,2}, Ksenia Vershinina¹, K. Kartashova¹ (¹National Research Tomsk Polytechnic University, ²Kutateladze Institute of Thermophysics SB RAS, Novosibirsk, Russia) **Ignition, combustion, and emission performance of composite fuels from fossil and biomass derived components**

13.00-13.15 Gabriela Morar, A. Karpov, A. Shaklein (Udmurt Federal Research Center Ural Branch Russian Academy of Science, Izhevsk, Russia) **Numerical Study of the Thermal Structure of Turbulent Diffusion Flame on PMMA surface**

13.15-14.45 LUNCH

5 July, Friday (Samara time UTC +4)

Session 4.1 **Chair:** Ivan O. Antonov (Lebedev Physical Institute of RAS, Samara Branch)

09.15-09.40 Sergey G. Matveev, S. Matveev, N. Gurakov (Samara National Research University, Samara, Russia) **Issues of process modelling in aircraft gas turbine engines' combustion chambers** (*Plenary*)

09.40-10.20 Aleksandrs Prokofjevs (North Carolina Agricultural and Technical State University, Greensboro, USA) **Organic Chemists' Journey into 2D Materials** (*Plenary*)

10.20-10.45 Anyang Li (College of Chemistry and Materials Science, Northwest University, Xi'an, P. R. China) **Effects of submerged barrier on rate coefficients and microscopic mechanisms of ion-molecule reactions** (*Invited*) (*Online*)

10.45-11.10 Viatcheslav Bykov, (Karlsruhe Institute of Technology, Institute of Technical Thermodynamics, Karlsruhe, Germany,) **Model reduction of mechanisms of chemical kinetics and the problem of estimation of reaction rate constants** (*Invited*) (*Online*)

11.10-11.30 **Coffee Break**

Session 4.2 **Chair:** Leonid L. Fershtat (N.D. Zelinsky Institute of Organic Chemistry)

11.30-11.45 Mehdi Abbasi¹, Ali Chaibakhsh Langroudi², Amirreza P. Shirazi¹ (¹University of Tehran, Tehran, I.R. Iran, ²University of Guilan, Rasht, I.R. Iran) **Rearrangement of Combustion Control System of Gas Turbine, Based on the Diesel Surrogate Model**

11.45-12.00 Vyacheslav Stakhanov, O. Shults, A. Ryakin, I. Sharapov, A. Ushkov (FSUE «RFNC – VNIITF named after Academ. E. I. Zababakhin», Snezhinsk, Russia) **Experimental investigation of combustion limits of hydrogen/ methane/carbon monoxide/air/water vapor mixtures**

12.00-12.15 Artyom Shostov, K. Fedotova (Bauman Moscow State Technical University, Moscow, Russia) **Numerical simulation of waveguide elements of an experimental microwave setup to determine the burning rate of energy condensed systems**

12.15-12.30 Savva Yakovlev, E. Bezgodov, S. Pasyukov, A. Tarakanov, M. Nikiforov (FSUE «RFNC – VNIITF named after Academ. E. I. Zababakhin», Snezhinsk, Russia) **Combustion of non-uniformly hydrogen-air mixtures in partially obstructed closed volume**

12.30-12.45 Egor Sosnin^{1,2}, S. Trubachev^{1,2}, O. Korobeinichev¹, A. Karpov³, A. Paletsky¹, A. Shaklein³, I. Kulikov¹, A. Sagitov^{1,2}, A. Shmakov¹, A. Chernov¹, O. Tuzhikov⁴ (¹Voevodsky Institute of Chemical Kinetics and Combustion SB RAS, ²Novosibirsk State University, ³Udmurt Federal Research Center., Izhevsk, ⁴Volgograd State Technical University, Russia) **Experimental study of flame spread over flame retardant glass fiber-reinforced epoxy resin in opposed oxidizer flow**

12.45-13.00 Anastasia Moroshkina, A. Ponomareva, E. Sereshchenko, V. Mislavskii, V. Gubernov (P.N. Lebedev Physical Institute of Russian Academy of Sciences, Moscow, Russia) **Investigation of critical phenomena of the methane-air flames at normal and elevated pressure**

13.00-14.30 LUNCH

Session 4.3 **Chair:** Valery N. Azyazov (Lebedev Physical Institute, Samara Branch)

14.30-15.10 Aleksey Kuznetsov (Universidad Técnica Federico Santa María, Vitacura, Chile) **Graphene composites with various partner species: porphyrinoids, organometallic compounds, metal clusters, etc. (Invited), (online)**

15.10-15.50 A. Nikolayev,¹ M. Evseev,¹ V. Krasnoukhov¹, A. Kuznetsova,¹ P. Pivovarov,¹ D. Porfiriev,¹ Alexander M. Mebel,² and R. Kaiser³ (¹Samara National Research University, Samara, Russia, ²Florida International University, Miami, USA, ³University of Hawaii at Manoa, Honolulu, USA) **Functionalization of pyrimidine and purine to RNA bases in water/ammonia ices via radical substitution reactions (Plenary), (online)**

15.50-16.05 Andrey Pershin, S. Miroshnichenko (Samara University, Samara Branch of LPI RAS) **Inelastic cross sections for Ar*-He complex**

16.05-16.20 Nikita Gurakov, A. Popov, R. Ivanov, O. Kolomzarov, A. Semenikhin (Samara National Research University, Samara, Russia) **Study of the Initial Air-Fuel Mixture Temperature Effect on Ethane Flame Heat Release Rate Pulsation**

16.20-16.30 Closing remarks