

May Section Meeting: Dinner and Discover Selective Oxidation Catalysis



Dr. Nicholas (Nick) Thornburg will be presenting his thesis work on Selective Oxidation Catalysts from the Northwestern University. Nick has a B.S. in Chemical Engineering from Washington University in St. Louis

and a Ph.D. in Chemical Engineering from Northwestern University, in addition to industrial R&D experience with the Dow Chemical Company and 3M. He is currently a Chemical Reaction Engineer at the National Renewable Energy Laboratory (NREL).

Our special guests for the evening will be the winners of the Colorado Science & Engineering Fair for grades 6-12.

May Section Meeting

- Topic:** Dinner and Discover Sustainable Chemical Manufacturing
- Speaker:** Dr. Nicholas (Nick) Thornburg
- Guests:** 2019 Colorado State Science Fair (grades 6-12) Winners
- Date:** Tuesday, May 14
- Time:** 6:00 – Networking & Dinner
7:00 – Presentation
- Location:** [Clements Community Center](#)
1580 Yarrow Street
Lakewood, CO 80214
- Cost:** \$20 Rocky Mtn. Section Members (w RSVP)
\$25 Non-members
\$10 Students / Unemployed

RSVP REQUIRED by Friday, May 10 (early RSVPs are greatly appreciated!) You may RSVP via email at rockyaiche@yahoo.com indicating your name, phone number, and number of attendees and pay at the meeting. Or you may RSVP and pay online using [PayPal on our meeting link](#).

*Add \$5 for attending meeting without RSVP

WE NEED VOLUNTEERS!

Our program year is nearly over, and we would like to give a big thank you to our officers and board members for the past year! Thank you so much for your dedication to our local AIChE group by serving our members this past year!

If you would like to volunteer for an officer position for the upcoming program year, please contact Cindy Fischer at 303-988-3611 or cindy.fischer@q.com.

Winners of the 2019 Colorado State Science Fair

The Rocky Mountain Section (RMS) of the American Institute of Chemical Engineers announced the four winners of our judging at the 2019 Colorado State Science Fair. RMS awards a 1st and 2nd Place monetary award and certificate in the Junior and Senior High Divisions. First Place was awarded a check for \$100.00. Second Place was awarded a check for \$75.00. You can learn more about winners in all categories by reviewing the Colorado State Press Release at http://www.csef.colostate.edu/2019_Press_Release.pdf

Each winner also received a certificate and was invited to our May Meeting. Read the abstract of the winners below. Congratulations to all!

SENIOR DIVISION - 1st Place

Project Title: Anaerobic Digestion of Food Waste Part 4: Does Temperature Affect the Production of Food Waste Generated Electricity?

Individual/Team Leader's Name: Sophia Markuson DiPrince

School & City: Pueblo Central High School, Pueblo

Sponsor's Name: Jamie Withnell

Category: Energy

Abstract— The purpose of this experiment was to determine the effect temperature has on the process of anaerobic digestion and the energy production involved in the process. In order to perform this experiment, I made multiple fuel cells and put them into different climates of varied temperatures. Each cell was made the same and had all the same contents. The only variable changed was whether the cell was in a 40°F, 50°F, 70°F, 90°F, or 120°F environment. The object of this experiment was to see in which environment the fuel cell performed most efficiently. The hypothesis that the warm 90°F environment would prove to be the best climate for these cells was supported by the data in that this cell not only produced the highest voltage but did so at a longer period of time than the other cells.

SENIOR DIVISION - 2nd Place

Project Title: Comparing Water pH Upstream and Downstream From Mines to Determine If Mines Are Affecting the Purgatoire River

Individual/Team Leader's Name: Nathan Nash

School & City: Primero Jr/Sr High School, Weston

Sponsor's Name: Decker Gonsalves

Category: Environmental Sciences

Abstract— Coal mines are infamous for changing the pH of nearby water sources. Are aspects of the New Elk Mine, Allen Mine, and Golden Eagle Mine near the Purgatoire River influencing the pH of the river? If the pH of a water source is altered ever so slightly, then this could seriously harm aquatic macroinvertebrates, fry, and fish eggs. A chemical in the Allen Mine, New Elk Mine, and Golden Eagle Mine that the Purgatoire River runs through nearby is altering the pH of the Purgatoire River significantly. If this project tests the pH of the water upstream and downstream from a mine, then a significant difference in the data will be observed. To find out if the mines are affecting the pH, this project will collect a water sample directly upstream from a mine, and will then test the pH ten times and will record the result. After that, the water pH will be tested downstream right after the same mine. This project will then compare the results from upstream and downstream to determine if there is a difference,

which would indicate the New Elk Mine, Allen Mine and/or Golden Eagle Mine is affecting the pH of the water. This process will be repeated for four weeks.

JUNIOR DIVISION - 1st Place

Project Title: Hot Under the Collar? Massive Blow Up? Or Chill Out? What's the Right Reaction?

Individual/Team Leader's Name: Gabriela Ferrell

School & City: Home School, Durango

Sponsor's Name: Robert Ferrell

Category: Chemistry & Biochemistry

Abstract— This year I am studying chemistry and chemical reactions. My project is exploring what happens in some chemical reactions. I hypothesize that in some chemical reactions energy is released (exothermic reactions) and in other chemical reactions energy is absorbed (endothermic reactions). I conducted three different sets of experiments, two qualitative and one quantitative. In the first I mixed and burned thermite. In the second I mixed and detonated AmmonAl. Those two were definitely exothermic. In the third I dissolved Ammonium Nitrate in water. This is an endothermic reaction, and I carefully measured the amount of energy absorbed by the dissolution of the Ammonium Nitrate. These sets of experiments did not disprove my hypothesis.

JUNIOR DIVISION - 2nd Place

Project Title: Does Pressure Affect Carbon Dioxide Absorption by Polyethyleneimine?

Individual/Team Leader's Name: Benjamin Homan

School & City: Monument Charter Academy, Monument

Sponsor's Name: Paul Homan

Category: Chemistry & Biochemistry

Abstract— The purpose of this research is to determine how pressure affects carbon dioxide (CO₂) absorption by polyethyleneimine (PEI). This research is important because if the conditions that PEI absorbs most efficiently can be determined, then scrubbers that utilize PEI can be developed for space

ships or submarines. Previous results by this researcher suggest that kinetic molecular motion theory can explain why PEI absorbs more CO₂ at higher temperatures. Therefore, if pressure is varied, then PEI will absorb less CO₂ at lower pressures because there are fewer molecules present and thus less to absorb. In order to test this theory, 6 trials identical to trials conducted previously at sea level (1013 hPa) are accomplished at 7,350 ft (770 hPa) or about a 24% reduction in pressure. Each trial is run for one hour with CO₂ (ppm), dewpoint, and temperature measured every five minutes. Each trial is run in a test chamber with 4.9 ml. of PEI spread evenly across an aluminum foil plate, and 1000 ppm starting CO₂. After analyzing the results, it is determined that lower pressures cause PEI to absorb on average 36% less CO₂. This is possibly explained because there are fewer molecules causing lower probability for CO₂ to collide with PEI and be absorbed. As established at sea-level, higher temperatures correlate well with CO₂ absorption. An R² correlation of 0.61 is observed between temperature and the absorption rate of CO₂ by PEI.

AIChE BEER BREWING COMPETITION

The 3rd annual AIChE Beer Brewing Competition (ABBC) will be taking place at the 2019 AIChE Annual Meeting in Orlando in November. The registration process for the 2019 ABBC will be opening this summer. Coordinate your team today! To learn more about the ABBC, go to www.aiche.org/brewbeer. Cheers!

AIChE Meetings

2019

- May 13-14 [Commercializing Industrial Biotechnology 2019](#)
Los Angeles, CA
- May 28-31 [8th Int'l Conference on Bioengineering and Nanotechnology](#)
Baltimore, MD
- June 2-6 [12th Natural Gas Conversion Symposium](#)
San Antonio, TX
- June 10-13 [2019 Dow Sponsored CCPS Faculty Workshop](#)
Midland, MI
- June 11-13 [2019 Process Development Symposium](#)
Houston, TX
- June 23-27 [2019 Synthetic Biology: Engineering, Evolution & Design \(SEED\)](#)
New York, NY

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The objectives of AIChE are to advance chemical engineering in theory and practice, to maintain a high professional standard among its members, and to serve society, particularly where chemical, engineering can contribute to the public interest.

AIChE Rocky Mountain is a public non-profit 501(c)(3) organizations and thus any and all donations are tax deductible.

Rocky Mountain AIChE News

Publication Schedule

September 2019 Issue

Articles due Wednesday, September 11

Publish on Friday, September 13

Meeting on Tuesday, September 17

MEETING SCHEDULE

The Rocky Mountain District of AIChE generally meets the second or third Tuesday of every month, September through November and January through May.