

Hydrogen: Fueling the Sustainable Future

2022 WORLD FUEL CELL CONFERENCE

Join Us for ICEPAG 2022, A Virtual / In-Person Colloquium, December 13-15, 2022

December 13-15, University of California, Irvine | Hybrid in-person/virtual format | <https://www.iahe-fcd.org/wfcc2022>

Monday, 12 December 2022

4:00pm - 7:00pm

Meeting and Venue Preparations

Session 1A: Fuel Cell Catalysts 1

Session Chair: Jianbo Zhang

Location: DBH 1200

CA Time (12 Dec)	China Time (13 Dec)	Speaker First Name	Speaker Last Name	Organization	Topic
16:00	8:00	Caihan	Zhu	Beijing University of Chemical Technology	Effect of ink, spinning and environmental parameters on the electrospinning of fuel cell catalyst layer
16:20	8:20	Yi	Zheng	Tianjin University	P- and S- co-doped Fe-N-C Catalysts for Oxygen Reduction Reaction in Anion Exchange Membrane Fuel Cells
16:40	8:40	Weikang	Zhu	Tianjin University	Space confinement to regulate ultrafine CoPt nanoalloy for dynamic operating PEMFC
17:00	9:00	Yiming	Zhang	Tsinghua University	Effect of Pt loading on the performance and durability of electrospun catalyst layer

17:20 9:20 BREAK

Session 2A: Catalysts and Diffusion Layers

Session Chair: Jack Brouwer

Location: DBH 1200

CA Time (12 Dec)	China Time (13 Dec)	Speaker First Name	Speaker Last Name	Organization	Topic
18:00	10:00	Xinning	Zhu	Xiamen University	Research and analysis on mass transfer characteristics of the traveling-wave flow field
18:20	10:20	Han	Dingbo	Beijing Univ. of Chemical Technology	Construction of proton transport channels in composite membrane with highly sulfonated SPEEK nanofibers
18:40	10:40	Wang	Qing	Shanghai Jiao Tong University	Study on the different pretreatment of gas diffusion layer in PEM water electrolysis

19:00 ADJOURN

Session 1B: System and Component Performance

Session Chair: Jack Brouwer

Location: DBH 1300

CA Time (12 Dec)	China Time (13 Dec)	Speaker First Name	Speaker Last Name	Organization	Topic
16:00	8:00	Wenbo	Shi	Tsinghua Univ.	Ultralow-degradation-alternate hydrogen pump method for PEMFC cold start
16:20	8:20	Sibo	Wang	Shanghai Jiao Tong University	Critical comparison between high-temperature and low-temperature PEM fuel cell
16:40	8:40	Caizhi	Zhang	Chongqing University	Analysis of the tendency and key technology in fuel cell system for vehicle application
17:00	9:00	Tongsh	Chasen	Tianjin University	Experimental study of graphene-coated nickel foam as flow field in high volumetric power density fuel cells

17:20 9:20 BREAK

Session 2B: Computation in Fuel Cells 1

Session Chair: Yun Wang

Location: DBH 1300

CA Time (12 Dec)	China Time (13 Dec)	Speaker First Name	Speaker Last Name	Organization	Topic
18:00	10:00	Chenkun	Li	Tsinghua University	Impedance modeling on fingerprints of couplings between interfacial electron transfer reaction and electrolyte-phase ion transport
18:20	10:20	Guobin	Zhang	Xi'an Jiaotong University	Full-scale three-dimensional simulation of proton exchange membrane fuel cell stack
18:40	10:40	Ning	Wang	Xi'an Jiaotong University	Three-dimensional full-morphology simulation of commercial-size proton exchange membrane fuel cells

19:00 ADJOURN

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7:00 -8:00 **Breakfast and Registration**

WFCC Opening Plenary Session **Session Chair: Jack Brouwer, UCI**

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
8:00	Plamen	Atanassov	University of California, Irvine	KEYNOTE:
8:30	Natalia	Macauley	Giner	KEYNOTE: Fabrication and Scale-up of Highly Durable Heavy Duty Fuel Cell MEAs
9:00	Gaohua	Zhu	Toyota Research Institute of North America	KEYNOTE: High-Temperature Polymer Electrolyte Membrane Fuel Cells for Heavy-duty Vehicle Applications: Recent Development and Catalyst Challenges
9:30	Angelina	Galiteva	California Independent System Operator	KEYNOTE: Hydrogen is what is needed next to meet our CA Zero Emissions Policy Goals

10:00am BREAK

Session 3A: Computation in Fuel Cells 2

Session Chair: Yun Wang, UCI

Location: DBH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Adithya	Legala	University of Waterloo	Data-Based Model To Predict Proton Exchange Membrane Fuel Cell (PEMFC) Thermal, Pressure And Performance Degradation Dynamics
10:50	Joy Marie	Mora	University of California Merced	Analytical-Based Simulation Approach for an Anion Exchange Membrane Fuel Cell
11:10	Aslan	Kosakian	University of Alberta	An Open-Source Transient Model for the Analysis of Liquid-Water Accumulation in Proton-Exchange-Membrane Fuel Cells

Session 3B: Electrolysis 1

Session Chair: Iryna Zenyuk, UCI

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Feng Yuan	Zhang	University of Tennessee, Knoxville	KEYNOTE: Green Hydrogen Production from PEMECs: Challenges and Potential Solutions.
11:00	Ben	Meekins	University of South Carolina	para-Polybenzimidazole (PBI) Membranes for Anhydrous and Aqueous Electrolysis of Hydrogen Chloride (HCl)
11:20	Weitian	Wang	University of Tennessee, Knoxville	Visualizing and enhancing multi-phase mass transport in PEM electrolyzer cells for highly-efficient green hydrogen energy

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11:30	Yanzhou	Qin	Tianjin University	Simulation analysis of the effect of liquid water on the relative effective gas diffusivity of GDL
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Noon LUNCH BREAK

11:40	Stoyan	Bliznakov	University of Connecticut	Effective and Durable Recombination Layers for Hydrogen Crossover Mitigation in Proton Exchange Membrane Water Electrolyzers
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Noon LUNCH BREAK

Session 4A: Electrolysis 2 & Computation

Session Chair: Luca Mastropasqua, UW-Madison

Session Chair: Yu Morimoto, UCI

Location: DBH 1200

Location: DBH 1300

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Kui	Jiao	Tianjin University	KEYNOTE: Cold start mode classification based on the water state for proton exchange membrane fuel cells
13:30	Mohammed Hicham	Nejma	Mohammed V University in Rabat, Morocco	Numerical investigation on a 3D Honeycomb Arranged (HCA) PEMFC
13:50	Zabihollah	Najafianashrafi	University of California, Merced	Development a 1-D Analytical Model to Predict Solid Oxide Electrolysis Cell Performance Under Non-Isothermal Operating Conditions
14:10	Jun Yong	Kim	University of California, Irvine	Experimental validation of H ₂ O electrolysis and H ₂ O/CO ₂ co-electrolysis in solid oxide cells
14:30	Massimo	Santarelli	Politecnico di Torino	CO ₂ recovery and H ₂ generation by perovskite solar-assisted looping

15:00 BREAK

Session 5A: High Temp. SOFC/SOEC

Session Chair: Jakub Kupecki, IEN, Poland

Location: DBH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
15:30	Hye Rim	Kim	Inha University	Proposal and Investigation of Hydrogen Fed SOFC With Water Cooling for Performance Improvement

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Shuhui	Sun	INRS, Canada	KEYNOTE: Strategies to Improve the Stability of Fe/N/C Catalysts in PEM Fuel Cells
13:30	Zhiqiao	Zeng	Center for Clean Energy Engineering, University of Connecticut	Advanced Nickel-based Catalysts for the Hydrogen Oxidation Reaction in Alkaline Media Synthesized by Reactive Spray Deposition Technology: Study of the Effect of Particle Size
13:50	Katherine	Rinaldi	H2U Technologies	High-Throughput Catalyst Discovery for PEM Electrolyzers
14:10	Nitul	Kakati	University of California Merced	Nanostructured Reduced Nickel Cobalt Tungstate on Ni Foam as an Efficient Bifunctional Electrocatalyst for Urea Assisted Water Electrolysis
14:20	Chris	Weiland	Precision Resource Technical Center	KEYNOTE: Scale-up to Commercialization of Metallic Bipolar Plates: Challenges & Opportunities

15:00 BREAK

ARCHES Working Group Session

Location: EH 1200

Noon - 4:00pm
Joint in-person meeting

ARCHES Power Generation Working Group

Production, Distribution, and Storage Working Group



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15:50	Dohyung	Jang	Seoul National University	Dynamic modeling and simulation of alkaline water electrolysis for green hydrogen production
16:10	Yevgeniy	Naumovich	Institute of Power Engineering	Methanation of CO ₂ -H ₂ O-H ₂ mixtures by co-electrolysis in solid oxide cell
16:30	Roberto	Scaccabarozzi	LEAP - Laboratorio Energia & Ambiente Piacenza	SOEC integration in DRI production plant for decarbonized steel production



17:00 Banquet

19:30 Adjourn

17:00 Banquet

19:30 Adjourn

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Wednesday, 14 December 2022

7:00 -8:00 *Breakfast and Registration*

ICEPAG Plenary Session **Session Chair: Jack Brouwer, UCI**
Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
8:00	Sunita	Satyapal	Hydrogen & Fuel Cell Technology Office	KEYNOTE: U.S. DOE Hydrogen and Fuel Cell Overview
8:30	Chao-Yang	Wang	Penn State University	KEYNOTE: Fuel Cell and Energy Storage Technologies for a Sustainable Energy Future
9:00	Ibrahim	Dincer	Ontario Tech. University	KEYNOTE: Hydrogen 1.0: A New Age
9:30	Jian	Zhao	Mississippi State	KEYNOTE: Structural-dependent Properties of Catalyst Layers for PEM Fuel Cells - A Comprehensive Review

10:00a. BREAK

ICEPAG Session 1: Leading H2 Companies **Session Chair: Jeff Reed, UCI**
Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Tim	Cortes	Plug Power	Building the Green Hydrogen Economy
10:50	Tony	Leo	FuelCell Energy	Hydrogen for Decarbonization & Zero Emissions

WFCC Sessions:

Session 6: Low Temp. Fuel Cells 1 **Session Chair: Feng Yuan Zhang, UTK**
Location: DBH 1300

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Qiusen	Wang	Chongqing University	Portable micro fuel cell based on Polyacrylamide amide hydrogel solid electrolyte
10:50	Elvin	Aliyev	University of Birmingham	GO-Incorporated Nafion Composite Membranes for Intermediate Temperature Fuel Cell Applications

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11:10	Steve	Szymanski	Nel Hydrogen	
11:30	Tim	Sasseen	Ballard Power Systems	Hydrogen Fuel Cells for Decarbonization

11:50 LUNCH BREAK

ICEPAG Session 2: Utility, Agency & Industry

Session Chair: Vince McDonell, UCI

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Pere	Margalef	Snam, S.p.A.	Italian gas utility perspectives on hydrogen
13:20	Maryam	Brown	Southern California Gas Company	
13:40	Aaron Katzenstein	Katzenstein	South Coast Air Quality Mgmt. District	Air quality and emissions regulations related to hydrogen and fuel cells
14:00	Bob	Wegang	STARS	
14:20	James	Kast	Toyota	

14:40 BREAK

11:10	Xi	Yang	Shanghai Hydrogen Propulsion Technology Co.	An Innovative Fuel Cell Stack Compression Methodology with Improved Time Series Model based on ARIMA
11:30	Regis	Chenitz	National Research Council Canada	Investigation of Inks Rheology as a Quality Control tool for MEA manufacturing

11:50 LUNCH BREAK

Session 7: Low Temp. Fuel Cells 2

Session Chair: Ivan Tolj, FESB

Location: DBH 1300

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Shangfeng	Du	University of Birmingham	Nanoscale Self-Assembled Anodes to Boost Power Performance of Direct Formic Acid Fuel Cells
13:20	Amirhossein	Amirsoleymani	University of Waterloo	Effective Bipolar Plate Design for Water Removal by CFD Analysis
13:40	Wenming	Huo	Tianjin University	Modeling non-uniform contact resistance of full-scale PEM fuel cell under realistic assembly
14:00	Pulkit	Sagar	University of California Merced	Study of Porous Media in an Electrochemical Cell using 3-D Printed Conductive Ink
14:20	Mrittunjoy	Sarker	UC Merced	Experimental and computational study of the microporous layer (MPL) and hydrophobic treatment in the gas diffusion layer (GDL) of a proton exchange membrane fuel cell (PEMFC)

14:40 BREAK

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ICEPAG Session 3: Panels Session Chair: (see moderators below)

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
15:00	Katrina	Fritz	California Hydrogen Business Council	PANEL: CHBC - 20 Years in the Hydrogen Business: (1) <i>Jamie Randolph, PG&E</i> (2) <i>Tom Swenson, Cummins</i> (3) <i>Hernan Henriquez, Bayotech</i> (4) <i>Rob DelCore, SYMBIO</i>
16:00	Yaofan	Yi	Chevron	PANEL: Building the hydrogen eco-system in hard to abate sectors (1) <i>Paulo Frederico Prunzel, Oil & Gas Climate Initiative (OGCI)</i> (2) <i>Ben Leonard, Chevron New Energies</i> (3) <i>Joe Pratt, Zero Emission Industries</i> (4) <i>Bart Sowa, GTI Energy</i> (5) <i>Bryan Lee, CalStart</i> (6) <i>Neeraj Agarwal, Cummins</i>

17:00 Laboratory Tours

18:30 Adjourn

Session 8: Low Temp. Fuel Cells 3 Session Chair: Lei Cheng, Bosch

Location: DBH 1300

Time	Speaker First Name	Speaker Last Name	Organization	Topic
15:00	Jianbo	Zhang	Tsinghua University	KEYNOTE: Performance of Electrospun Catalyst Layer and Property of Electrospun Nafion Nanofiber
15:30	Pramoth Varsan	Madhavan	University of Waterloo	Ex-situ Characterizations of coated metallic bipolar plates for Proton Exchange Membrane Fuel Cells Applications
15:50	Alper	Ince	University of Connecticut/ Los Alamos National Lab.	Oxygen and proton transport model for a mesoporous carbon structure supported cathode catalyst layer of proton exchange membrane fuel cell
16:10	Fei	Wei	University of Alberta	Understanding the Impact of Micro-Porous Layer on Performance and Water Transport in Proton Exchange Membrane Fuel Cells
16:30	Jaebong	Sim	Seoul National University	Effect of Accelerated Stress Test on the Durability and Performance Degradation of the Gas Diffusion Layer

17:00 Laboratory Tours

18:30 Adjourn

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Thursday, 15 December 2022

7:00 -8:00 Breakfast and Registration

WFCC Closing Plenary Session Session Chair: Jack Brouwer, UCI

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
8:00	Iryna	Zenyuk	University of California, Irvine	KEYNOTE: Observation of Oxygen Removal in Polymer Electrolyte Membrane Water Electrolyzers
8:30	Ivan	Tolj	FESB, University of Split	KEYNOTE: Development of fuel cell powered module and its integration into forklift
9:00	Lei	Cheng	Bosch Sunnyvale	KEYNOTE: Insights of polymer electrolyte fuel cell degradation enabled by correlated in-situ electrochemical diagnostics and spatially resolved diffraction mapping
9:30	Zhiguo	Qu	Xian Jiaotong University	KEYNOTE: Multi-scale modeling of water and thermal management for proton exchange membrane fuel cells

10:00am BREAK

Session 9A: High Temp. Fuel Cells 2 Session Chair: Stefano Campanari, PoliMI

Location: EH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Junchao	Yao	UCI APEP	EIS analysis of direct seawater solid oxide electrolysis
10:50	Rory	Roberts	Tennessee Tech University	Carbon-Neutral Electrical Power Generation for Electrifying Large Aircraft
11:10	Paolo	Marocco	Politecnico di Torino	Assessment of the effectiveness of SOFC-based cogeneration systems from a techno-economic and environmental perspective
11:30	Preethi	Sudarsan	Seoul National University, South Korea	Surface Engineering of NiO -YSZ anode support by sputtering for Solid Oxide Fuel cells

Noon LUNCH BREAK

Session 10A: High Temp. Fuel Cells 3 Session Chair: Luca Mastropasqua, UW-Madison
Location: EH 1200

Session 9B: H2 Prod./Storage/Use 1 Session Chair: Zian Zhao, Mississippi St.

Location: DBH 1200

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Pascal	Ruzzante	University of Waterloo	Pore Size and Lineal Path Distribution-based Simulated Annealing for Reconstruction of Proton Exchange Membrane Fuel Cell Catalyst Layers
10:50	Ahmed	Saber	ETAP	Energy Storage Modeling, Sizing and Standards
11:10	Sergio	Peres	Universidade de Pernambuco - Recife, Brazil	Use of hydrogen in co-combustion with Diesel and biodiesel and impacts on emissions in a 3.6 kW compression ignition generator
11:30	Praveen	Cheekatamarla	Oak Ridge National Laboratory	Fuel Flexible, Hydrogen Compatible, Virtually Zero NOx emitting Burner for Domestic Appliances

Noon LUNCH BREAK

Session 10B: H2 Prod./Storage/Use 3 Session Chair: Xianguo Li, U. Waterloo
Location: DBH 1200

Session 9C: H2 Prod./Storage/Use 2 Session Chair: Robert Flores, UCI

Location: DBH 1300

Time	Speaker First Name	Speaker Last Name	Organization	Topic
10:30	Bobby	Laviguer	University of California, Irvine	Experimental Evaluation of Power-to-Gas-to-Power for Long Duration Energy Storage
10:50	Marta	Gandiglio	Department of Energy, Politecnico di Torino	Can hydrogen play a role in decarbonizing high-temperature heat? A case study of the steel industry
11:10	Paolo	Colbertaldo	Politecnico di Milano	Assessment of long-term net-zero-emission energy system scenarios under a multi-node multi-vector multi-sector perspective
11:30	Alberto	Cammarata	Politecnico di Milano	Design and Optimization of Hybrid Power Generation System using Ammonia as Fuel

Session 10C: H2 Prod./Storage/Use 4 Session Chair: Blake Lane, UCI
Location: DBH 1300

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Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Stefano	Campanari	Politecnico di Milano	KEYNOTE: The Solid Oxide Semi-closed CO2 cycle (SOSCO2) for innovative blue power production
13:30	Jaroslav	Milewski	Warsaw University of Technology	Analysis of Off-design Parameters of Molten Carbonate Fuel Cells and Solid Oxide Fuel Cells
13:50	Taebeen	Kim	Seoul National University	Energy, exergy, exergoeconomic, environmental (4E) Analysis of Cascade SOFC Systems with Fuel Regenerator for High Electrical Efficiency
14:10	Christian	Rose	University of California, Irvine	Development of a Hardware-in-the-Loop Demonstration for a Thermochemically Integrated Pressurized SOEC with Direct Reduced Iron Furnace

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Nageh	Allam	American University in Cairo	KEYNOTE: Design and fabrication of nanostructured electrode materials for water splitting
13:30	Alberto	Cammarata	Politecnico di Milano	Design and Optimization of Green Ammonia Production Plant using Solid Oxide Electrolysis
13:50	Sergio	Peres	Universidade de Pernambuco - Recife, Brazil	Hydrogen from residues - a solution to meet the decarbonization goals in Pernambuco - Brazil
14:10	Xiyuan	Zhang	Tianjin University	Transient modelling and control strategy of hydrogen production system by water electrolysis via renewable electricity

Time	Speaker First Name	Speaker Last Name	Organization	Topic
13:00	Paolo	Colbataldo	Politecnico di Milano	A comparison of system configurations for hydrogen production from renewable electricity
13:20	Farhad	Angizeh	Rutgers University	Integrated Framework to Develop and Evaluate Clean Hydrogen Value Chain
13:40	Pawel	Brusilo	University of California San Diego; Wroclaw University of Economics and Business	Policies and strategies for sustainable development of the fuel cell electric vehicle industry in California
14:00	Zeje	Chen	University of California, Irvine	Technoeconomically Viable Ensembles of Artificial Photosynthetic Nanoreactors for Z-Scheme Solar Water Splitting

14:30 Plenary Session - Awards Announced (Location: EH 1200)

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15:00 Outing - Bus to Laguna Beach to walk, talk & dine

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