Brian M. Tackett

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EDUCATION

UNIVERSITY OF PITTSBURGH, Pittsburgh, PA ***Aug. 2009 – Dec. 2013***

B.S. Chemical Engineering, Chemistry Minor, Overall GPA: 3.97

COLUMBIA UNIVERSITY, New York City, NY ***Sept. 2014 – May 2019***

M.S., Ph. D. Candidate, Chemical Engineering, Overall GPA: 3.94

PUBLICATIONS

- J. H. Lee, S. Kattel, Z. Xie, **B. M. Tackett**, J. Wang, C. Liu, and J. G. Chen. "Understanding the Role of Functional Groups in Polymeric Binder for Electrochemical Carbon Dioxide Reduction on Gold Nanoparticles" ***Adv. Funct. Mater.,* 2018, *accepted***
- **B. M. Tackett,** W. Sheng, S. Kattel, S. Yao, B. Yan, K. Kuttiyiel, Q. Wu, and J. G. Chen. "Reducing Iridium Loading in Oxygen Evolution Reaction Electrocatalysts Using Core-shell Particles with Nitride Cores." ***ACS Catal.,* 2018, 8,** 2615-2621.
- **B. M. Tackett**, W. Sheng and J. G. Chen. "Opportunities and Challenges in Utilizing Metal-modified Transition Metal Carbides as Low-cost Electrocatalysts." ***Joule*, 2017**, **1,** 253-263.
- W. Wan, **B. M. Tackett** and J. G. Chen, "Reactions of C1 molecules on carbide and metal modified carbide surfaces." ***Chem. Soc. Rev*., 2017**, **139**, 9739-9754.
- Q. Zhang, **B. M. Tackett**, Q. Wu and J. G. Chen, "Trends in Hydrogen Evolution Activity of Metal-Modified Molybdenum Carbides in Alkaline and Acid Electrolytes." ***ChemElectroChem*, 2016, 3**, 1686-1693.
- **B. M. Tackett,** Y. C. Kimmel and J. G. Chen. "Metal-Modified Niobium Carbides as Low-Cost and Impurity-Resistant Electrocatalysts for Hydrogen Evolution in Acidic and Alkaline Electrolytes." ***Int. J. Hydrogen Energy*, 2016**, **41**, 5948-5954.
- S. Bhavsar; **B. Tackett** and G. Veser. "Evaluation of iron- and manganese-based mono- and mixed-metallic oxygen carriers for chemical looping combustion." ***FUEL*, 2014**, **136**, 268-279.

HONORS AND AWARDS

- University of Pittsburgh: University Scholar award (top two percent of class) ***2011, '12, & '13***
- II-VI Foundation Scholarship ***2011 & 2012***
- University of Pittsburgh: Stuart Memorial Scholarship ***2012***
- University of Pittsburgh: Omega Chi Epsilon poster contest winner ***2012***
- University of Pittsburgh: Lubrizol Foundation Scholarship ***2013***
- Keynote Speaker at Swanson School of Engineering Graduation ***2013***
- NSF Graduate Research Fellowship Honorable Mention ***2014***
- Columbia University: Presidential Fellowship ***2014 – Present***
- Columbia University: Carl Gryte Fellowship ***2016***
- North American Catalysis Society: NAM25 Conference Kokes Award ***2017***
- DOE Office of Science Graduate Student Research Program Award ***2017 – 2018***
- Columbia Center for Teaching and Learning: Lead Teaching Fellow ***2018***

TEACHING EXPERIENCE

LEAD TEACHING FELLOW

Columbia Center for Teaching and Learning **Aug. 2018 – May 2019**

- Develop, organize, and lead unique programming to enhance teaching skills of grad students in the department
- Attend workshops on motivating pedagogical improvement

GRADUATE TEACHING ASSISTANT

Undergraduate Chemical Engineering and Applied Chemistry Lab **Jan. 2017 – May 2017**

- Instructed groups of 5 senior ChemE students on a fixed bed adsorption reactor twice weekly
- Held review sessions on adsorption kinetics and theory
- Graded bi-weekly lab reports
- Created exam questions based on course goals and student experimental results

Reactor Design and Kinetics – Columbia University **Jan. 2016 – May 2016**

- Instructed students during in-class problem solving in a “flipped classroom” setting
- Held 2 office hours weekly
- Graded weekly homework for 40 students

STEM LAB TUTOR

Double Discovery Center – Columbia University **Sept. 2014 – May 2015**

- Tutored New York City high school students in STEM fields during weekly 2hr sessions
- Provided one-on-one and small group (4-5 students) instruction
- Prepped students for SAT and New York state Regent test

UNDERGRADUATE TEACHING ASSISTANT

Organic Chemistry I – University of Pittsburgh **Fall 2012 & Fall 2013**

- Led weekly organic chemistry recitation (25-30 students)
- Created student worksheets based on professor’s notes
- Used examples to simplify complex topics to increase student understanding
- Provided additional one-on-one tutoring as requested

RESEARCH EXPERIENCE

DOE SCGSR AWARDEE

Broookhaven National Lab – Dr. Radoslav Adzic & Dr. Jingguang Chen ***Nov. 2017 – Oct. 2018***

- Investigate transition metal nitride electrocatalysts for water electrolysis
- Synthesize transition metal nitride thin films using PVD and ALD
- Develop correlations between DFT calculations and model surface electrochemical measurements
- Characterize catalysts under reaction conditions with in-situ XRD and XAS measurements

PRESIDENTIAL FELLOW ***Sept. 2014 – Present***

Columbia University – Dr. Jingguang Chen

- Investigate low-cost electrocatalysts for fuel cell, water electrolysis, and CO_2 reduction applications
- Synthesize metal modified carbide and nitride thin films using physical vapor deposition
- Perform X-ray photoelectron spectroscopy for material characterization
- Conduct electrochemical testing to evaluate reaction kinetics

NATIONAL SCIENCE FOUNDATION REU SCHOLAR ***May – Aug. 2013***

Stony Brook University – Dr. Jason Trelewicz

- Investigated novel nanocrystalline tungsten compounds for self sharpening projectiles
- Interacted with primary investigator and graduate students to create cohesive research plan
- Performed over 15 high-energy ball mill experiments for material synthesis
- Characterized materials using SEM and synchrotron X-ray diffraction
- Implemented thermodynamic model in MATLAB script

UNDERGRADUATE RESEARCH ASSISTANT ***Aug. 2012 – Dec. 2013***

University of Pittsburgh – Dr. Götz Veser

- Carried out packed bed reactor and TGA experiments for chemical looping combustion research
- Synthesized, characterized, and tested nanoscale materials for chemical looping partial oxidation of methane applications

RELEVANT WORK EXPERIENCE

PROCESS METALLURGY ENGINEERING INTERN

ATI Allegheny Ludlum, Leechburg, PA ***May – Aug. 2012***

- Organized mill experiments for steel insulation improvement
- Defined alternate operating conditions to save $350k/year in cost
- Performed over 30 surface analyses using SEM
- Collected, analyzed, and reported data using statistical software

MATERIALS SCIENCE/CHEMICAL RESEARCH CO-OP

Mine Safety Appliances, Cranberry, PA ***Jan. – May 2011 & Aug. – Dec. 2011***

- Set up, carried out, and analyzed service life tests of chemical cartridges (wet lab work)
- Resolved product complaints from the field using analytical chemistry techniques
- Extensive use of DSC, TGA, and FTIR for determining composition of materials
- Extensive use of tensile tester and DMA for mechanical analysis of materials
- Organized and presented results of over 25 tests to management

VOLUNTEER / CLUB ACTIVITIES

COLUMBIA CHEM.E. GRAD. ORGANIZATION -- President ***Feb. 2016 – Feb. 2018***

- Oversaw academic, social, and community outreach programming within the department
- Coordinated student evaluations of new faculty candidates
- Facilitated communication between faculty and grad student population (50 PhD, 75 MS)

COLUMBIA CHEM.E. GRAD. ORGANIZATION -- Academic Chair ***Feb. 2015 – Feb. 2016***

- Coordinated 2-3 academic development events per semester for graduate students
- Organized recruitment weekend for accepted Ph.D. students
- Acted as liaison between graduate students and faculty

PITT CLUB CROSS COUNTRY TEAM – President/Coach ***Aug. 2012 – Dec. 2013***

- Organized daily team practices and wrote training plan for 30-60 members
- Organized travel logistics for team members at 4-5 meets during each Fall term
- Competed with team and attended daily practice

OMEGA CHI EPSILON (Pitt) – Treasurer ***Jan. – May 2013***

- Organized travel logistics to conferences
- Managed club bank account
- Wrote and defended proposals for university funding

SELECTED TECHNICAL SKILLS

- Aqueous electrochemical testing for hydrogen oxidation/evolution, oxygen reduction/evolution, alcohol oxidation, and CO_2 reduction reactions
- X-ray photoelectron spectroscopy
- In-situ infrared spectroscopy for electrochemistry
- In-situ X-ray diffraction for electrocatalysis and thermocatalysis (APS BM 17)
- In-situ X-ray absorption spectroscopy for electrocatalysis (APS BM 20)
- Physical vapor deposition
- Glancing incidence X-ray diffraction
- Matlab, Python, and VBA programming

SELECTED PRESENTATIONS

- “Low-cost Electrocatalysts for Water Electrolysis, Based on Transition Metal Carbides and Nitrides.” North American Catalysis Society Meeting, Denver, CO. 2017
- “Trends in Hydrogen Evolution Reaction Activity Among Metal Modified Carbide Thin Films and Powders.” AIChE National Conference, San Francisco, CA. 2016.