



WORKSHOP PROGRAMME

PLASMA CHEMICAL TECHNOLOGIES
NANOMATERIALS & HYDROGEN PRODUCTION

EPR

3rd International Workshop

“Plasma Chemical Technologies as the Important Approach to the (Nano)Materials and Hydrogen Production (PLASCHEMAT)”

1

Marianská

8-11.6.2026



AIMS, MESSAGE AND FUTURE VISION

The workshop has been held on 1-2.7.2024 for the first time. Back then it summoned 25 experts from different branches of knowledge. Representatives of science and industry were present. This event resulted in the establishment of several important cooperations between the scientific and industrial institutions: international consortia were created and several joint projects were applied for.

The **core message** of the workshop is: “Harnessing the power of plasma to drive cleaner, smarter, and more efficient chemical transformations”. Plasma chemical technologies bridge the gap between physics and chemistry leading to the efficient material engineering, offering a disruptive platform to address global industrial and environmental challenges. The message underscores plasma’s potential to make production processes not only more efficient but also more sustainable and adaptable to future needs. The main accent is put on environmental sustainability, innovation in material processing and process efficiency and selectivity. Therefore, the workshop **is aimed** at bringing together experts of many fields of knowledge both scientific and industrial, to discuss the market needs and work out the effective response to the existing hurdles.

The **future vision** is broadening the impact of the workshop through extending the impact of this meeting to the level of the international conference. The following aspects will be considered. (i) *Circular Economy Integration*. Plasma technologies will play a central role in turning waste (plastic, CO₂, biomass) into reusable chemicals and fuels, fostering a closed-loop industrial ecosystem. (ii) *Decarbonization of Industry*. As industries face pressure to meet carbon neutrality goals, plasma processes will offer low- or zero-emission alternatives to traditional combustion-based systems. (iii) *Plasma for Green Hydrogen and Ammonia*. Emerging plasma technologies can produce hydrogen and ammonia without relying on fossil fuels, supporting the global hydrogen economy. (iv) *On-Demand, Decentralized Production*. Miniaturized, plasma-based reactors will enable on-site and on-demand chemical manufacturing, reducing transportation emissions and increasing supply chain resilience. (v) *Integration with AI and Smart Control Systems*. Combining plasma systems with artificial intelligence and internet of things will lead to self-optimizing chemical reactors that adapt in real time to changing inputs and conditions.

2

ACKNOWLEDGEMENTS

The financial support of this networking event from the program “Strategy AV 21” of the Czech Academy of Sciences, specifically work package VP 27 (“Efficient energy transformation and storage” led by Dr. Alan Mašláni and “Renewable energy resources and distributed energy systems” led by Dr. hab. Maksym Buryi, Ph.D.) is gratefully acknowledged.



PARTICIPANTS

Staff of the Plasma Chemical Technologies Department, Institute of Plasma Physics of the Czech Academy of Sciences

Dr. hab. Maksym Buryi (Head)	Dr. Brenda Natalia Lopez-Niño	Zdeňka Tomášová
Dr. Alan Mašláni (Deputy head)	Dr. Oldřich Živný	Dominik Kralik
Dr. Michal Hlína	Dr. Tomáš Hostinský	Petr Brom
Dr. Jiří Jeništa	Jan Zich	Antonín Musil
Dr. Prokhorov	Jakub Pilař	Václav Březina

External domestic experts

Dr. T. Mates (Company HVM Plasma ltd., Prague, Czech Republic)
Dr. Z. Remeš (FZU – Institute of Physics of the Czech Academy of Sciences, Prague, Czech Republic)
N. Streltsov (UJV Řež a.s.)
Dr. P. Míkeš (Technical University of Liberec)
Dr. P. Krtěnová (Technical University of Liberec)
Dr. K. Šíma (Asekol a.s.)
T. Bubeníček (Asekol a.s.)
Klára Herink Weiglová (Asekol a.s.)
R. Fojt (University of Chemistry and Technology, Prague)
Ngo Trung Kien (University of Chemistry and Technology, Prague)
Jakub Volf (University of Chemistry and Technology, Prague)
Olena Bakhmachuk (Nuclear Physics Institute of the Czech Academy of Sciences)

3

External international experts

Prof. M. Brik (Institute of Physics, University of Tartu, Tartu, Estonia)
Prof. M. Piasecki (Jan Dlugosz University in Czestochowa, Czestochowa, Poland)
Dr. Edgars Elsts (Institute of Solid-State Physics, University of Latvia, Riga, Latvia)
Dr. R. Tomala (Faculty of Chemistry and Geosciences, Vilnius University, Vilnius, Lithuania)
T. Höhne (Helmholtz-Zentrum Dresden-Rossendorf – Institute of Fluid Dynamics)



ORGANIZING COMMITTEE

Dr. hab. Maksym Buryi, Ph.D. (Chair)
Dr. Alan Mašláni (Co-Chair)
Dr. Michal Hlína (Secretary)
Dr. Shelja Sharma (Member)
Dr. Brenda Natalia Lopez-Niño (Member)
Dr. Tomáš Hostinský (Member)
Jan Zich (Member)
Jakub Pilař (Member)
Dominik Kralik (Member)

INTERNATIONAL ADVISORY BOARD

Dr. hab. Maksym Buryi (Institute of Plasma Physics, Prague, Czech Republic) – Chair
Prof. A. Popov (Institute of Solid-State Physics, University of Latvia, Riga, Latvia) -
member
Prof. M. Piasecki (Institute of Jan Dlugosz University in Czestochowa, Czestochowa,
Poland) – member
Prof. M. Brik (Institute of Physics, University of Tartu, Tartu, Estonia) – member
Prof. F. Průša (University of Chemistry and Technology in Prague, Prague, Czech Republic) 4
Dr. Tomáš Mates (Company HVM Plasma ltd., Prague, Czech Republic) - member
Dr. Andrei Racu (National Institute of Research and Development for Electrochemistry and
Condensed Matter, Timisoara, Romania) - member
Dr. K. Bartosiewicz (FZU – Institute of Physics of the Czech Academy of Sciences,
Prague, Czech Republic) - member
Dr. R. Tomala (Institute of Low Temperature and Structure Research, Polish Academy of
Sciences, Wroclaw, Poland) - member
Dr. M. Konuhova (Institute of Solid-State Physics, University of Latvia, Riga, Latvia) –
member
R. Pjatkan (Association of Chemical Industry of the Czech Republic) – member



THE WORKSHOP TOPICS

Plasma techniques and methods of plasma investigation;
Plasma Physics and Chemistry;
Solid-State Physics and Chemistry;
Physical Chemistry;
Quantum Physics and Chemistry;
Materials Engineering including nano-, micro- and macromaterials;
Methods of materials investigation

TALK LENGTH

Oral talk: 15 minutes (talk) + 5 minutes (questions)
Invited talk: 25 minutes (talk) + 5 minutes (questions)

OFFICIAL LANGUAGES: ENGLISH, CZECH



SCHEDULE AND PROGRAMME

Monday 8.6.2026

10:30-11:30 – Tour de labs. Visiting of the laboratories of the Plasma Chemical Technologies Department of the Institute of Plasma Physics of the Czech Academy of Sciences. Discussions.

11:30-13:00 – Lunch

13:00-15:30 – Embarkment. Trip to Mariánská (Popovská 83):

15:30-16:00 – Accommodation at the cottage.

16:00-16:15 – Workshop opening, welcome speech (Dr. hab. M. Buryi, Ph.D.).

16:30-18:30 – Session I - INVITED TALKS (4). Chairperson: Dr. hab. M. Buryi, Ph.D.

16:30-17:00 – **N. T. Kien.** *Characterization of NMC Black Mass as a Potential Catalyst for Plasma Pyrolysis*

17:00-17:30 – **R. Fojt.** *Electrochemically Active Electrospun Amorphous SiO₂ Fibers for All-solid-state Batteries*

17:30-18:00 – **N. Streltsov.** *Low-Carbon Hydrogen Production*

18:00-18:30 – **Dr. T. Höhne.** *Application of Multiscale Multiphase CFD Modeling Including Phase Transfer for Plasma-Driven Thermal and Reactive Systems*

19:00-22:00 – Networking

6



Tuesday 9.6.2026

08:30-09:30 – Breakfast

09:30-11:30 – Session II - INVITED TALKS (4). Chairperson: Dr. A. Mašláni

09:30-10:00 – **Dr. hab. M. Buryi Ph.D.** *Thermal plasma approach as a branch of nanotechnology*

10:00-10:30 – **Dr. R. Tomala.** *Optically Induced Phenomena in Graphene*

10:00-10:30 – **Prof. M. Brik.** *First-principles and machine learning methods for description of optical materials*

11:00-11:30 – **Dr. Z. Remeš.** *Frequency Resolved UV Photoluminescence of NV Rich Single Crystal Diamond*

11:30-12:00 – Coffee break

12:00-13:20 – Session III. Chairperson: Dr. Z. Remeš

12:00-12:20 – Dr. S. Sharma. *Application of Carbon Quantum Dots in Next-Generation Scintillation Material*

12:20-12:40 – Z. Tomášová. *Effect of Hydrogen Substitution in a Hybrid Plasma Torch*

12:40-13:00 – Dr. T. Hostinský. *Recent Advances in Plasma-Assisted Materials Synthesis at the Institute of Plasma Physics*

13:00-13:20 – J. Zich. *From CAD to Experiment: Prototyping Tools at IPP PCHT*

13:20-18:00 – Lunch and social program in Karlovy Vary.

19:00-22:00 – Networking.

7



Wednesday 10.6.2026

08:30-09:30 – Breakfast

09:30-11:30 – Session IV - INVITED TALKS (3 people). Chairperson: Dr. M. Hlína

09:30-10:00 – **Dr. K. Šíma**. *Processing of Fine Plastic Fractions from WEEE Using Plasma Technology*

10:30-11:00 – **Prof. M. Piasecki**. *Chalcogenide Materials for Next-Generation Electronics, Storage and Energy Conversion*

10:30-11:00 – **Dr. E. Elsts**. *Formic Acid Production via Molecular Robson Type Dual Metal Catalysts: Integrated Design, Green Synthesis, and Electrolyzer Validation*

11:00-11:30 – **Dr. P. Mikeš**. *Activated Lignin-Derived Carbon Nanofibres for Electrochemical and Sensing Applications*

11:30-12:00 – Coffee break

12:00-13:30 – Session V (4 people). Chairperson: Dr. S. Sharma

12:00-12:30 – **Dr. T. Mates** (INVITED). *Mass Production Process Development of Thin Film Si Solar Panels*

12:30-12:50 – Dr. B. N. Lopez-Niño. *Destructing Chemical Additives in WEEE Plastics*

12:50-13:10 – Dr. O. Živný. *A Self-Consistent Non-Equilibrium Numerical Framework for Microwave Plasma Dynamics and Electron Kinetics*

13:10-13:30 – Dr. J. Jeništa. *Decomposition of Methane in a Multichamber Plasma Reactor*

13:30-16:30 – Lunch and networking.

16:30-19:00 – Session VI - (4 people). Chairperson: Dr. T. Mates

16:30-17:00 – **J. Volf** (INVITED). *Evaporation of Zinc During Aerodynamic Levitation Melting of Aluminosilicate Glasses*

17:00-17:30 – **O. Bakhmachuk** (INVITED). *NAA and PAA Research Applications at NPI Řež*

17:30-18:00 – Coffee break

18:00-18:20 – J. Pilař. *Effects of Thermal Plasma Treatment on Structural and Surface Properties of Oxide Materials*

18:20-18:40 – Dr. M. Hlína. *Gas-Phase FTIR Spectroscopy*

18:40-19:00 – Dr. A. Mašláni. *From Diagnostics to Industrial Application: Plasma Arc Cutting Research in Collaboration with Fronius GmbH*

19:00-22:00 – Networking

8



Thursday 11.6.2026

08:30-09:30 – Breakfast

09:30-12:00 – Session VII (in Czech). Internal discussions. Responsible persons: **Vaclav Březina, Petr Brom, Antonín Musil**

12:00-13:00 – Free time

13:00-15:00 – Lunch

15:00-15:15 – Workshop closing

15:15 – Departure