



3rd International Conference
on Unconventional Catalysis,
Reactors and Applications

17–20 September 2024 · Warsaw, Poland

PROGRAM BOOK



Warsaw University of Technology
Faculty of Chemical
and Process Engineering



Honorary patronage
of the Mayor of Warsaw



Honeywell
UOP

hubergroup 
print solutions

CEE Energy Outlook

Where do national commitments lead?

future.oralen.pl/en



Practical information

Getting around Warsaw

To get around Warsaw, we strongly recommend Warsaw Public Transport. They offer a reliable and accessible service in the entire city at a low cost.



**Warsaw
Public
Transport**

On the next page, you can find information on the routes that could be most useful to you during your participation in UCRA3.

Tickets for public transport are available for purchase in vending machines on trams and buses, near stops, and next to metro station entrances. Vending machines with public transport tickets are also available at the Chopin Airport.

For more information on public transport, fares and regulations, please head to go2warsaw.pl/en/getting-around-warsaw/ or scan the QR code.



The **conference venue** is located in the *Rektorska4* building of the Warsaw University of Technology at Rektorska 4, 00-614 Warsaw.



Public transport routes

Chopin Airport → Conference venue

Bus no. 188 · final stop: *Metro Politechnika 01*, 22 min. + 5 min. walk

Chopin Airport → hotels in the city centre

Bus no. 175 · final stop: *Dw. Centralny 01* or *Centrum 15*, ≈ 30 min.

Most of the hotels suggested by UCRA3 organizers in the central part of Warsaw are located within 5 min. walking distance from the listed bus stops.

Hotels in the city centre → Conference venue

M1 metro line · final station: *Politechnika* 5 min. + 5 min. walk.

Conference venue → Conference dinner at Podwale 25, Warsaw

Tram no. 15 + tram no. 4 · from *Pl. Politechniki 01* to *Stare Miasto 01* stop, change at *Pl. Bankowy 08* stop, 20 min. + 9 min. walk

M1 metro line · from *Politechnika* to *Ratusz Arsenal* station, 6 min. + 13 min. walk

Hotels in the city centre → Conference dinner at Podwale 25, Warsaw

Tram no. 4 · from *Centrum 08* to *Stare Miasto 01* stop, 9 min. + 9 min. walk

M1 metro line · from *Centrum* to *Ratusz Arsenal* station, 4 min. + 13 min. walk

Social events

Welcome reception

The welcome reception will take place on Tuesday, September 17th, at 18.00 after the Marie Curie Lecture of Prof. Frances H. Arnold on the conference venue's ground floor in the Lunch & coffee break area.

All UCRA3 Participants are welcome!

Important! The conference ID will be necessary to enter the event.

Warsaw Old Town sightseeing tour

The Warsaw Old Town sightseeing tour will take place on Wednesday, September 18th. Professional tour guides will guide the tours through the Old Town of Warsaw.

UCRA3 organizers **provide transportation to the start** of the sightseeing. Buses will depart from the conference venue at 18.20.

Important! Only the Participants who declared their participation in the tour will be able to attend this event. The tour will end in the Old Town at around 20.00. We **do not** provide transportation back to the conference venue or your hotel.

Conference dinner

The conference dinner will take place on Thursday, September 19th, in the *Podwale 25 Kompania Piwna* restaurant at Podwale 25 in the Warsaw Old Town.

All UCRA3 Participants are welcome! The dinner will start at 20.00.

Important! The conference ID will be necessary to enter the event. UCRA3 organizers **do not provide transport** to and from the conference dinner.

Casual dress code.



Instructions for presenting authors

Oral presentations

- The presentation time is 15 minutes, plus 5 minutes for discussion.
- Provided in the lecture hall will be: a Windows computer with Microsoft PowerPoint and PDF reader software, a projector and screen, a wireless remote control for presentations with a laser pointer, and a wireless microphone.
- The organizers do not guarantee that you will be able to connect your own computer.
- Uploading presentations to computers in conference rooms will be possible from Wednesday, September 18th, at 8.00 and on subsequent days in the morning before the conference sessions begin. Please bring your presentation on a USB drive and upload the presentation no later than before the start of your session.

Poster presentations

- The poster boards will be 99 cm wide and 120 cm high. We recommend a poster format A0 (84.1 cm × 118.9 cm).
- Adhesive tapes for attaching posters will be available on-site.
- The poster boards will be available on Thursday, September 19th, from 8.00. Please place your posters no later than during the lunch break.
- Please take down your posters the same day by 18.30. After that time, the posters will be removed and destroyed by the organizers.

Conference venue plans







0 Ground floor



- | | | | |
|--|--------------------------------|--|-----------|
| | Registration & conference desk | | Elevators |
| | Cloakroom | | Staircase |
| | Lunch & coffee break area | | Toilets |
| | Building entrance | | |

1 First floor



 Room A	 Elevators
 Poster session A	 Staircase
 No food & drinks allowed	 Toilets

2 Second floor



- | | |
|--------------------------|-----------|
| Room B | Elevators |
| Poster session B | Staircase |
| No food & drinks allowed | Toilets |

4 Fourth floor








Conference venue plans · 9

- | | |
|--------------------------|-----------|
| Room C | Elevators |
| No food & drinks allowed | Staircase |
| | Toilets |

Conference program

Tuesday, 17 September

	 Room A 1.01 “Syriusz”	 Room B 2.01 “Syriusz”	 Room C 4.01+02 “Polaris”
14.00–20.00	 Registration & conference desk		
17.00–18.00	OL1 · Marie Curie Lecture “Innovation by Evolution: Bringing New Chemistry to Life” Prof. Frances H. Arnold · <i>California Institute of Technology, United States</i>		
18.00–20.00	Welcome reception		
	<i>End of conference day</i>		

Wednesday, 18 September

🏠 **Room A 1.01 "Syriusz"**

🏠 **Room B 2.01 "Syriusz"**

🏠 **Room C 4.01+02 "Polaris"**

08.00–18.00 🗂️ Registration & conference desk

09.00–09.10 **Opening**

09.10–10.00 **OL2 · Opening Lecture "Mars, MOXIE, and the Future of Human Space Flight"**
Prof. Jeffrey A. Hoffman · *Massachusetts Institute of Technology, United States*

10.00–10.10 **Welcome by the Rector of the Warsaw University of Technology**

10.10–11.00 **PL1 · Taking clues from nature to advance catalysis and reactor engineering for sustainable development**
Prof. Marc-Olivier Coppens · *University College London, United Kingdom*

11.00–11.40 ☕ **Coffee break**

S01 · Nature inspired catalysts

S08 · Part 1/5 · Reactors with unconventional catalyst activation

S10 · Part 1/2 · TITAN and sister projects

11.40–12.00 **Tunable cationic backbone-alkaline anion interactions for ultra-selective catalytic synthesis of ethyl methyl carbonate in ionized frameworks**
Jie Chen · Fuzhou University, China

Efficiency of micro discharge on plasma catalytic nitrogen fixation
Pradeep Lamichhane · University of Warwick, United Kingdom

Towards hydrogen production by methane reforming in a microwave-assisted fluidized bed reactor. Hydrodynamics of the Fe/C catalyst fluidized bed
Robert Cherbański · Warsaw University of Technology, Poland

12.00–12.20 **Light-driven water oxidation by bio-inspired Perylene bisimide "Quantasomes"/WO₃ hybrid photoanode**
Jintao Liu · University of Padova, Italy

Low energy cost ethylene from methane coupling in 3D printed catalytic plasma reactor
Fabio Cameli · Ghent University, Belgium

Effect of catalyst shaping in microwave-assisted dry reforming of methane
Nolven Guillaume · CNRS and University Claude Bernard Lyon, France

12.20–12.40 **New perspectives in catalyst shaping: DLP 3D printing of γ -Al₂O₃ catalyst architectures**
Luca Mastroianni · Åbo Akademi University, Finland

Hydrogen obtaining by ammonia decomposition in gliding discharge plasma-catalytic processes
Michał Młotek · Warsaw University of Technology, Poland

Hydrogen and CNTs production by catalytic methane decomposition under microwave heating
David Martín · Universidad de Zaragoza, Spain

12.40–14.10 🍴 **Lunch**







Wednesday, 18 September

	🏠A Room A 1.01 “Syriusz”	🏠B Room B 2.01 “Syriusz”	🏠C Room C 4.01+02 “Polaris”
	S07 · Part 1/3 · Reactors with multifunctional reaction media	S02 · Biobased catalysts	S10 · Part 2/2 · TITAN and sister projects
14.10–14.30	<p>Continuous biocatalytic production of furfurylamine within a falling film microflow device enabling in situ product separation Igor Plazl · <i>University of Ljubljana, Slovenia</i></p>	<p>Kinetic modelling of plastic pyrolysis over biomass-derived catalysts Syie Luing Wong · <i>Eindhoven University of Technology, the Netherlands</i></p>	<p>Towards hydrogen production by methane reforming in a microwave-assisted fluidized bed reactor. Regeneration of Fe/C catalyst Stanisław Murgrabia · <i>Warsaw University of Technology, Poland</i></p>
14.30–14.50	<p>Investigation of the multiphase flow using a transparent direct formic acid fuel cell Monika Jałowicka · <i>Warsaw University of Technology, Poland</i></p>	<p>Transforming biomass to chemicals: mild upgrading with activated carbon-based catalysts Abhisek Sahoo · <i>University College London, United Kingdom</i></p>	<p>Ecotoxicological effects of nanocarbon materials from direct biogas conversion into H₂ on soil organisms Kateryna Kostiuk · <i>University of Hohenheim, Germany</i></p>
14.50–15.10	<p>Development of a new CO₂ electrolyzer boosted by the NETmix technology: Challenges and perspectives overview Maria Helena de Sá · <i>Network for a Sustainable CO₂ Economy, Portugal</i></p>	<p>🏆 Silver Partner presentation: Honeywell UOP – Solutions for the Energy Transition Travis Bowen · <i>Honeywell UOP, United States</i></p>	<p>Enhancing soil water retention and remediation capabilities through nanocarbonaceous soil amendments: Insights from controlled lab studies Hermin Saki · <i>University of Hohenheim, Germany</i></p>
15.10–15.40	☕ Coffee break		
15.40–16.30	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; height: 100%; transform: rotate(45deg);"></div> <div style="width: 35%; background-color: #f9e79f; padding: 10px;"> <p>PL2 · Overcoming the bottlenecks in electron transfer in biomolecular solar conversion nanodevices through electrochemical and theoretical approaches Prof. Joanna Kargul · <i>University of Warsaw, Poland</i></p> </div> <div style="width: 30%; border: 1px solid black; height: 100%; transform: rotate(-45deg);"></div> </div>		
16.30–16.40	Technical break		

Wednesday, 18 September

	🏠A Room A 1.01 “Syriusz”	🏠B Room B 2.01 “Syriusz”	🏠c Room C 4.01+02 “Polaris”
	S07 · Part 2/3 · Reactors with multifunctional reaction media	S09 · Part 1/2 · Reactors with novel catalyst supports	S05 · Novel catalysts preparation methods
16.40–17.00	Intensification of hydrogen flux in a Pd membrane separator and membrane reactor under an electric field Rimon Dawidowicz · <i>Technion – Israel Institute of Technology, Israel</i>	A combined experimental and modeling study of a 3D printed gyroidal copper structure for post-plasma chemical process intensification Victor Rosa · <i>Gent University, Belgium</i>	Searching for electric field-based control over zeolite synthesis using nonconventional reactors Mostafa Torka Beydokhti · <i>KU Leuven, Belgium</i>
17.00–17.20	Electrified sorption enhanced steam reforming: a novel approach to low-carbon hydrogen production with CO₂ capture Federico Nicolini · <i>Politecnico di Milano, Italy</i>	Intelligent catalyst carrier concept with reversible wall contact in tubular reactors for an improved wall heat transfer Dominik Rudolf · <i>TU Dortmund University, Germany</i>	Plasma promoted K-catalysts for higher alcohol synthesis Evgeny Rebrov · <i>University of Warwick, United Kingdom</i>
17.20–17.40	LTA-membrane reactors for CO₂ utilization Michael Patrascu · <i>Technion – Israel Institute of Technology, Israel</i>	Nickel-based monolithic catalysts with segmented construction for CO₂ methanation Karolina Gałęziowska · <i>Cracow University of Technology, Poland</i>	Supported gold catalyst: design, synthesis and catalytic applications Nidhi Kapil · <i>University College London, United Kingdom</i>
17.40–18.00	Parametric study of intensified DME synthesis from CO₂ Mert Ozden · <i>Bogazici University, Turkey</i>		Sm-doped barium cerate as support for cobalt catalyst for ammonia synthesis Hubert Ronduda · <i>Warsaw University of Technology, Poland</i>
18.20–20.00	Warsaw Old Town sightseeing tour <i>End of conference day</i>		

Thursday, 19 September

	 Room A 1.01 “Syriusz”	 Room B 2.01 “Syriusz”	 Room C 4.01+02 “Polaris”
08.30–18.00	  Registration & conference desk		
09.00–09.50		PL3 · Exploring catalytic reaction networks with machine learning Prof. Karsten Reuter · <i>Fritz-Haber-Institute, Germany</i>	
09.50–10.00	<i>Technical break</i>		
	S03 · Hybrid systems	S08 · Part 2/5 · Reactors with unconventional catalyst activation	S04 · Part 1/2 · Catalysis in unconventional environments and applications
10.00–10.20	Chemistry between mirrors – modifying chemical reactivity using Vibrational Strong Coupling (VSC) <i>Maciej Piejko · University of Strasbourg, France</i>	Demonstration of an electrothermal fluidised bed reactor for acid gas conversion <i>Izabel Medeiros Costa · TotalEnergies, France</i>	Catalysis on Mars: exploring the potential of in-situ available resources for thermal CO₂ conversion <i>Bart Michielsens · Flemish Institute of Technology VITO, Belgium</i>
10.20–10.40	Dry reforming of methane in molten In-Sn alloy <i>Nikil Surya R · Indian Institute of Technology Kanpur, India</i>	Multi-scale modeling of microwave reactors for scale-up analysis <i>Maxwell P. Bobbin · University of Delaware, United States</i>	Nanoengineering platinum-copper nanostructures with enhanced light-absorbing properties for photothermal therapy and targeted copper delivery <i>Jesús Santamaría · University of Zaragoza, Spain</i>
10.40–11.00	Synergy for the plasma-based CO₂ conversion with the Solid Oxide Electrolysis Cell <i>Mauritius C.M. van de Sanden · Dutch Institute for Fundamental Energy Research, the Netherlands</i>	Enhancement of the rate of electrocatalytic formic acid oxidation by forced periodic modulation <i>Sidhanth Chandra Kanth · Eindhoven University of Technology, the Netherlands</i>	Copper-based nanocatalysis for the disruption of tumor homeostasis <i>Jesús Santamaría · University of Zaragoza, Spain</i>
11.00–11.40	 Coffee break		







Thursday, 19 September

	🏠 A Room A 1.01 “Syriusz”	🏠 B Room B 2.01 “Syriusz”	🏠 C Room C 4.01+02 “Polaris”
	S07 · Part 3/3 · Reactors with multifunctional reaction media	S08 · Part 3/5 · Reactors with unconventional catalyst activation	S06 · Model-based catalyst development and synthesis
11.40–12.00	Boosted ammonia decomposition over ruthenium catalysts: a comparative study in a traditional fixed bed, membrane-assisted, and in a catalytic membrane reactor <i>Salvatore Abate · University of Messina, Italy</i>	Dynamic electrification toward sustainable and enhanced catalysis <i>Rucha Railkar · University of Delaware, United States</i>	Bimetallic catalysts for the hydrogenation of amides: from experimental to data-driven insights <i>Jorge A. Delgado · Syensqo, China</i>
12.00–12.20	Investigation of the limits of unconventional NH₃ synthesis <i>Irem Taşpınar · Bogazici University, Turkey</i>	Computational insights into steady-state and dynamic joule-heated reactors <i>Arnav Mittal · University of Delaware, United States</i>	Application of neural networks to multi-scale modelling of nanocatalysts <i>Tomasz Kotkowski · Warsaw University of Technology, Poland</i>
12.20–12.40	Synthesis and simulation of an intensified NH₃ synthesis process <i>Gozde Kara · Bogazici University, Turkey</i>	Selective and adaptive hydrogenation of amides using a magnetically-responsive Pt/Al₂O₃ catalyst heated by magnetic induction <i>Sheng-Hsiang Lin · Max Planck Institute for Chemical Energy Conversion, Germany</i>	Ab initio molecular dynamics study to elucidate the role of Mo doping in molten KCl for methane activation <i>Aditya Goyal · Indian Institute of Technology Kanpur, India</i>
12.40–14.10	🍴 Lunch		
14.10–15.00	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; border-bottom: none;"> <div style="background-color: #ffcc99; padding: 5px;">PL4 · Design and implementation of de novo biocatalytic cascades <i>Prof. Sabine L. Flitsch · University of Manchester, United Kingdom</i></div> </div> <div style="width: 30%; border: 1px solid black; border-bottom: none;"> <div style="background-color: #ffcc99; padding: 5px;">Gold Partner Presentation: Orlen SA Pilot plants as a tool for industrial catalysts evaluation <i>Tomasz Trzeciak · Orlen SA, Poland</i></div> </div> <div style="width: 30%; border: 1px solid black; border-bottom: none;"> </div> </div>		
15.00–15.10	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; border-top: none;"> </div> <div style="width: 30%; border: 1px solid black; border-top: none;"> </div> <div style="width: 30%; border: 1px solid black; border-top: none;"> </div> </div>		

Thursday, 19 September

	🏠A Room A 1.01 “Syriusz”	🏠B Room B 2.01 “Syriusz”	🏠C Room C 4.01+02 “Polaris”
15.10–16.30	<p>📄 Poster session A See the presentations list at Page 26</p> <p>S09 · Part 2/2 · Reactors with novel catalyst supports</p>	<p>📄 Poster session B See the presentations list at Page 28</p> <p>S08 · Part 4/5 · Reactors with unconventional catalyst activation</p>	
16.40–17.00	<p>Benefits of 3D-printed catalysts: the case of CO₂ methanation Bart Michielsens · <i>Flemish Institute of Technology VITO, Belgium</i></p>	<p>Ir/BaTiO₃ catalytic coatings for plasma assisted CO₂ hydrogenation to CH₄ Yuyan Gong · <i>University of Warwick, United Kingdom</i></p>	
17.00–17.20	<p>Biphasic furfural synthesis from biorefinery feed using coated 3D foam structures Adarsh Patil · <i>Technische Universiteit Eindhoven, the Netherlands</i></p>	<p>Bulk oxidative plasma functionalization of plastic waste Darien Nguyen · <i>University of Delaware, United States</i></p>	
17.20–17.40	<p>Catalytic hollow fibre-based reactors: design principles Claire Leishman · <i>University of Edinburgh, United Kingdom</i></p>	<p>Scaling up microwave excited plasmas – an alternative technology for industrial processing Marilena Radoiu · <i>Microwave Technologies Consulting, France</i></p>	
17.40–18.00		<p>Model-assisted scaleup of microwave heated monolith reactors for steam methane reforming Arun Senthil Sundaramoorthy · <i>University of Delaware, United States</i></p>	
from 20.00	<p>Conference dinner Podwale 25 Kompania Piwna · Podwale 25 St., Warsaw Old Town</p> <p><i>End of conference day</i></p>		

Friday, 20 September

	 Room A 1.01 "Syriusz"	 Room B 2.01 "Syriusz"	 Room C 4.01+02 "Polaris"
09.00–13.30	  Registration & conference desk		
09.30–10.20		PL5 · Enhancing flexibility in chemical reactor design with 3D printed catalyst structures Prof. Martin van Sint Annaland · <i>Eindhoven University of Technology, the Netherlands</i>	
10.20–10.30	<i>Technical break</i>		
10.30–10.50	S04 · Part 2/2 · Catalysis in unconventional environments and applications Supercritical catalytic cracking of n-dodecane for cooling in scramjet engines Mira Faour · <i>Technion, Israel</i>	S08 · Part 5/5 · Reactors with unconventional catalyst activation Ultrasound as a tool in the improvement of enzymatic catalysis: Epoxidation of vegetable oils to valuable products Tapio Salmi · <i>Åbo Akademi University, Finland</i>	
10.50–11.10	Combined electrostatic precipitation-photocatalysis technology for indoor air purification Donja Baetens · <i>University of Antwerp, Belgium</i>	Temperature modulation for enhanced catalytic NH₃ decomposition Nefeli Kamarinopoulou · <i>University of Delaware, United States</i>	
11.10–11.30	Computational modeling as a design tool for integrated and combined air purification technologies Siegfried Denys · <i>University of Antwerp, Belgium</i>	Light-driven Pickering interfacial catalysis for the oxidation of alkenes at near-room temperature Jean Francois Dechezelles · <i>Université de Lille, France</i>	
11.30–11.40	<i>Technical break</i>		
11.40–12.10	Conference closing		
12.10–13.30	 Farewell lunch <i>End of the conference</i>		

Oral presentations

Session 01 · Nature inspired catalysts

Day · Time · Room Presentation title & presenting author

Wed. 11.40 A Tunable cationic backbone-alkaline anion interactions for ultra-selective catalytic synthesis of ethyl methyl carbonate in ionized frameworks

Jie Chen · Fuzhou University, China

Wed. 12.00 A Light-driven water oxidation by bio-inspired Perylene bisimide “Quantasomes”/WO₃ hybrid photoanode

Jintao Liu · University of Padova, Italy

Wed. 12.20 A New perspectives in catalyst shaping: DLP 3D printing of γ -Al₂O₃ catalyst architectures

Luca Mastroianni · Åbo Akademi University, Finland

Session 02 · Biobased catalysts

Day · Time · Room Presentation title & presenting author

Wed. 11.40 B Kinetic modelling of plastic pyrolysis over biomass-derived catalysts

Syie Luing Wong · Eindhoven University of Technology, the Netherlands

Wed. 12.00 B Transforming biomass to chemicals: mild upgrading with activated carbon-based catalysts

Abhisek Sahoo · University College London, United Kingdom

Session 03 · Hybrid systems

Day · Time · Room Presentation title & presenting author

- Thu. 10.00 A Chemistry between mirrors – modifying chemical reactivity using Vibrational Strong Coupling (VSC)**
Maciej Piejko · *University of Strasbourg, France*
- Thu. 10.20 A Dry reforming of methane in molten In-Sn alloy**
Nikil Surya R · *Indian Institute of Technology Kanpur, India*
- Thu. 10.40 A Synergy for the plasma-based CO₂ conversion with the Solid Oxide Electrolysis Cell**
Mauritius C.M. van de Sanden · *Dutch Institute for Fundamental Energy Research, the Netherlands*

Session 04 · Catalysis in unconventional environments and applications

Day · Time · Room Presentation title & presenting author

- Thu. 10.00 C Catalysis on Mars: exploring the potential of in-situ available resources for thermal CO₂ conversion**
Bart Michiels · *Flemish Institute of Technology VITO, Belgium*
- Thu. 10.20 C Nanoengineering platinum-copper nanostructures with enhanced light-absorbing properties for photothermal therapy and targeted copper delivery**
Jesús Santamaría · *University of Zaragoza, Spain*
- Thu. 10.40 C Copper-based nanocatalysis for the disruption of tumor homeostasis**
Jesús Santamaría · *University of Zaragoza, Spain*
- Fri. 10.30 A Supercritical catalytic cracking of n-dodecane for cooling in scramjet engines**
Mira Faour · *Technion, Israel*
- Fri. 10.50 A Combined electrostatic precipitation-photocatalysis technology for indoor air purification**
Donja Baetens · *University of Antwerp, Belgium*
- Fri. 11.10 A Computational modeling as a design tool for integrated and combined air purification technologies**
Siegfried Denys · *University of Antwerp, Belgium*

Session 05 · Novel catalysts preparation methods

Day · Time · Room Presentation title & presenting author

- Wed. 16.40 C **Searching for electric field-based control over zeolite synthesis using nonconventional reactors**
Mostafa Torka Beydokhti · *KU Leuven, Belgium*
- Wed. 17.00 C **Plasma promoted K-catalysts for higher alcohol synthesis**
Evgeny Rebrov · *University of Warwick, United Kingdom*
- Wed. 17.20 C **Supported gold catalyst: design, synthesis and catalytic applications**
Nidhi Kapil · *University College London, United Kingdom*
- Wed. 17.40 C **Sm-doped barium cerate as support for cobalt catalyst for ammonia synthesis**
Hubert Ronduda · *Warsaw University of Technology, Poland*

Session 06 · Model-based catalyst development and synthesis

Day · Time · Room Presentation title & presenting author

- Thu. 11.40 C **Bimetallic catalysts for the hydrogenation of amides: from experimental to data-driven insights**
Jorge A. Delgado · *Syensqo, China*
- Thu. 12.00 C **Application of neural networks to multi-scale modelling of nanocatalysts**
Tomasz Kotkowski · *Warsaw University of Technology, Poland*
- Thu. 12.20 C **Ab initio molecular dynamics study to elucidate the role of Mo doping in molten KCl for methane activation**
Aditya Goyal · *Indian Institute of Technology Kanpur, India*

Session 07 · Reactors with multifunctional reaction media

Day · Time · Room Presentation title & presenting author

- Wed. 14.10 A **Continuous biocatalytic production of furfurylamine within a falling film microflow device enabling in situ product separation**
Igor Plazl · *University of Ljubljana, Slovenia*
- Wed. 14.30 A **Investigation of the multiphase flow using a transparent direct formic acid fuel cell**
Monika Jałowicka · *Warsaw University of Technology, Poland*
- Wed. 14.50 A **Development of a new CO₂ electrolyzer boosted by the NETmix technology: Challenges and perspectives overview**
Maria Helena de Sá · *Network for a Sustainable CO₂ Economy, Portugal*
- Wed. 16.40 A **Intensification of hydrogen flux in a Pd membrane separator and membrane reactor under an electric field**
Rimon Dawidowicz · *Technion – Israel Institute of Technology, Israel*
- Wed. 17.00 A **Electrified sorption enhanced steam reforming: a novel approach to low-carbon hydrogen production with CO₂ capture**
Federico Nicolini · *Politecnico di Milano, Italy*
- Wed. 17.20 A **LTA-membrane reactors for CO₂ utilization**
Michael Patrascu · *Technion – Israel Institute of Technology, Israel*
- Wed. 17.40 A **Parametric study of intensified DME synthesis from CO₂**
Mert Ozden · *Bogazici University, Turkey*
- Thu. 11.40 A **Boosted ammonia decomposition over ruthenium catalysts: a comparative study in a traditional fixed bed, membrane-assisted, and in a catalytic membrane reactor**
Salvatore Abate · *University of Messina, Italy*
- Thu. 12.00 A **Investigation of the limits of unconventional NH₃ synthesis**
Irem Taşpınar · *Bogazici University, Turkey*
- Thu. 12.20 A **Synthesis and simulation of an intensified NH₃ synthesis process**
Gozde Kara · *Bogazici University, Turkey*

Session 08 · Reactors with unconventional catalyst activation

Day · Time · Room Presentation title & presenting author

- Wed. 11.40 B Efficiency of micro discharge on plasma catalytic nitrogen fixation**
Pradeep Lamichhane · *University of Warwick, United Kingdom*
- Wed. 12.00 B Low energy cost ethylene from methane coupling in 3D printed catalytic plasma reactor**
Fabio Cameli · *Ghent University, Belgium*
- Wed. 12.20 B Hydrogen obtaining by ammonia decomposition in gliding discharge plasma-catalytic processes**
Michał Młotek · *Warsaw University of Technology, Poland*
- Thu. 10.00 B Demonstration of an electrothermal fluidised bed reactor for acid gas conversion**
Izabel Medeiros Costa · *TotalEnergies, France*
- Thu. 10.20 B Multi-scale modeling of microwave reactors for scale-up analysis**
Maxwell P. Bobbin · *University of Delaware, United States*
- Thu. 10.40 B Enhancement of the rate of electrocatalytic formic acid oxidation by forced periodic modulation**
Sidhanth Chandra Kanth · *Eindhoven University of Technology, the Netherlands*
- Thu. 11.40 B Dynamic electrification toward sustainable and enhanced catalysis**
Rucha Railkar · *University of Delaware, United States*
- Thu. 12.00 B Computational insights into steady-state and dynamic joule-heated reactors**
Arnav Mittal · *University of Delaware, United States*
- Thu. 12.20 B Selective and adaptive hydrogenation of amides using a magnetically-responsive Pt/Al₂O₃ catalyst heated by magnetic induction**
Sheng-Hsiang Lin · *Max Planck Institute for Chemical Energy Conversion, Germany*

Session 08 · Reactors with unconventional catalyst activation

Day · Time · Room Presentation title & presenting author

- Thu. 16.30 B Ir/BaTiO₃ catalytic coatings for plasma assisted CO₂ hydrogenation to CH₄**
Yuyan Gong · *University of Warwick, United Kingdom*
- Thu. 16.50 B Bulk oxidative plasma functionalization of plastic waste**
Darien Nguyen · *University of Delaware, United States*
- Thu. 17.10 B Scaling up microwave excited plasmas – an alternative technology for industrial processing**
Marilena Radoiu · *Microwave Technologies Consulting, France*
- Thu. 17.30 B Model-assisted scaleup of microwave heated monolith reactors for steam methane reforming**
Arun Senthil Sundaramoorthy · *University of Delaware, United States*
- Fri. 10.30 B Ultrasound as a tool in the improvement of enzymatic catalysis: Epoxidation of vegetable oils to valuable products**
Tapio Salmi · *Åbo Akademi University, Finland*
- Fri. 10.50 B Temperature modulation for enhanced catalytic NH₃ decomposition**
Nefeli Kamarinopoulou · *University of Delaware, United States*
- Fri. 11.10 B Light-driven Pickering interfacial catalysis for the oxidation of alkenes at near-room temperature**
Jean Francois Dechezelles · *Université de Lille, France*

Session 09 · Reactors with novel catalyst supports

Day · Time · Room Presentation title & presenting author

- Wed. 16.40 B A combined experimental and modeling study of a 3D printed gyroidal copper structure for post-plasma chemical process intensification**
Victor Rosa · *Gent University, Belgium*
- Wed. 17.00 B Intelligent catalyst carrier concept with reversible wall contact in tubular reactors for an improved wall heat transfer**
Dominik Rudolf · *TU Dortmund University, Germany*
- Wed. 17.10 B Nickel-based monolithic catalysts with segmented construction for CO₂ methanation**
Karolina Gałęziowska · *Cracow University of Technology, Poland*
- Thu. 16.30 A Benefits of 3D-printed catalysts: the case of CO₂ methanation**
Bart Michielsen · *Flemish Institute of Technology VITO, Belgium*
- Thu. 16.50 A Biphasic furfural synthesis from biorefinery feed using coated 3D foam structures**
Adarsh Patil · *Technische Universiteit Eindhoven, the Netherlands*
- Thu. 17.20 A Catalytic hollow fibre-based reactors: design principles**
Claire Leishman · *University of Edinburgh, United Kingdom*

Session 10 · TITAN and sister projects

Day · Time · Room Presentation title & presenting author

- Wed. 11.40 C Towards hydrogen production by methane reforming in a microwave-assisted fluidized bed reactor. Hydrodynamics of the Fe/C catalyst fluidized bed**
Robert Cherbański · Warsaw University of Technology, Poland
- Wed. 12.00 C Effect of catalyst shaping in microwave-assisted dry reforming of methane**
Nolven Guilhaume · CNRS and University Claude Bernard Lyon, France
- Wed. 12.20 C Hydrogen and CNTs production by catalytic methane decomposition under microwave heating**
David Martín · Universidad de Zaragoza, Spain
- Wed. 14.10 C Towards hydrogen production by methane reforming in a microwave-assisted fluidized bed reactor. Regeneration of Fe/C catalyst**
Stanisław Murgrabia · Warsaw University of Technology, Poland
- Wed. 14.30 C Ecotoxicological effects of nanocarbon materials from direct biogas conversion into H₂ on soil organisms**
Kateryna Kostiuk · University of Hohenheim, Germany
- Wed. 14.50 C Enhancing soil water retention and remediation capabilities through nanocarbonaceous soil amendments: Insights from controlled lab studies**
Hermin Saki · University of Hohenheim, Germany

Poster presentations

Thursday, September 19th, 15.10–16.30



Poster session A Hall on the 1st floor, in front of Room A

Stand Presentation title & presenting author

- A01 Alkaline poly(ionic liquid)s for effective conversion of EC to DMC**
Ting Qiu · Fuzhou University, China
- A02 Methane removal from ventilation air on a copper oxide catalyst**
Mateusz Korpyś · Polish Academy of Sciences, Poland
- A03 Electrochemical studies of CO₂ reduction towards a new electrolyzer design (eNETmix) for e-methanol synthesis**
Maria Helena de Sá · Network for a Sustainable CO₂ Economy, Portugal
- A04 Plasma-enhanced chemical vapor deposition of Co₃O₄ thin films: boosting electrocatalytic oxygen evolution activity**
Dominik Knozowski · Lodz University of Technology, Poland
- A05 Direct biogas reforming to turquoise H₂ and carbon material by microwave heated catalytic fluidized bed reactor**
Valentin L'hospital · IRCELYON, France
- A06 Novel air purification reactor for indoor VOC abatement through active carbon filtration and photocatalytic regeneration**
Kobe Schoofs · UAntwerpen, Belgium
- A07 CFD modelling of direct biogas conversion for turquoise H₂ and carbon production with a microwave-heated catalytic fluidized bed reactor**
Leandro Araujo · Université de Lyon, France
- A08 Pd decorated TiO₂ nanomembranes for solar-driven non-oxidative coupling of methane in flow conditions**
Chiara Genovese · University of Messina, Italy
- A09 Coaxial microwave plasma reactor for continuous production of H₂O₂ using water and argon**
Mery Hernandez · Karlsruhe Institute of Technology, Germany

Stand Presentation title & presenting author

- A10 Ammonia for hydrogen storage – NH₃ synthesis on a cobalt catalyst supported on yttrium-modified perovskite support**
Magdalena Zybert · *Warsaw University of Technology, Poland*
- A11 The impact of the type of active metal on the properties and activity of catalysts for ammonia synthesis deposited on neodymium oxide**
Małgorzata Lemańska · *Warsaw University of Technology, Poland*
- A12 Cobalt-based catalysts for plasma-catalytic ammonia decomposition**
Weronika Góral · *Warsaw University of Technology, Poland*
- A13 Development of new NiCu-based electrocatalysts for ammonia oxidation reaction in low-temperature DAFCs**
Jakub Zabrzycki · *Warsaw University of Technology, Poland*
- A14 Zirconia functionalized monolithic cores with improved hierarchical porosity for continuous-flow microreactors for cascade reactions**
Agnieszka Ciemięga · *Polish Academy of Sciences, Poland*
- A15 Continuous photocatalytic gas-phase CO₂ hydrogenation over metal-deposited MoO_xS_y/TiO₂ heterojunctions**
Francisco Balas · *University of Zaragoza, Spain*

Stand no. Presentation title & presenting author

- B01** **Barium-promoted cobalt supported on lanthanide oxides as ammonia synthesis catalysts – exploring the promoter influence on the catalytic activity**
Wojciech Patkowski · *Warsaw University of Technology, Poland*
- B02** **Fe-Co dual site SAC over N-doped carbons for electrocatalytic oxygen reduction reaction**
Francisco Balas · *Instituto Nanociencia y Materiales de Aragón, Spain*
- B03** **Continuous catalytic process for reduction of nitroarenes**
Sebastian Kinas · *Wroclaw University of Science and Technology, Poland*
- B04** **Intensification of processes in PEM electrolyzers**
Maria Jarzabek-Karnas · *Warsaw University of Technology, Poland*
- B05** **Itaconic esters obtained by enzymatic esterification as monomers for non-polar polymers**
Ewa Mierzwa · *Cracow University of Technology, Poland*
- B06** **Purification and immobilization of His6-tagged amine transaminase in a microreactor with functionalized nonwoven nanofiber membranes**
Polona Žnidaršič-Plazl · *University of Ljubljana, Slovenia*
- B07** **Enhanced photocatalytic efficiency and stability of g-C₃N₄ via novel synthesis method for superior benzyl alcohol oxidation**
Nilesh R Manwar · *Polish Academy of Sciences, Poland*
- B08** **Continuous recycled packed bed reactor technology: effect of liquid flowrate on sugar oxidation**
Mouad Hachhach · *Abo Akademi University, Finland*
- B09** **Bioconversion of industrial glycerol on liquid medium with culture of Lactibacillus brevis WLP 672 – lactic acid production**
Edyta Strzelec · *AGH University of Krakow, Poland*
- B10** **Numerical investigation with boundary conditions from experimental data for Low Parafin Wax reactors in the ground mass by computational fluid dynamics with trend for a biocatalytic application**
Stela Panyovska · *Bulgarian Academy of Sciences, Bulgaria*



Stand no. Presentation title & presenting author

- B11** **Development and modification of catalyst materials enabling induction heating**
Asad Asadli · Karlsruhe Institute of Technology, Germany
- B12** **Ultra-high vacuum diffusion to study effects of roughness on Knudsen diffusion in nanoporous catalysts**
Maria Mourkou · University College London, United Kingdom
- B13** **Indoor air purification by VOC abatement using photocatalytic reactor**
Mohammad Rusydi Fatahillah · Ghent University, Belgium
- B14** **Design and efficiency of a photocatalytic reactor for indoor VOC degradation**
Hadis Mortazavi Milani · Ghent University, Belgium
- B15** **Acid-modified ZSM-5 catalyst for the selective conversion of methanol to ethylene or propane**
Mohammed Babkoo · University College London, United Kingdom



**hubergroup – a driver for
sustainable printing inks**

**The solid base for
a circular economy**

www.hubergroup.com

hubergroup Polska Spółka z o.o.
Nowa Wieś Wrocławska, ul. Nowa 27
55-080 Kąty Wrocławskie
+48 71 3548110
wroclaw@hubergroup.com

More than just ink...

hubergroup 
print solutions

Honeywell

THE NEXT GENERATION OF ENERGY INNOVATION STARTS HERE.

All human progress starts with someone asking,
"There has to be a better way."

Today, that questions is being asked around the world
as we confront the challenges of climate change
and move toward the energy transition.

At Honeywell UOP, we are the makers of that
better way. We are the people who invent, engineer,
and design the solutions to develop the energy landscape
the world needs.

Harnessing over 100 years of experience to create
groundbreaking technologies time and time again –
including catalytic reforming for high octane gasoline,
catalytic converters to clean automobile exhaust,
hydroprocessing for renewable diesel, and gas purification
to make cleaner burning natural gas.

Making us uniquely equipped to help shape the future
of a carbon-neutral world.

Today, we are empowering industry to deliver the energy
of tomorrow in a sustainable, profitable way, working with
each customer on their path to provide the right solutions
for where they are right now.

We're helping industries across the world decarbonize
their invaluable infrastructure to make it less
environmentally intensive and more economically attractive.

We're finding new ways to make essential polymers
and materials, so the world can keep building the things
it needs, more sustainably and efficiently.

We're helping our customers enhance the quality of life
around the world by creating carbon capture solutions
that power the removal of tens of millions of tons of
carbon from the air every year.

We are the only company with the technology to turn
each of a wide range of waste fats and oils, ethanol,
methanol, and biomass into renewable fuels, with our
next generation catalysts driving efficiency.

We are powering real time insights with our digital
performance services that help unlock greater
efficiencies, to benefit our customers' bottom line.

We're keeping people connected and flying with
sustainable aviation fuels that reduce greenhouse gas
emissions of aircrafts by 88%. We can even make jet
fuel out of carbon dioxide with our methanol to
jet technology.

It will take all of us together, at Honeywell UOP and
our customers, to achieve the energy transition the
world needs to power future generations of prosperity.

**PIONEERING FUTURE ENERGY.
POWERING CUSTOMER EVOLUTION.**

uop.honeywell.com

U



P

Honeywell
UOP



© 2024 Faculty of Chemical and Process Engineering,
Warsaw University of Technology



Warm thanks to UCRA3 Partners

Gold Partner



Silver Partners

Honeywell
UOP

hubergroup 
print solutions

Sponsors of the Poster Session

