

MONDAY, OCTOBER 1, 2018

9:30–10:30

Registration (small conference hall)

10:40–11:00

Opening Ceremony (large conference hall)

Session 1

**KINETICS OF ELEMENTARY PROCESSES IN PLASMA,
COMBUSTION AND ATMOSPHERE - I**

Session Chairs: S. M. Frolov and M. V. Gordin

11:00–11:40

Plenary lecture

To the memory of Prof. A. M. Starik: Scientific school and contribution to the physics and chemistry of nonequilibrium phenomena

11:40–12:00

Modeling of vibration–electronic–chemistry coupling in nonequilibrium air plasma under shock conditions

I. N. Kadochnikov and I. V. Arsentiev

12:00–12:20

Mechanisms of vibrationally assisted CO₂ dissociation

E. Kustova and I. Armenise

12:20–12:40

Coffee break

Session 2

KINETICS OF ELEMENTARY PROCESSES IN PLASMA, COMBUSTION AND ATMOSPHERE - II

Session Chairs: *P. Leyland and Yu. N. Shebeko*

12:40–13:00

Reaction kinetics of CO and CH₄ molecules with O₂ in excited electronic states: quantum chemical study

A. S. Sharipov, A. V. Pelevkin

13:00–13:20

Measurements of rate constants for O₂(*b*¹Σ) quenching by H₂, CH₄, and CO at temperatures of 300–800 K

G. I. Tolstov, M. V. Zagidullin, N. A. Khvatov, A. M. Mebel, and V. N. Azyazov

13:20–13:40

Analysis of N₂ dissociation in nitrogen DC glow discharge

A. A. Chukalovsky, T. V. Rakhimova, Yu. A. Mankelevich, A. V. Volynets, D. V. Lopaev, and N. A. Popov

13:40–14:00

Thermochemical study of energies of bonds. Enthalpies of formation, and reorganization of radicals

E. A. Miroshnichenko, T. S. Kon'kova, and L. L. Pashchenko

14:00–15:00

Brunch

Session 3

KINETICS OF ELEMENTARY PROCESSES IN PLASMA, COMBUSTION AND ATMOSPHERE - III

Session Chairs: *A. V. Eremin and N. S. Titova*

15:00–15:40

Plenary lecture

Atmospheric impact of emissions from space debris: A kinetic approach, and special memorium to prof. A. Starik's contributions to aircraft emission analyses

P. Leyland

15:40–16:00

On the role of thermal and kinetic factors in origin of flammability limits in gaseous mixtures

V. V. Azatyan, Yu. N. Shebeko, A. Yu. Shebeko, and A. V. Zuban

16:00–16:20

Numerical study of H₂ production during the partial oxidation of CH₄-H₂S mixture

V. A. Savelieva, N. S. Titova, and O. N. Favorskii

16:20–16:40

Influence of nonequilibrium model on hydrogen ignition behind a shock wave

I. V. Asrentiev and I. N. Kadochnikov

16:40–17:00

Coffee break

Small conference hall

Session 4

**KINETICS OF ELEMENTARY PROCESSES IN PLASMA,
COMBUSTION AND ATMOSPHERE - IV**

Session Chairs: *F. Krčma, B. I. Loukhovitski*

17:00–17:20

Theoretical model of state-resolved exchange reactions and their implementation

E. V. Kustova, A. S. Savelev, and A. A. Lukasheva

17:20–17:40

Investigation of CO oxidation by nitrogen oxides based on the first principles

A. A. Krupnov and M. Yu. Pogosbekyan

17:40–18:00

Computer simulation of nonequilibrium phase transition processes

G. I. Zmievskaya

18:00–18:20

Formation mechanisms of phenanthrene and anthracene from naphthalene radicals

M. M. Evseev, E. K. Bashkirov, V. N. Azyazov, and A. M. Mebel

20:00–22:00

WELCOME PARTY

TUESDAY, OCTOBER 2, 2018

Large conference hall

Session 5

**FUNDAMENTALS OF IGNITION, COMBUSTION
AND ABLATION OF ORGANIC, METALIZED
AND SYNTHETIC FUELS - I**

Session Chairs: M. S. Assad and A. G. Korotkikh

10:40–11:20

Plenary lecture

Dual role of fluorinated hydrocarbons as inhibitors and promoters of combustion of gases in various oxidizing atmospheres

Yu. N. Shebeko, A. Yu. Shebeko, A. V. Zuban, and N. V. Golov

11:20–11:40

Cars and fluorescent study of ignition and combustion of H₂/O₂ mixtures upon photo-dissociation of O₂ molecules

K. A. Vereshchagin, S. Yu. Volkov, V. D. Kobtsev, S. A. Kostritsa, V. V. Smirnov, A. V. Pelevkin, N. S. Titova, and S. A. Torokhov

11:40–12:00

Ignition delay reduction in the syngas-O₂ mixture due to excitation of O₂ molecules to the a¹Δ_g state

V. D. Kobtsev, S. A. Kostritsa, V. V. Smirnov, N. S. Titova, and S. A. Torokhov

12:00–12:20

Modeling of combustion of polyfractional aluminium air-suspension, with taking into account kinetic limitations of suboxide AlO reactions on particles surface

A. Yu. Kryukov and V. I. Malinin

12:20–12:40

Coffee break

Session 6
**FUNDAMENTALS OF IGNITION, COMBUSTION
AND ABLATION OF ORGANIC, METALIZED
AND SYNTHETIC FUELS - II**

Session Chair: A. S. Sharipov and Y. Wang

12:40–13:00

On the role of heterogeneous processes by combustion of aluminum nanopowders in water vapor

V. B. Storozhev and A. N. Yermakov

13:00–13:20

Ignition conditions of single boron particle in hot gas flow

G. V. Ermolaev and A. V. Zaitsev

13:20–13:40

Mathematical modeling of flame propagation in the aerosuspension of nanosized aluminum powder

A. Yu. Krainov, V. A. Poryazov, and K. M. Moiseeva

13:40–14:00

Experimental study of foamed emulsion combustion: Effects of oxygen, dichloroethane and glycerol concentrations

A. Korshunov

14:00–15:00

Brunch

Session 7
**FUNDAMENTALS OF IGNITION, COMBUSTION
AND ABLATION OF ORGANIC, METALIZED
AND SYNTHETIC FUELS - III**

Session Chairs: E. Kustova and V. B. Storozhev

15:00–15:40

Plenary lecture

Gas-phase synthesis of diamond structures

A. K. Rebrov

15:40–16:00

One-dimensional numerical study of the combustion acceleration in lean air–fuel mixtures activated by nonequilibrium discharge

***A. Dobrovolskaya, E. A. Filimonova, V. A. Bityurin,
and A. N. Bocharov***

16:00–16:20

Stability of ultralean hydrogen flames in terrestrial conditions

I. Yakovenko, K. Melnikova, and A. Kiverin

16:20–16:40

Modes and spectra of combustion of porous silicon at elevated oxygen pressures

***V. N. Mironov, O. G. Penyazkov, P. N. Krivosheev,
Ya. A. Baranyshin, I. A. Ivanov, K. I. Delendik,
and L. Yu. Roshchin***

16:40–17:00

Coffee break

Small conference hall

Session 8

**FUNDAMENTALS OF IGNITION, COMBUSTION
AND ABLATION OF ORGANIC, METALIZED
AND SYNTHETIC FUELS - IV**

Session Chairs: A. Dobrovolskaya and B. Fikus

17:00–17:20

On the mechanisms of porous silicon combustion in oxygen and air atmosphere when sodium perchlorate is incorporated in pores

V. N. Mironov, O. G. Penyazkov, P. N. Krivosheev, I. A. Ivanov, K. N. Kasparov, and L. Yu. Roshchin

17:20–17:40

Thermal decomposition and ignition of HEMs containing B, AlB_2 , and TiB_2

A. G. Korotkikh, V. A. Arkhipov, I. V. Sorokin, and E. A. Selikhova

17:40–18:00

Experimental and simulation studies of VUV radiation with ablative materials for high energy reentry

P. Leyland, H. Wei, T. McIntyre, J. Mora-Monteros, and U. Sheikh

18:00–18:20

Influence of the degree of coal metamorphism on characteristics of coal-water fuel particles ignition of drops of water–coal fuel

V. V. Salomatov, G. V. Kuznetsov, and S. V. Syrodoy

18:20–18:40

The role of bubble pulsations in processes of generation of thrust pulse for water movers

V. S. Teslenko, A. P. Drozhzhin, and R. N. Medvedev

18:40–19:00

Recent advancements in research of the solid propellants combustion with nanocatalyst additives by means of the data science methods

V. S. Abrukov, A. N. Lukin, D. A. Anufrieva, Ch. Oommen, V. R. Sanalkumar, N. Chandrasekaran, and V. Sankar

WEDNESDAY, OCTOBER 3, 2018

Large conference hall

Session 9

**PHYSICAL AND CHEMICAL PROCESSES IN LOW
TEMPERATURE COMPLEX PLASMA, INCLUDING
BURNING PLASMA - I**

Session Chairs: A. K. Rebrov and V. I. Kopchenov

10:40–11:20

Plenary lecture

Mechanisms of hot spot formation in reacting flows

O. G. Penyazkov

11:20–11:40

Chemical ionization in the oxidation of mixtures of *n*-hexane and acetone with oxygen behind reflected shock waves

***P. A. Vlasov, V. N. Smirnov, D. I. Mikhailov, I. V. Zhiltsova,
I. L. Pankrat'eva, and V. A. Polyanskii***

11:40–12:00

The initiation of an extended streamer discharge at the interior surface of dielectric tube

***P. B. Lavrov, I. I. Esakov, L. P. Grachev, P. V. Bulat,
and V. V. Upyrev***

12:00–12:20

Wave kinetics of powders consolidation by high-voltage electrical pulse

E. G. Grigoryev and D. O. Moskovskikh

12:20–12:40

Coffee break

Session 10

PHYSICAL AND CHEMICAL PROCESSES IN LOW TEMPERATURE COMPLEX PLASMA, INCLUDING BURNING PLASMA - II

Session Chairs: J. Michalski and V. S. Teslenko

12:40–13:00

Visualization of nonequilibrium gas flows by schlieren technique with a double-pulse femtosecond laser as a source of optical radiation

V. V. Kuzmitskiy, O. G. Penyazkov, and O. V. Buganov

13:00–13:20

Integrals of quasi-linear equations for low temperature plasma hydrodynamics and solitons with experimental confirmation

M. Ja. Ivanov

13:20–13:40

Thermal radiations of high temperature shock waves and jets

M. Ja. Ivanov, V. K. Mamaev, and V. L. Semenov

13:40–14:00

Study of pulsed laser charging of dust particle

A. A. Sergeev, A. S. Boreysho, and A. V. Savin

14:00–14:20

Generation of high power electromagnetic radiation from nanocluster beams under the action femtosecond laser radiation: From terahertz to X-ray

A. P. Shkurinov

14:20–15:00

Brunch

15:30–19:30

EXCURSION

“AKHUN MOUNTAIN AND VISIT OF STALIN’S MANSORY”

THURSDAY, OCTOBER 4, 2018

Large conference hall

Session 11

**PLASMA, LASER AND COMBUSTION ASSISTED
TECHNOLOGIES, FUEL REFORMING, NANOMATERIALS,
AND SURFACE TREATMENT**

Session Chairs: M. Ja. Ivanov and A. Korshunov

10:40–11:20

Plenary lecture

State of art review of nanoparticles synthesis/surface treatment
in plasma liquid systems

F. Krcma and Z. Kozakova

11:20–11:40

β -SiAlON-based ceramic composites by combustion synthesis
and spark plasma sintering

K. L. Smirnov, E. G. Grigoryev, and E. V. Nefedova

11:40–12:00

Results of the spatiotemporal spectral study of the region
of the destructive impact of a nitrogen plasma jet on carbon sample

***A. A. Belevtsev, D. I. Kavyrshin, M. A. Sargsyan,
and V. F. Chinnov***

12:00–12:20

Quantum chemical analysis of structure and properties of $(\text{AlB}_2)_n$
and $(\text{MgB}_2)_n$ clusters

B. I. Loukhovitski and A. S. Sharipov

12:20–12:40

Dispersion of silicon carbide melt clusters

T. A. Averina and G. I. Zmievskaya

12:40–13:00

Coffee break

Session 12

IGNITION, COMBUSTION AND DETONATION IN APPLICATION TO JET AND INTERNAL COMBUSTION ENGINES AND POWER PLANTS

Session Chairs: *S. A. Zhdan and E. A. Miroshnichenko*

13:00-13:40

Plenary lecture

Ignition, combustion and agglomeration of hem based on aluminum and boron

***A. G. Korotkikh, V. A. Arkhipov, O. G. Glotov, I. V. Sorokin,
and E. A. Selikhova***

13:40–14:00

Absorption spectroscopy for investigating use of discharge plasmas for engine performance enhancement

P. Leyland, C. Skourides, A. Howling, and I. Furno

14:00–14:20

Ignition and stabilization of homogeneous combustion in high-speed flow by pulse-periodic laser radiation

V. N. Zudov, P. K. Tretyakov, and A. V. Tupikin

14:20–14:40

Multifocal ignition of combustion chamber by subcritical streamer microwave discharge

***P. V. Bulat, M. P. Bulat, P. V. Denissenko, V. V. Upyrev,
and I. A. Volobuev***

14:40–15:40

Brunch

Session 13

PHYSICS OF SHOCK AND DETONATION WAVES - I

Session Chairs: V. N. Mironov and I. Yakovenko

15:40–16:20

Plenary lecture

Detonation wave of condensation

A. V. Eremin

16:20–16:40

Numerical modeling of detonation initiation in multifocused systems using unstructured computational meshes

A. I. Lopato and P. S. Utkin

16:40–17:00

Flame front dynamic studies before the onset of detonation in diluted stoichiometric acetylene–oxygen mixtures

Ya. A. Baranyshyn, P. N. Krivosheyev, O. G. Penyazkov, and K. L. Sevrouk

17:00–17:20

Coffee break

Small conference hall

Session 14

PHYSICS OF SHOCK AND DETONATION WAVES - II

Session Chairs: TBA

17:20–17:40

On the gasdynamic mechanisms of exothermal reaction wave formation behind shock waves

A. Kiverin and I. Yakovenko

17:40–18:00

Cartesian grid method for the simulation of the flows with detonation waves in the areas with variable geometry

V. V. Elesin, D. A. Sidorenko, A. I. Lopato, and P. S. Utkin

18:00–18:20

The initialization of supersonic combustion by transmitting the transverse detonation wave into the flow

S. S. Katsnelson, A. A. Litvintseva, and G. A. Pozdnyakov

18:20–18:40

Assessment of application of ansys autodyn powder burn material model in combustion calculations in conditions of internal ballistics

B. Fikus and J. Michalski

20:00–23:00

CONFERENCE DINNER

FRIDAY, OCTOBER 5, 2018

Large conference hall

Session 15

**NOVEL PHYSICAL AND CHEMICAL PROPULSION
CONCEPTS**

Session Chairs: *V. Molkov and O. G. Penyazkov*

10:40–11:20

Plenary lecture

Detonation-driven propulsion

S. M. Frolov

11:20–11:40

Specific impulses for continuous detonation of methane/hydrogen–air mixtures

F. A. Bykovskij, S. A. Zhdan, and E. F. Vedernikov

11:40–12:00

High-speed imaging for an optically accessible rotating detonation engine

Y. Wang and J. Le

12:00–12:20

On the mechanism for maintaining an over-driven detonation in a rotating detonation engine

P. V. Bulat, N. B. Fedosenko, and V. V. Upyrev

12:20–12:40

Thrust characteristics of a reactive-type pulsed detonation combustor

K. Alhussan, M. S. Assad, O. G. Penyazkov, and I. I. Chernuho

12:40–13:00

Coffee break

Session 16

SAFETY, GASEOUS AND PARTICULATE POLLUTANT FORMATION AND POLLUTION CONTROL - I

Session Chairs: N. M. Kortsenshteyn and A. I. Lanshin

13:00–13:40

Plenary lecture

The progress in hydrogen safety research

V. Molkov

13:40–14:00

Computational and experimental study of unstable combustion in low-emission gas-turbine combustors

***E. D. Sverdlov, A. N. Dubovitskii, K. Ya. Yakubovskii,
and N. S. Galimov***

14:00–14:20

Peculiarity of soot formation in pyrolysis of mixtures of acetylene and benzene with hydrogen, oxygen, and methane

***A. Drakon, A. Eremin, E. Mikheyeva, S. Bo, M. Fikri,
and Ch. Schulz***

14:20–15:20

Brunch

Session 17

SAFETY, GASEOUS AND PARTICULATE POLLUTANT FORMATION AND POLLUTION CONTROL - II

Session Chairs: *A. V. Lebedev and G. I. Zmievskaya*

15:20–15:40

Prospective directions for the development of civil aviation power plants

A. I. Lanshin, M. V. Gordin, and A. V. Lukovnikov

15:40–16:00

Engineering development methodology of aircraft engine combustor for NO_x emission reduction

A. M. Sipatov, R. A. Zagitov, L. Yu. Gomzikov, T. V. Abramchuk, and A. Yu. Pleskan

16:00–16:20

Organization of low-emission combustion of fuel-lean kerosene–air mixtures in gas-turbine combustors

E. D. Sverdlov, A. N. Dubovitskii, A. V. Lebedev, and K. I. Spiridonov

16:20–16:40

A novel strategy for smart control of the solid propulsion systems operational capabilities for enhanced flight safety

A. N. Lukin

16:40–17:00

Coffee break

Small conference hall

17:00–18:00

**DISCUSSION ON POSTER PRESENTATIONS
AND PANEL DISCUSSION**

POSTER SESSION

(Poster dimension is 80 x 100 cm)

<i>Poster 1</i>	Zagidullin M. V., Parfiliev D. P., Kaiser R. I., Mebel A. M., Azyazov V. N.	Naphthalene generation in $C_6H_5NO + C_4H_4$ system in high temperature microreactor: Experiment and modeling
<i>Poster 2</i>	Smetanyuk V. A., Frolov S. M.	The effect of mixing of fuel components on the flow pattern in the rotating detonation engine: Numerical simulation
<i>Poster 3</i>	Shamshin I. O., Frolov S. M.	Deflagration-to-detonation transition in a stratified system “liquid fuel film – gaseous oxidizer”
<i>Poster 4</i>	Zangiev A. E., Ivanov V. S., Frolov S. M.	Numerical simulation of DDT in pulsed detonation engine
<i>Poster 5</i>	Frolov F. S.	Simulation of low-temperature oxidation of liquid fuel drops in microgravity conditions
<i>Poster 6</i>	Medvedev S. N., Frolov S. M.	LES of the operation process in gasoline engine
<i>Poster 7</i>	Alekseev V. A., Matveev S. S., Khoroshev A. S., Chechet I. V., Matveev S. G., Konnov A. A.	Laminar burning velocities of methylcyclohexane + air flames
<i>Poster 8</i>	Eremin A. V., Gurentsov E. V., Kolotushkin R. N., Musikhin S. A.	Experimental evidence of catalytic decomposition of hydrocarbons on molybdenum nanoparticles at room temperature
<i>Poster 9</i>	Medvedev R. N.	Detection of impurities by spectroscopic analysis of microwave water vapor plasma

<i>Poster 10</i>	Oleinikov A. D., Azyazov V. N., Mebel A. M.	Oxidation of cyclopentadienyl radical with molecular oxygen: A theoretical study
<i>Poster 11</i>	Pogosebkyan M. Yu., Sergievskaia A. L., Krupnov A. A.	Investigation of the model of thermally nonequilibrium dissociation in air
<i>Poster 12</i>	Solomatina R. S., Semenov I. V.	Simulation of a supersonic mixing in Burrows-Kurkov combustor by using SA-RANS and SA-DES models
<i>Poster 13</i>	Nemtsev M. Y., Semenov I. V., Ermolaev B. S.	Simulation of filtration and convective burning block charges of powder grains inhibited by PVB at constant volume
<i>Poster 14</i>	Bystrov N. S., Emelianov A. V., Eremin A. V., Yatsenko P. I.	Experimental study of reaction of ethanol with oxygen behind shock waves using ARAS method
<i>Poster 15</i>	Azyazov V. N., Zagidullin M. V., Kaiser R. I., Mebel A. M., Porfiriev D. P.	Kinetics of pyrolysis of C ₁₀ H ₇ Br in a high temperature microreactor: Experiment and modeling
<i>Poster 16</i>	Poryazov V. A., Krainov A. Yu. Russia	Combustion of frozen bimodal aluminum particles and water suspension
<i>Poster 17</i>	Minkov L. L., Moiseeva K. M.	Simulation of the air–methane coal dust mixture combustion in the swiss-roll burner
<i>Poster 18</i>	Triaskin J. V., Pavlov V. A.	Anomalous nonlinear effects in a weakly ionized gas exposed to a strong shock wave
<i>Poster 19</i>	Gerasimov A. V., Kirpichnikov A. P., Sabirova F. R.	Using two-temperature model heat-exchange for calculation the break the of the electrons and the atom–ion temperature border arc discharge

<i>Poster 20</i>	Petrov L. V., Kortsenshteyn N. M.	Numerical simulation of the ultrafine aerosols formation from supersaturated metal vapors
<i>Poster 21</i>	Galimova G. R., Azyazov V. N., Mebel A. M.	Oxidation of the C ₁₅ H ₉ by hydroxyl
<i>Poster 22</i>	Ghildina A. R., Mebel A. M., Azyazov V. N., Porfiriev D. P.	The potential energy surface for indenyl C ₉ H ₇ oxidation
<i>Poster 23</i>	Uvarov V. I., Loryan V. E., Kachin A. R., Borovinskaya I. P., Shustov B. S., Tsodikov M. V., Fedotov A. S.	Combustion formation of membranes based on mica- structured materials
<i>Poster 24</i>	Gidasov V. Yu., Moskalenko O. A., Severina N. S., Fang Ch.	Numerical investigation of the effect of water drops on the detonation wave structure in the methane–air combustible mixture
<i>Poster 25</i>	Lebedev A. B., Sekundov A. N., Yakubovskii K. Ya.	Numerical simulation of supersonic combustion
<i>Poster 26</i>	Yakubovsky K. Ya., Lebedev A. B., Toktaliev P. D.	Numerical modeling of the influence of initial nonuniformity and fluctuation of fuel concentration on the stability of combustion and emission of NO _x and CO in a combustion chamber operating on a lean methane–air mixture
<i>Poster 27</i>	Savel'ev A. M., Savelieva V. A.	Features of gas-phase kinetics of diborane oxidation
<i>Poster 28</i>	Krikunova A. I.	Influence of gravitational forces on a flame: Numerical modeling, comparison with experiment