

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA, 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.
PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE (DD-MM-YYYY) 14-11-2018	2. REPORT TYPE Final Report	3. DATES COVERED (From - To) 15-Feb-2017 - 14-Sep-2017
---	--------------------------------	---

4. TITLE AND SUBTITLE Final Report: 2017 CEC Annual Workshop on Electrochemistry	5a. CONTRACT NUMBER W911NF-17-1-0114
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER 611102

6. AUTHORS	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES University of Texas at Austin 101 East 27th Street Suite 5.300 Austin, TX 78712 -1532	8. PERFORMING ORGANIZATION REPORT NUMBER
--	--

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES) U.S. Army Research Office P.O. Box 12211 Research Triangle Park, NC 27709-2211	10. SPONSOR/MONITOR'S ACRONYM(S) ARO
	11. SPONSOR/MONITOR'S REPORT NUMBER(S) 70973-CH-CF.1

12. DISTRIBUTION AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.
--

13. SUPPLEMENTARY NOTES The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Allen Bard
a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU			19b. TELEPHONE NUMBER 512-471-3761

RPPR Final Report
as of 21-Nov-2018

Agency Code:

Proposal Number: 70973CHCF

Agreement Number: W911NF-17-1-0114

INVESTIGATOR(S):

Name: Allen J. Bard
Email: ajbard@mail.utexas.edu
Phone Number: 5124713761
Principal: Y

Organization: **University of Texas at Austin**

Address: 101 East 27th Street, Austin, TX 787121532

Country: USA

DUNS Number: 170230239

EIN: 746000203

Report Date: 14-Dec-2017

Date Received: 14-Nov-2018

Final Report for Period Beginning 15-Feb-2017 and Ending 14-Sep-2017

Title: 2017 CEC Annual Workshop on Electrochemistry

Begin Performance Period: 15-Feb-2017

End Performance Period: 14-Sep-2017

Report Term: 0-Other

Submitted By: Allen Bard

Email: ajbard@mail.utexas.edu

Phone: (512) 471-3761

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

STEM Degrees:

STEM Participants:

Major Goals: Each year in Austin, Texas, the CEC Annual Workshop on Electrochemistry brings together experts in fields of engineering, materials, and electrochemistry to focus on a topic in an important area of research. Participants address specific challenges in the field, exchange ideas and information, and catch up with colleagues from around the world. These exclusive workshops feature scientists and researchers from top universities, national laboratories, and electrochemical industries discussing cutting-edge electrochemical science, and addressing issues with respect to the mechanisms of electron transfer. Each workshop features technical presentations and posters from several different perspectives covering areas ranging from electrocatalysis, electrochemical sensors, and electroanalysis.

Accomplishments: See Attachment.

Training Opportunities: Nothing to Report

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

RPPR Final Report
as of 21-Nov-2018

2017 CEC Annual Workshop on Electrochemistry

February 11–12, 2017

Each year in Austin, Texas, the CEC Annual Workshop on Electrochemistry brings together experts in fields of engineering, materials, and electrochemistry to focus on a topic in an important area of research. Participants address specific challenges in the field, exchange ideas and information, and catch up with colleagues from around the world. These exclusive workshops feature scientists and researchers from top universities, national laboratories, and electrochemical industries discussing cutting-edge electrochemical science, and addressing issues with respect to the mechanisms of electron transfer. Each workshop features technical presentations and posters from several different perspectives covering areas ranging from electrocatalysis, electrochemical sensors, and electroanalysis.

The Center for Electrochemistry (CEC) at the University of Texas at Austin held its ninth annual electrochemistry workshop February 11–12, 2017 in Welch Hall on the campus of The University of Texas at Austin. There were 116 registered attendees for this conference, including experts from academia, industry, and national laboratories, brought together with the goal of improving understanding in electrochemistry. Three sessions were held sequentially, covering the following topics: nitrogen electrochemistry, platinum dissolution during reduction, and electrochemical energy conversion and storage. CEC faculty members moderated the sessions and promoted discussion. There was additionally a panel discussion on the topic of DFT and electrochemistry by the speakers from that session.

CEC host Allen J. Bard opened the conference with a discussion of the CEC mission and the request that all participants actively engage the topic. The workshop format allowed for interactive exchange with each of the eleven speakers having a full 50 minutes to present their materials and engage in discussions with the attendees. In addition to these presentations, the meeting featured a poster session and reception. Students and postdocs from UT-Austin and other schools, as well as some industry representatives presented about 36 posters and answered questions from attendees in an informal evening session.

The CEC would like to acknowledge and thank the meeting's sponsors who made it possible: The U.S. Army Research Office (Contract No. 70973-CH-CF), The Energy Institute at The University of Texas at Austin, the Cockrell School of Engineering at The University of Texas at Austin, and the Robert A. Welch Foundation (Grant H-F-0037). The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

CEC intends to continue a tradition of excellence and host an electrochemistry workshop annually with new topics in important areas of research to be addressed each year. The 2018 meeting will again focus on a variety of current topics in a session format.

AGENDA

Saturday, February 11, 2017

Welch Hall – Room 1.308

7:30-8:30a Check-in and Continental Breakfast

8:30-8:40 Introductory Remarks

Nitrogen Electrochemistry – Richard M. Crooks, moderator

8:45-9:35 **Robert Hamers**, University of Wisconsin
Photochemical Reduction of Aqueous Nitrogen to Ammonia at Diamond Surfaces

9:40-10:30 **Lauren Greenlee**, University of Arkansas
Heterogeneous Catalysts for Low-temperature Electrochemical Reduction of Nitrogen to Ammonia

10:30-10:50 Break.

10:50-11:40 **Michael Janik**, Penn State University
Density Functional Theory Studies of Electrocatalysis at the Electrode/Electrolyte Interface

11:40a-1:20p Lunch Break

Platinum Dissolution during Reduction – Allen J. Bard, moderator

1:20-2:10p **Marc Koper**, Leiden University
New Views of Platinum Electrochemistry

2:15-3:05 **Philippe Hapiot**, Université de Rennes
The Reduction of Platinum in Dry Aprotic Solvents and the Production of OH during O₂ reduction. Two Examples of the Unexpected Behaviors of Pt in Reductive Conditions.

3:05-3:25 Break

3:25-4:15 **Michael Mirkin**, Queens College, CUNY
SECM: How Low Can You Go?

Poster Session, Reception, and Exhibition – Welch Hall, Grand Hallway

4:30-7:00p Posters and reception

Sunday, February 12, 2017

Welch Hall – Room 1.308

7:30-8:30a Continental breakfast

Electrochemical Energy Conversion and Storage – Arumugam Manthiram, moderator

8:30-9:20 **Yang Shao-Horn**, Massachusetts Institute of Technology

Towards Mastering Oxygen Redox for Sustainable Energy Storage

9:25-10:15 **Joaquín Rodríguez-López**, Univ. of Illinois at Urbana-Champaign

Digging Deeper into Ionic Reactivity: New Tools and Emerging Trends for Energy Storage Nanomaterials

10:15-10:35 Break

10:35-11:25 **Martin Bazant**, Massachusetts Institute of Technology

Control of Phase Transformations in Rechargeable Batteries

11:30a-1:10p Lunch Break

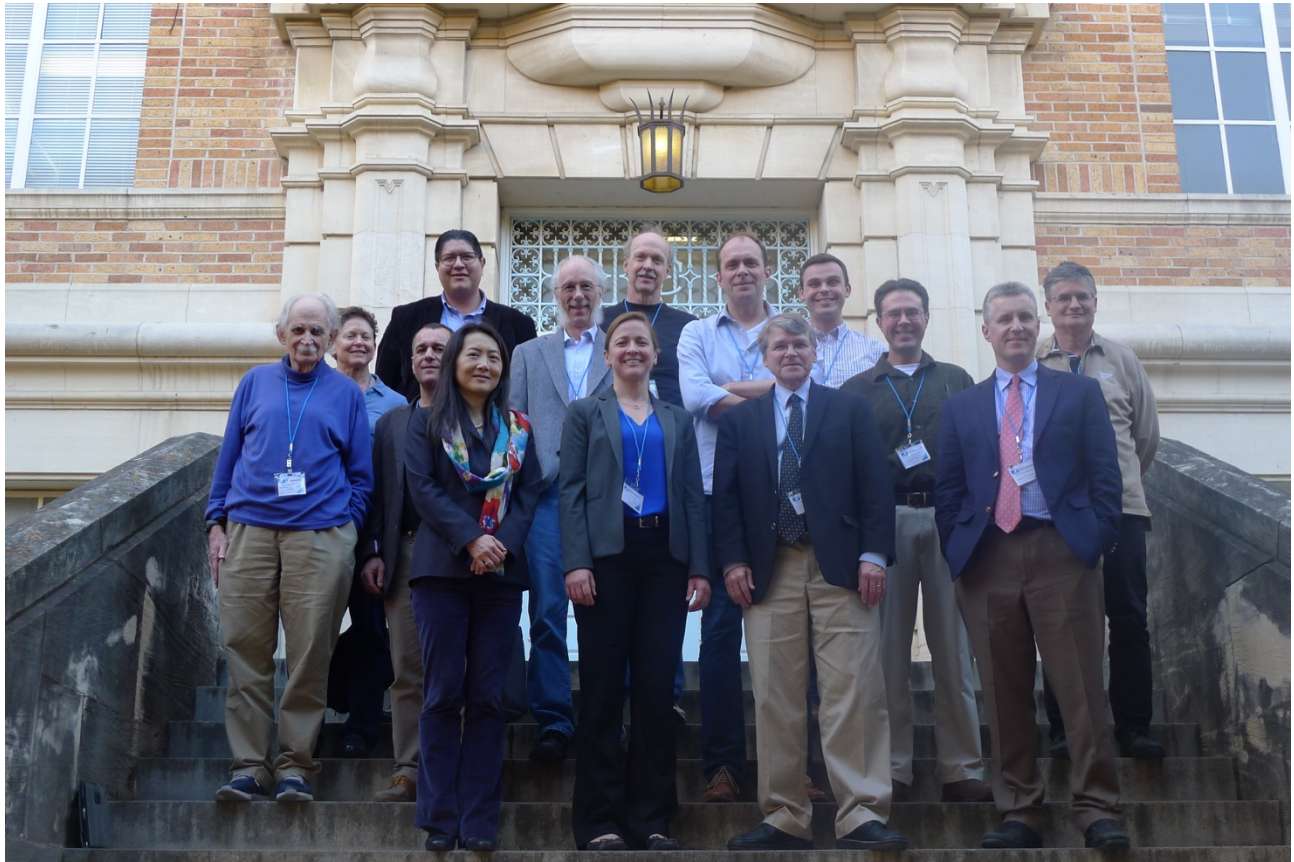
1:10-2:00p **Daniel Buttry**, Arizona State University

Designer Ionic Liquids for Magnesium Batteries

2:05-2:55 **Jeffrey E. Dick/Allen J. Bard**, University of Texas at Austin

Synthesizing and Electrochemically Characterizing Single Isolated Platinum Nanoparticles One Atom at a Time

2:55-3:15 Closing Remarks



2017 CEC Workshop speakers (from top left): Joaquín Rodríguez-López, Richard Crooks, Jeffrey Dick, Cynthia Zoski, Michael Mirkin, Daniel Buttry, Mark Koper, Michael Janik, Philippe Hapiot, Allen Bard, Yang Shao-Horn, Lauren Greenlee, Robert Hamers, Martin Bazant.

Poster Session

Attendee Name	Poster Title
Paul DeGregory	A Point-of-Care Electrochemical Biosensor for Monitoring Heart Failure
Dylan Boucher	Band-Edge Modulation of Si(111): Mixed-Monolayer Functionalized Photoelectrodes
Felicia Konopka	Electron Transfer through Embedded Molecular Wires on Si(111) Surfaces
Swati Mohan	Oxygen Evolution Activity of IrO ₂ Nanocrystals Synthesized by Molten Salt Method
Jan Clausmeyer	Electrocatalysis and Energy Storage at Single-Particle Nanoelectrodes
Carlos Cabrera	Ammonia Oxidation at Nanostructured Pt Nanoparticles on Carbon and Boron Doped Diamond Supports
Jingshu Hui	Alkali Ions Intercalation on Few Layer Graphene – Mechanistic Study and In-situ Electrochemical Imaging via SECM
Zachary Barton	Stripping-Based Scanning Electrochemical Microscopy (SECM) of Energy Storage Materials
Burton Simpson	Enabling Nanotitrations for InSitu Imaging of Reactive Adsorbed Species on Heterogeneous Catalysts Using Surface Interrogation Scanning Electrochemical Microscopy
Xiaonan Shan	Developing novel plasmonic imaging techniques for battery and catalytic research
Molly Kogan	Paper-Based Sensor for Electrochemical Detection of Female Hormones
Jamie Trindell	Size-Dependence of Au-DENs towards electrochemical CO ₂ Reduction Paper-Based Sensor for Electrochemical Detection of Female Hormones
Amal Suleiman	Platinum Electrodeposition on CeO ₂ / Vulcan XC-72R using a Rotating Disk-Slurry Electrode Technique for Oxidation of Methanol in Alkaline Medium
Ian McCrum	Effects of pH and Alkali Cations on H [*] /OH [*] Adsorption and the Hydrogen Oxidation Reaction
Rafael Masitas	Electrochemical Synthesis of Surface Enhanced Raman Scattering Spectroscopy Microfluidic Paper-based device (SERS-μPADs)
Melissa Meyerson	Selective Lithium Electrodeposition on Impurity Veins in 99.9% Metallic Lithium: A Potential Cause of Dendrites
Bryan Wygant	Thinking Outside the BiOxSy: Photoelectrochemical Performance and Degradation of Bismuth Oxysulfide on TiO ₂ and SnO ₂
Logan Wilder	Fabrication and Characterization of Metal-Oxides on Paper
Nevena Ostojic	Fabrication and Characterization of Metal-Oxides on Paper Imprint Enabled Metal Assisted Chemical Etching
Akhila Mallavarapu	
Guillaume Goubert	Electrochemistry at the Nanoscale using Tip Enhanced Raman Spectroscopy

Rodrigo Rodriguez	The Effect of Electrolyte Composition on Sodium Dendrite Morphology
Ryan Pekarek	Effects of Oxygenic Organic Surface Linkers on ALD-TiO ₂ Growth and Charge-Transfer Distance on n-Si(111) R TiO ₂ Photoelectrodes
Caleb Alexander	Synergistic Support Effects on the Oxygen Evolution and Reduction Reaction
Xi Cao	Combinatorial Synthesis of Novel High-efficiency Transition Metal Selenides as Oxygen Evolution Electrocatalysts
Joshua Pender	Reduced Graphene Oxide-Poly(acrylic acid) Aerogels as 3-D Architectures for Lithium Ion Battery Electrodes
Naveen K. Mahenderkar	Epitaxial Lift-off of Electrodeposited Single-Crystal Gold Foils for Flexible Electronics
Meagan Kelso	Chiral Surfaces: Silicon (643) as a Versatile Chiral Template
Lingbo Mao	Sol-Gel Synthesized CuMnO ₂ : An Effective Electrocatalyst for Water Splitting
Collin Davies	Membrane-Free Ion and Particle Manipulation via Faradaic Ion Concentration Polarization
Karl Kreder	High voltage LiCoPO ₄ as next generation lithium ion battery cathode
Morgan Anderson	Microfluidic Surface Titration of Electroactive Self Assembled Monolayers
Alma Castaneda	Detection of miRNAs using Electrocatalytic Amplification and Duplex Specific Nuclease Cleavage of DNA-modified Pt Nanoparticles
Tianhan Kai	Detection of Short-lived Radical Intermediate in the Electrochemical Reduction of Carbon Dioxide by SECM