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RPPR Final Report

as of 19-Jan-2023

Agency Code: 21XD

Proposal Number: 80611ESCF

Agreement Number: W911NF-22-1-0241

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Report Date: 27-Dec-2022

Date Received: 18-Jan-2023

Final Report for Period Beginning 28-Sep-2022 and Ending 27-Dec-2022

Title: Polymer Electrolyte Fuel Cells & Electrolyzers 22 (PEFC&E22)

Begin Performance Period: 28-Sep-2022

End Performance Period: 27-Dec-2022

Report Term: 0-Other

Submitted By: Kellie Gilbert

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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees:

STEM Participants:

Major Goals: The 22nd Symposium on Polymer Electrolyte Fuel Cells & Electrolyzers (PEFC&E22) took place at the 242nd Meeting of The Electrochemical Society (ECS) from October 9-13, 2022 in Atlanta, Georgia (US). PEFC&E-22 was devoted to all aspects of research, development, and engineering of polymer electrolyte fuel cells (PEFCs) and electrolysis systems. The symposium's goal was to bring together the international community working on the subject to enable effective interactions between research and engineering communities.

Accomplishments: PEFC&E22 provided attendees with opportunities to foster scientific collaboration and network building.

The symposium had 6 sections covering: (a) Diagnostics/Characterization Methods, Membrane Electrode Design, (b) Cells, Stacks and Systems, (c) Cation-Exchange Membrane Performance & Durability, (d) Catalysts for Acidic Fuel Cells, (e) Materials for Alkaline Fuel Cells, and (f) Polymer-Electrolyte Electrolysis.

Three hundred and twenty one talks were submitted to the PEFC&E22 symposium. Of the submitted talks, 306 were presented during the 40 live technical sessions and poster sessions at the 242nd ECS Meeting. A total of 37 papers were published in ECS Transactions (ECST), the official conference proceedings publication of The Electrochemical Society. ECST Volume 109, Issue 9 is available online: <https://iopscience.iop.org/issue/1938-5862/109/9>.

With the \$5,000 in financial support from the Army Research Office, and \$10,000 from the Office of Naval Research (ONR), The Electrochemical Society provided over 100 students with meeting registration awards, giving them the opportunity to present their work to the international community.

Training Opportunities: Nothing to Report

Results Dissemination: The proceedings from PEFC&E22 are published in ECS Transactions (ECST) Volume 109, Issue 9 (<https://iopscience.iop.org/issue/1938-5862/109/9>). A total of 37 papers were published.

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Honors and Awards: The PEFC&E22 Symposium hosted its annual student poster competition on October 10, 2022. Over 30 students submitted posters to the competition. Dr. James (Jim) Fenton led the group of senior fuel cell and electrolysis researchers, which judged the posters for technical content and visual presentation. A total of USD \$3,000 was awarded for four prizes to honor the work of promising young students.

1st Place – USD \$1,200

Seiji Ichikawa, Doshisha University

I01D-1562 "MEA Performance of Pd@Pt Core-Shell Catalysts Supported on Different Particle Sizes of Mesoporous Carbon"

2nd Place – USD \$800

Daichi Yasufuku, Kyushu University

I01D-1557 "Investigation of a Correlation Between IV Performance and Cathode Structure for MEAs Using Mesoporous Carbon Supports"

3rd Place (tie) – USD \$500

Weijie Cao, Kyoto University

I01D-1559 "Operando X-Ray Absorption Spectroscopic Study on Influence of Specific Adsorption of Sulfo Group in Perfluorosulfonic Acid Ionomer Towards ORR Activity of Pt/C Catalyst"

3rd Place (tie) – USD \$500

Ryosuke Nishiizumi, Kyushu University

I01D-1566 "PEFC Electrocatalysts Using Sn-Based Materials Dispersed on Mesoporous Carbon"

The related ECS News post is available at <https://www.electrochem.org/ecnews/pefce-22-poster-competition-winners>.

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: Karen Swider-Lyons Ph.D.

Person Months Worked: 12.00

Project Contribution:

National Academy Member: N

Funding Support:

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as of 19-Jan-2023

Partners

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I certify that the information in the report is complete and accurate:

Signature: Kellie Gilbert

Signature Date: 1/18/23 11:19PM

Polymer Electrolyte Fuel Cells & Electrolyzers (PEFC&E22)

The 22nd Symposium on Polymer Electrolyte Fuel Cells & Electrolyzers (PEFC&E22) took place at the 242nd Meeting of The Electrochemical Society (ECS) from October 9-13, 2022 in Atlanta, Georgia (US).

The symposium brought together the international community working on polymer electrolyte fuel cells (PEFCs) and electrolysis systems, enabling effective interactions between research and engineering communities, and spotlighting important research. Six sessions throughout the meeting covered all the critical aspects of research, development, and engineering of polymer electrolyte fuel cells and electrolysis systems:

- (a) Diagnostics/Characterization Methods, Membrane Electrode Design,
- (b) Cells, Stacks and Systems,
- (c) Cation-Exchange Membrane Performance & Durability,
- (d) Catalysts for Acidic Fuel Cells,
- (e) Materials for Alkaline Fuel Cells,
- (f) Polymer-Electrolyte Electrolysis.

Objective:

The funding requested from the Army Research Office and the Office of Naval Research was intended to support student participation in the PEFC&E22 Symposium at the 242nd ECS Meeting. Encouraging scientific careers is critical for the technical leadership of the United States, and support for a student to participate in a technical meeting can be critical to his or her future success.

Outcome:

Three hundred and twenty one talks were submitted to the PEFC&E22 symposium. Of the submitted talks, 306 were presented during the 40 live technical sessions and poster sessions at the 242nd ECS Meeting. A total of 37 papers were published in *ECS Transactions (ECST)*, the official conference proceedings publication of The Electrochemical Society. *ECST* Volume 109, Issue 9 is available at <https://iopscience.iop.org/issue/1938-5862/109/9>.

With the \$5,000 in financial support from the Army Research Office, and \$10,000 from the Office of Naval Research (ONR), The Electrochemical Society supported over 100 students with membership awards, meeting registration awards, and poster awards, giving them the opportunity to present their work to the international community.

The symposium's annual student poster competition was hosted on October 10, 2022. Over 30 students submitted posters to the competition. Dr. James (Jim) Fenton led the group of senior fuel cell and electrolysis researchers, which judged the posters for technical content and visual presentation. A total of USD \$3,000 was awarded for four prizes to honor the work of promising young students.

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In closing, The Electrochemical Society and the volunteer organizers of PEFC&E22 wish to extend our deepest appreciation for the support of this important technical symposium.