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**7th International Conference on Polymer Electrolyte Membrane Fuel Cells & Electrolysis. Materials, Systems & Applications**

**1-5 October 2023**

**Lefkada, Greece**

**http://carisma2023.iceht.forth.gr/**

**Letter of the chair of the Organizing Committee**

Ιt is a great honor and pleasure to cordially invite you at the “7th International Conference on Proton Exchange Membrane Fuel Cells & Electrolysis: Materials, Systems & Applications” that will be held in the island of Lefkada in the Ionian Sea, Greece during October 1st – 5th, 2023.

This series of conferences was initiated as CARISMA in 2008 by the CARISMA European Coordination Action on Intermediate and High Temperature Membrane Electrode Assemblies. The first event took place in France and the conference series was held bi-annually around the world. After a successful meeting in 2019 in Germany, COVID restricted the smooth continuation of the conferences, and CARISMA 2023, the 7th event in series, aspires to continue this tradition.

CARISMA conferences are dedicated to all aspects related to Polymer Electrolyte Membrane Hydrogen Technologies with an emphasis on increasing the operating temperature. However, CARISMA2023 conference will cover fundamental aspects, applied research and industrial applications over a broad temperature range. Moreover, this is the first time that both fuel cell and electrolysis mode will be considered. The conference covers the challenges in the development of materials, electrode-electrolyte assemblies and cell/stack systems, operation and process optimization, component and/or device degradation. Finally, the purpose is to review important issues and market perspectives of PEM technologies.

Looking forward to seeing you ALL in Lefkada!

Bewelcome – Καλώςναορίσετε

MaRia Daletou on behalf of the Local Organizing Committee

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| **International Scientific Committee**  Deborah Jones – Université Montpellier (FR) Brian Benicewicz – University of South Carolina (US) Andreas Friedrich – DLR Stuttgart (DE) Hans Aage Hjuler – Blue World Technologies (DK) Steven Holdcroft – Simon Fraser University (CA) Jens Oluf Jensen – Technical University of Denmark (DK) Klaus–Dieter Kreuer – Max–Planck–Inst. Solid St. Res. (DE) Justo Lobato – University Of Castilla–la Mancha (ES) Pei Kang Shen – Guangxi University (CN) Siva Kumar Pasupathi – University of Western Cape (ZA) Bryan Pivovar – National Renewable Energies Lab. (US) Bruno G. Pollet – L’Université du Québec à Trois–Rivières (CA) Gregory Jerkiewicz – Queen’s University, Canada (CA) Ulrich Stimming – University of Newcastle upon Tyne (UK) Joannis Kallitsis – University of Patras (GR) Kenji Miyatake – University of Yamanashi (JP) George Bandlamudi – ZBT GmbH (DE) Peter Wagner – DLR Oldenburg (DE) Ben Gould – U.S. N.R.L. (USA) Yu Seung Kim – LANL (USA) Mads Friis Jensen – Blue World Technologies (DK) | **Conference Chair**  Maria Daletou – ICEHT/FORTH  **Local Organizing Committee**  Stylianos Neophytides – ICEHT/FORTH  Joannis Kallitsis – Univ. of Patras  Aikaterini Andreopoulou – Univ. of Patras  Alexandros Katsaounis – Univ. of Patras  Stella Ballomenou – CPERI/CERTH  Angeliki Kosmatou – ICEHT/FORTH |

**Topics**

The conference will be the opportunity for presentation of recent results, discussion and debate on the bottlenecks and solutions, with an international program of invited lectures, oral and poster contributions. The topics to be covered are listed below:

* Polymer electrolyte membranes for PEM and AEM fuel cell & electrolysis
* Non-PGM & low-PGM-loading catalysts
* Electrode and MEA development and characterization
* Ageing, degradation, mitigation
* Novel characterisation and assessment techniques
* Modelling/simulation of components and processes
* Stacks, components and systems
* Industrial aspects and market perspectives

**Plenary speaker**

**Takeo Yamaguchi** (Tokyo Institute of Technology, Japan)

**Keynote speakers**

**Isotta Cerri** (Toyota Motor Europe, Belgium)

**Steven Holdcroft** (Simon Fraser University, Canada)

**Peter Strasser** (Technical University Berlin, Germany)

**Joris Proost** (Université catholique de Louvain, Belgium)

**Dimitrios Papageorgopoulos** (U.S. Department of Energy, USA)

**Emory De Castro** (Advent Technologies, Inc., USA)

**Lars Nilausen Cleemann** (Head of Material, Blue World Technologies, Denmark)

**Brian C. Benicewicz** (University of South Carolina, USA)

**CARISMA 2023: FINAL PROGRAMME**

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| **Sunday, October 1st 2023** | | |
| **17.00-18.00** | **Registration** | |
| 18.00-18.30 | Opening of the conference \_ Maria K. Daletou |  |
| 18.30-19.20 | Systematic material design for anion-exchange membrane  water electrolysis | Takeo Yamaguchi  (Plenary talk )  Tokyo Institute of Technology  Japan |
| **20.00-22.00** | **Welcome Reception** | |

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| **Monday, October 2nd 2023** | | |
| **8.00-9.00** | **Registration** | |
| **Session 1. Chair: Aikaterini K. Andreopoulou, Isotta Cerri** | | |
| 9.15-9.50 | Toyota beyond zero strategy:relentlessly towards H2 mobility | Isotta Cerri  (Keynote talk)  Toyota Motor Europe  Belgium |
| 9.50-10.10 | Large-Area Polymer Electrolyte Membranes for High Temperature PEM Fuel Cells | Aikaterini K. Andreopoulou  University of Patras  Greece |
| 10.10-10.30 | PVDF-based aromatic hydrocarbon-containing proton exchange membranes with high performance in the hydrogen fuel cell | Tamas Nemeth  Paul Scherrer Institute  Switzerland |
| 10.30-10.50 | Improving Fuel Cell Electrode Ionomer Function Through Processing and Chemistry | Ahmet Kusoglu  Lawrence Berkeley National Laboratory  USA |
| **11.00-11.30** | **Coffee Break** | |
| **Session 2. Chair: Stylianos Neophytides** | | |
| 11.30-12.05 | Electrocatalyst Layers containing Fluorine-Free Hydrocarbon Ionomers | Steven Holdcroft  Simon Fraser University  Canada |
| 12.05-12.25 | High capacity printing as an efficient tool for PEM fuel cell electrode production – Impact on the catalytic layer transport properties | Karel Bouzek  University of Chemistry and Technology  Czech Republic |
| 12.25-12.45 | Development of non-PGM ORR electrocatalysts | Georgios Charalampopoulos  ICEHT-FORTH  Greece |
| 12.45-13.05 | The origin of ORR overpotential in HTPEMFCs | Panagiotis I. Giotakos  ICEHT-FORTH  Greece |
| **13.15-15.30** | **Lunch Time** | |
| **Session 3. Chair: Karel Bouzek, Peter Strasser** | | |
| 15.30-16.05 | Materials Science and Electrocatalysis of Hydrogen Production and Use in Polymer Electrolyte Membrane-based Devices | Peter Strasser  (Keynote talk)  Technical University Berlin  Germany |
| 16.05-16.25 | Evaluation of iridium and iridium oxide-based supported catalyst syntheses for oxygen evolution in PEM water electrolysis | Marius Gollasch  German Aerospace Center (DLR)  Germany |
| 16.25-16.45 | Spark ablation for the fabrication of PEM water electrolysis catalysts | Michail N. Tsampas  Dutch Institute for Fundamental Energy Research  Netherlands |
| 16.45-17.05 | Development of supported Iridium‐based OER electrocatalysts on titanium substrates for polymer electrolyte membrane water electrolysis (PEMWE) systems | Nikoleta Strataki  Centre for Research and Technology-Hellas (CERTH/CPERI)  Greece |
| **17.05-17.30** | **Coffee Break** | |
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| **Session 4. Chair: Michail N. Tsampas, Maria K. Daletou** | | |
| 17.30-17.50 | Electrochemically synthetized phosphide-based catalysts for hydrogen evolution reaction in alkaline environment | Jaromír Hnát  University of Chemistry and Technology Prague  Czech Republic |
| 17.50-18.10 | Stability of microporous layer on the anode of PEM water electrolyser | Martin Prokop  University of Chemistry and Technology Prague  Czech Republic |
| 18.10-18.30 | Study of PEMs based on chloro-alkali electrolyzer for EDEN® technology | Mahmoud M. Gomaa  University of Castilla - La Mancha  Spain |
| 18.30-18.50 | Corrosion study of Mo/SS bipolar plates for PEM electrolyzers | Eirini Zagoraiou  MONOLITHOS Catalysts & Recycling Ltd.  Greece |

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| **Tuesday, October 3rd 2023** | | |
| **Session 5. Chair: Stylianos Neophytides** | | |
| 9.00-9.35 | Green or Blue Hydrogen: (much) more than a matter of colors ! | Joris Proost  (Keynote talk)  Université catholique de Louvain  Belgium |
| 9.35-9.55 | Fueling the Future of Aviation: Multiphysics Modeling for Evaluating the Efficiency of Next-Generation PEM Fuel Cells | Maria Chiara Massaro  Politecnico di Torino  Italy |
| 9.55-10.15 | LT-PEMFC remaining useful life prediction for predictive maintenance | Gaultier Gibey  Université de Franche-Comté  France |
| 10.15-10.35 | Multiscale, Multiphysics Modeling of Fuel-Cell Catalyst-Layer Phenomena | Adam Z. Weber  Lawrence Berkeley National Laboratory  USA |
| **11.00-17.00** | **Excursion to Ionian Islands** | |
| **18.30-19.30** | **Poster Session** | |

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| **Wednesday, October 4th 2023** | | |
| **Session 6. Chair: Joris Proost, Lars Nilausen Cleemann** | | |
| 9.00-9.35 | Fuel Cell Technologies: A U.S. Department of Energy Perspective | Dimitrios Papageorgopoulos  (Keynote talk)  U.S. Department of Energy  USA |
| 9.35-9.55 | HT PEM’s Role and Challenges in Application for Zero-Emission Aviation | Victor Belousov  ZeroAvia  England |
| 9.55-10.15 | Regenerative fuel cell | Stylianos Neophytides  ICEHT-FORTH  Greece |
| 10.15-10.35 | Polyelectrolytes based on poly(pentafluorostyrene) | Vladimir Atanasov  University of Stuttgart  Germany |
| 10.35-10.55 | Efficient high temperature PEMFC metallic stack with innovative two-phase liquid cooling | Charalampos Neofytidis  ICEHT-FORTH  Greece |
| **10.55-11.30** | **Coffee Break** | |
| **Session 7. Chair: George Bandlamudi, Maria K. Daletou** | | |
| 11.30-12.05 | When rejection is good: HT PEM and heat rejection for mobility applications | Emory De Castro  (Keynote talk)  Advent Technologies, Inc.  USA |
| 12.05-12.25 | Providing Efficient Energy with the SereneU High Temperature PEM Fuel Cell Unit | Søren Juhl Andreasen  Advent Technologies A/S,  Denmark |
| 12.25-12.45 | Development of functional ion-exchange polymeric materials to prevent phosphoric acid poisoning of high-temperature polymer electrolyte membrane fuel cells(HT-PEMFCs) | Won Jae Choi  Hyundai Motor Group Republic of Korea |
| 12.45-13.05 | Water transport in PEMFCs at intermediate temperatures | Björn Eriksson  KTH Royal Institute of Technology  Sweden |
| **13.05-15.00** | **Lunch Time** | |
| **Session 8. Chair: Steven Holdcroft, Brian Benicewicz** | | |
| 15.00-15.35 | PBI based high-temperature PEM Fuel Cells –  Performance and lifetime | Lars Nilausen Cleemann  (Keynote talk)  Blue World Technologies  Denmark |
| 15.35-16.10 | Polybenzimidazoles – New materials and applications | Brian C. Benicewicz  (Keynote talk)  University of South Carolina  USA |
| 16.10-16.30 | HT-PEM fuel cell systems: current applications and perspectives | Volker Harbusch  SIQENS GmbH  Germany |
| **16.30-17.00** | **Coffee Break** | |
| **Session 9. Chair: Georgios Neofytidis** | | |
| 17.00-17.20 | Advanced high-temperature ionomers for fuel cells and hydrogen pumps | Christopher G. Arges  The Pennsylvania State University  USA |
| 17.20-17.40 | Electrochemical Investigation of Different Gas Diffusion Layers and Electrodes for HT-PEM Fuel Cells | Dana Schonvogel  German Aerospace Center (DLR)  Germany |
| 17.40-18.00 | Development of CCM Manufacturing Process for Improvement of High Temperature PEMFC Performance | Sung-Hee Shin  Hyundai Motor Group Republic of Korea |
| **20.00** | **Gala Dinner** | |

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| **Thursday, October 5th 2023** | | |
| **Session 10. Chair: Joannis K. Kallitsis** | | |
| 9.30-9.50 | **CDP based solid acid high temperature electrochemical cell** | George Bandlamudi  The hydrogen and fuel cell center ZBT GmbH  Germany |
| 9.50-10.10 | Sulfonated poly(phenylene sulfones) for PEM-fuel cells and electrolyzers: reducing water-swelling and gas-crossover by controlling their sulfonation sequence | Giorgi Titvinidze  Agricultural University of Georgia  Georgia |
| 10.10-10.30 | Gas diffusion layer influences on water diffusion, drag and absorption in an anion-exchange membrane fuel cell | Nikola Nikolić  KTH Royal Institute of Technology  Sweden |
| 10.30 - 10.50 | Anion exchange membranes based on chemical modification of PET | Varun Donnakatte Neelalochana  University of Trento  Italy |
| **11.00 – 11.30** | **Coffee Break** | |
| 11.30 - 11.50 | The production development process of an industrial alkaline electrolyzer system | Georgios Neofytidis  Hitachi Zosen Inova  Switzerland |
| 11.50 - 12.10 | Novel Ion-Solvating and AEM Chemistries membranes for alkaline water electrolysis | Valadoula Deimede  University of Patras  Greece |
| **12.10-12.40** | **Closing Remarks** | |
| **12.45** | **Lunch Time** | |

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| **Poster Session, Tuesday, October 3rd 2023, 18:00-19:00** | | | | |
| **P1** | | Development of Air Filtration for a Portable Fuel Cell DC Source | | Daniel Budáč,  Univ. of Chemistry and Technology  Czech Republic |
| **P2** | | Polymer Electrolytes as Alkaline ConductingMembranes | | Konstantinos C. Andrikopoulos  Universityof Patras  Greece |
| **P3** | | Water electrolysis system requirements for maximal production of hydrogen from unstable power source | | Martin Paidar  Univ. of Chemistry and Technology  Czech Republic |
| **P4** | | Cationic Covalent Organic Frameworks as Anion Exchange Membranes for Electrochemical Energy Applications | | Patrick Fortin  SINTEF  Norway |
| **P5** | | FeNC catalysts–the role of side phases on the ORR performance | | Vladislav Gridin  TechnicalUniversityofDarmstadt  Germany |
| **P6** | | Accelerate Stress Testing for carbon supports using different ionomers in half-cell gas diffusion electrode setup | | Giovanni Marco Carrabba  Politecnico di Torino  Italy |
| **P7** | | Alkaline Stability of Anion Exchange Membranes based on Modified PET | | Eleonora Tomasino  University of Trento  Italy |
| **P8** | | Development of highly alkaline stable poly(oxindolebiphenyl) based anion exchange membranes with flexible cycloaliphatic quaternary ammonium cations for Alkaline Water Electrolysis | | Sara Gjoshi  UniversityofPatras  Greece |
| **P9** | | Anion Exchange Membrane Water Electrolysis using nanofibre reinforced membrane | | Rossana Gentile  University of Montpellier  France |
| **P10** | | Iridium based electrocatalysts for PEM electrolysis | | Georgia Moysiadou  ICEHT-FORTH  Greece |
| **P11** | | Development of non-Noble-Metal Electrocatalysts for the Oxygen Reduction Reaction | | Ilias Maniatis  ICEHT-FORTH  Greece |
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