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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/FORTHJoannis Kallitsis – Univ. of PatrasAikaterini Andreopoulou – Univ. of PatrasAlexandros Katsaounis – Univ. of PatrasStella Ballomenou – CPERI/CERTHAngeliki 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 membranewater electrolysis | Takeo Yamaguchi(Plenary talk )Tokyo Institute of TechnologyJapan |
| **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 EuropeBelgium |
| 9.50-10.10 | Large-Area Polymer Electrolyte Membranes for High Temperature PEM Fuel Cells | Aikaterini K. AndreopoulouUniversity of PatrasGreece |
| 10.10-10.30 | PVDF-based aromatic hydrocarbon-containing proton exchange membranes with high performance in the hydrogen fuel cell | Tamas NemethPaul Scherrer InstituteSwitzerland |
| 10.30-10.50 | Improving Fuel Cell Electrode Ionomer Function Through Processing and Chemistry | Ahmet KusogluLawrence Berkeley National LaboratoryUSA |
| **11.00-11.30** | **Coffee Break** |
| **Session 2. Chair: Stylianos Neophytides** |
| 11.30-12.05 | Electrocatalyst Layers containing Fluorine-Free Hydrocarbon Ionomers | Steven HoldcroftSimon Fraser UniversityCanada |
| 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 BouzekUniversity of Chemistry and TechnologyCzech Republic |
| 12.25-12.45 | Development of non-PGM ORR electrocatalysts  | Georgios CharalampopoulosICEHT-FORTHGreece |
| 12.45-13.05 | The origin of ORR overpotential in HTPEMFCs | Panagiotis I. GiotakosICEHT-FORTHGreece |
| **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 BerlinGermany |
| 16.05-16.25 | Evaluation of iridium and iridium oxide-based supported catalyst syntheses for oxygen evolution in PEM water electrolysis  | Marius GollaschGerman Aerospace Center (DLR)Germany |
| 16.25-16.45 | Spark ablation for the fabrication of PEM water electrolysis catalysts  | Michail N. TsampasDutch Institute for Fundamental Energy ResearchNetherlands |
| 16.45-17.05 | Development of supported Iridium‐based OER electrocatalysts on titanium substrates for polymer electrolyte membrane water electrolysis (PEMWE) systems  | Nikoleta StratakiCentre 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 HnátUniversity of Chemistry and Technology PragueCzech Republic |
| 17.50-18.10 | Stability of microporous layer on the anode of PEM water electrolyser | Martin ProkopUniversity of Chemistry and Technology PragueCzech Republic |
| 18.10-18.30 | Study of PEMs based on chloro-alkali electrolyzer for EDEN® technology | Mahmoud M. GomaaUniversity of Castilla - La ManchaSpain |
| 18.30-18.50 | Corrosion study of Mo/SS bipolar plates for PEM electrolyzers | Eirini ZagoraiouMONOLITHOS 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 LouvainBelgium |
| 9.35-9.55 | Fueling the Future of Aviation: Multiphysics Modeling for Evaluating the Efficiency of Next-Generation PEM Fuel Cells | Maria Chiara MassaroPolitecnico di TorinoItaly |
| 9.55-10.15 | LT-PEMFC remaining useful life prediction for predictive maintenance | Gaultier GibeyUniversité de Franche-ComtéFrance |
| 10.15-10.35 | Multiscale, Multiphysics Modeling of Fuel-Cell Catalyst-Layer Phenomena | Adam Z. WeberLawrence Berkeley National LaboratoryUSA |
| **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 EnergyUSA |
| 9.35-9.55 | HT PEM’s Role and Challenges in Application for Zero-Emission Aviation | Victor BelousovZeroAviaEngland |
| 9.55-10.15 | Regenerative fuel cell | Stylianos NeophytidesICEHT-FORTHGreece |
| 10.15-10.35 | Polyelectrolytes based on poly(pentafluorostyrene) | Vladimir AtanasovUniversity of StuttgartGermany |
| 10.35-10.55 | Efficient high temperature PEMFC metallic stack with innovative two-phase liquid cooling | Charalampos NeofytidisICEHT-FORTHGreece |
| **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 AndreasenAdvent 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 ChoiHyundai Motor Group Republic of Korea |
| 12.45-13.05 | Water transport in PEMFCs at intermediate temperatures | Björn ErikssonKTH Royal Institute of TechnologySweden |
| **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 TechnologiesDenmark |
| 15.35-16.10 | Polybenzimidazoles – New materials and applications | Brian C. Benicewicz(Keynote talk)University of South CarolinaUSA |
| 16.10-16.30 | HT-PEM fuel cell systems: current applications and perspectives | Volker HarbuschSIQENS GmbHGermany |
| **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. ArgesThe Pennsylvania State UniversityUSA |
| 17.20-17.40 | Electrochemical Investigation of Different Gas Diffusion Layers and Electrodes for HT-PEM Fuel Cells | Dana SchonvogelGerman Aerospace Center (DLR)Germany |
| 17.40-18.00 | Development of CCM Manufacturing Process for Improvement of High Temperature PEMFC Performance | Sung-Hee ShinHyundai 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 GmbHGermany |
| 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 TitvinidzeAgricultural University of GeorgiaGeorgia |
| 10.10-10.30 | Gas diffusion layer influences on water diffusion, drag and absorption in an anion-exchange membrane fuel cell   | Nikola NikolićKTH Royal Institute of TechnologySweden |
| 10.30 - 10.50 | Anion exchange membranes based on chemical modification of PET | Varun Donnakatte NeelalochanaUniversity of TrentoItaly |
| **11.00 – 11.30** | **Coffee Break** |
| 11.30 - 11.50 | The production development process of an industrial alkaline electrolyzer system | Georgios NeofytidisHitachi Zosen InovaSwitzerland |
| 11.50 - 12.10 | Novel Ion-Solvating and AEM Chemistries membranes for alkaline water electrolysis | Valadoula DeimedeUniversity of PatrasGreece |
| **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 TechnologyCzech Republic |
| **P2** | Polymer Electrolytes as Alkaline ConductingMembranes | Konstantinos C. AndrikopoulosUniversityof PatrasGreece |
| **P3** | Water electrolysis system requirements for maximal production of hydrogen from unstable power source | Martin PaidarUniv. of Chemistry and TechnologyCzech Republic |
| **P4** | Cationic Covalent Organic Frameworks as Anion Exchange Membranes for Electrochemical Energy Applications | Patrick FortinSINTEFNorway |
| **P5** | FeNC catalysts–the role of side phases on the ORR performance  | Vladislav GridinTechnicalUniversityofDarmstadtGermany |
| **P6** | Accelerate Stress Testing for carbon supports using different ionomers in half-cell gas diffusion electrode setup | Giovanni Marco CarrabbaPolitecnico di TorinoItaly |
| **P7** | Alkaline Stability of Anion Exchange Membranes based on Modified PET | Eleonora TomasinoUniversity of TrentoItaly |
| **P8** | Development of highly alkaline stable poly(oxindolebiphenyl) based anion exchange membranes with flexible cycloaliphatic quaternary ammonium cations for Alkaline Water Electrolysis | Sara GjoshiUniversityofPatrasGreece |
| **P9** | Anion Exchange Membrane Water Electrolysis using nanofibre reinforced membrane | Rossana GentileUniversity of MontpellierFrance |
| **P10** | Iridium based electrocatalysts for PEM electrolysis | Georgia MoysiadouICEHT-FORTHGreece |
| **P11** | Development of non-Noble-Metal Electrocatalysts for the Oxygen Reduction Reaction | Ilias ManiatisICEHT-FORTHGreece |
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