AIChE Chicago Section

February Newsletter

Chicago Section

www.aiche.org/Chicago

February 2017

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AIChE Chicago February 2017 Meeting and Tour

Atomistic Models of High-capacity Layered Metal Oxide Cathode Materials

Hakim Iddir, Ph.D.

Argonne National Laboratory

Date: Thurs, February 16th, 2017

Cost: Members (Global + Local): \$40

Members (Global only): \$45 Non-Members: \$50

Students: \$10 Unemployed Members: \$15

To Register: http://www.cvent.com/d/kvqy58

Non-US Citizens (including student visas and green card holders)attending this meeting must submit an on-line form to Argonne National Laboratories prior to **February 7th**, or they will not be able to enter the Argonne laboratories. Link to form: Argonne Form



Feb 28—Mar 1, 2017 University of Illinois at Chicago Chicago, IL

Featuring... Keynote Speakers:

Sangtae Kim, *Purdue University*Pete Ludovice, *Georgia Tech*Anne Evens, *Elevate Energy*Mary Ellen Ternes, *Environmental Attorney, Crowe & Dunlevy*

For Conference Information and Registration, visit the conference website!

Chair Corner

Welcome to February! This is a fantastic and optimistic time for the Chicago Local Section as we head into the Midwest Regional Conference (MRC) at UIC the end of this month (February 28 – March 1). Our March local section meeting will be on March 1 (evening of day 2 of the MRC) at UIC. We, as a technical community, are very proud of all the volunteer effort and contributions that have made this conference possible and we highly value the technical content presented in advancing the Chemical Engineering field.

In addition to the MRC, our monthly meeting for February will be on February 16th at Argonne National Laboratory in Lemont IL (which includes a separate tour of the Advanced Photon Source at Argonne). Dr. Iddir will speak about models of layered metal oxide cathode materials and their applications to the lithium ion battery.

We are fortunate to have such fascinating technology in our field and the sky is the limit of how many different technology branches the tools of chemical engineering touch and help build. This is one of the key attributes of AIChE. The branches of our field include (but are not limited to): refining and petrochemicals, biotechnology and pharmaceuticals, materials science, process control, energy, theoretical modeling, and environmental / sustainability.

Within our fields, each of us tends to specialize in a specific branch of technology. Specialization is key to build expertise in a given area and advance technology forward. But to

challenge ourselves, I think it is also worthwhile to also keep up with other areas of science and technology. You never know, for instance, a method used to solve a problem in petrochemicals could



be used to solve a completely separate issue in biotechnology (and vice versa). That signifies the importance of this Institute in that each of us with our unique specialized backgrounds can share ideas and advance chemical engineering as a multi-disciplinary field together.

Every time I go to a conference, I try to go to at least two presentations outside the area I work in. It challenges you to learn something new and develop a diverse skillset. If you attend the MRC this year, or any conference / technical presentation this year, I challenge you to go to one presentation outside your area of expertise. Although you may not understand everything, the Scientific Method is universal and you may learn something new that you can take back and help you do your job more effectively. As a great German-American physicist once said:

"Once you stop learning, you start dying" – Albert Einstein

Tom King

AIChE Chicago Section Chair

February Meeting

Location:

Argonne Guest House Argonne National Laboratories 9700 S. Cass Avenue - Building 460 Lemont, Illinois 60439

Atomistic Models of Highcapacity Layered Metal Oxide Cathode Materials

ABSTRACT

New cathode materials with improved energy densities, longer cycle-life, and improved safety characteristics are needed for portable electronic devices, smart grid systems, and transportation technologies. The highest-energy-density cathode materials are based on transition-metal oxides, such as layered LiMO2 (M = Co, Ni, Mn). I will present two examples of current interest to the Li-ion battery research community.

The first example is on the promising layered Li(Ni1-x-yMnxCoy)O2 (NMC) oxides-based materials. These cathode materials are capable of addressing some of the challenges associated with next-generation energy storage devices. However, sufficient knowledge on the atomic-scale processes governing these metrics in working cells is still lacking.

The second example is on lithium and manganese-rich composite layered transition metal oxide (LMR-NMC) materials. These materials have the potential to double the capacity of the standard LiCoO2 electrodes. However they exhibit a slowly diminishing cell voltage with cycling known as voltage fade.

Herein, density functional theory is employed to predict the stability of several low-index surfaces of Li (Ni1/3Mn1/3Co1/3)O2 (NMC111) as a function of Li and O chemical potentials. Predicted particle shapes are compared with those of single crystal NMCs synthesized under different conditions. First-principles simulations are also performed on composite materials xLi2MnO3•(1-x) LiMO2 (with M = combinations Ni, Mn, and Co) to understand their behavior as cathode materials in Li-ion batteries. Attention is given to the structure of the pristine material, and to the destabilization of Mn and O ions with respect to migration that occurs during the first charge. Simulations have been applied to help interpret experimental x-ray (EXAFS and near-edge) and NMR spectroscopies.

BIOGRAPHY

Dr. Iddir is an Assistant Physicist in the Materials Science Division at Argonne National Laboratory (ANL).

Dr. Iddir holds a Ph.D. in Physics from the University of Illinois at Chicago, a Master of Chemical Engineering from the Illinois Institute



of Technology in Chicago. Dr. Iddir joined Argonne National Laboratory in 2006.

His research interests are in the area of materials science, with a focus on developing experimental and theoretical approaches for investigating structure-property relationships at the atomic scale, defects, surfaces, interfaces in materials, chemical and physical properties of catalytic, non-catalytic and energy materials. His approach involves the use of ab-initio thermodynamics and materials modeling tools along with of electron microscopy and spectroscopy techniques.

Dr. Iddir published over fifty scientific papers in international peer-reviewed journals and serves as a reviewer for several scientific journals and the National Science Foundation.

Schedule:

5:00-6:00pm Tour of Advanced Photon Source

(Meet at Argonne Guest House @ 5pm)

6:00-6:30pm Registration 6:30-7:30pm Dinner

7:30-7:45pm Announcements

7:45-8:45pm Technical Presentation

For driving directions, please see information on the registration link. For information on the Advanced Photon Source, visit the Argonne website.

Optional Registration for Tour of Advanced Photon Source: Click here!

Note: Non-US Citizens must register for the tour by FEBURARY 7.

Meeting Registration Link:

http://www.cvent.com/d/kvqy58

March Meeting

The March Monthly Dinner Meeting is held in conjunction with the Midwest Regional Conference. If you are not attending the conference, you can separately register for the March Meeting.

Location:

UIC Student Center East, Illinois Room B, Chicago, IL

Adjusting to EPA Policy Changes with the New Trump Administration

ABSTRACT

Following President Trump's inauguration on January 20, 2017, we have seen remarkable activity. As described in the January 2017 CEP, "Adjusting to Policy Changes: Full Reversal in Washington, D.C." it remains true that "some are appalled and some are applauding, but we should all fasten our seat belts!" President Trump has wasted no time initiating the changes he promised on the campaign trail. The transition has already seen numerous Executive Orders and strategic appointments, while Congress is preparing legislative strategy to undo regulation. In this presentation, Mary Ellen Ternes, industry environmental counsel and AIChE Public Affairs and Information Committee member, will review the changes so far and what these changes may mean for AIChE members in industry, academia and government.

BIOGRAPHY

With more than 30 years of experience regarding environmental projects throughout the United States, Mary Ellen Ternes began her career as a chemical engineer with U.S. EPA. With her unique background, Ternes specializes in Clean Air Act and hazardous waste management and remediation issues. She also assists with solid and hazardous waste determinations, permitting, regulatory interpretation and enforcement matters. In addition, Ternes has developed a significant practice in drinking water and wastewater treatment, assisting clients with water quality permitting and discharge regulation, such as wetlands and stormwater issues, as well as Safe Drinking Water Act permitting and compliance.

She is listed in Chambers USA Guide to America's Leading Lawyers for Business; Best Lawyers, where she was also named Oklahoma City Environmental Lawyer of the Year in 2011 and 2016; Oklahoma Super Lawyers, where she was selected for inclusion in



Top 25: Women Oklahoma Super Lawyers in 2009-12, 2013 and 2015; International Who's Who of Environment Lawyers; Martindale Hubbell AV; and is an American College of Environmental Lawyers (ACOEL) Regent and Fellow. Her specialized knowledge of air quality and hazardous waste issues has allowed Ternes to significantly contribute to both civic and professional organizations through various leadership positions including the SEER and Business Law Section, ACOEL, and the AIChE. Ternes received her Juris Doctor with high honors from the University of Arkansas at Little Rock and her Bachelor of Engineering in chemical engineering from Vanderbilt University.

Schedule:

5:45-6:30pm Registration / Reception

6:30-7:30pm Dinner

7:30-7:45pm Announcements

7:45-8:45pm Technical Presentation

If you are already registered for the conference, <u>check your</u> <u>registration</u> if you already paid for the Dinner Meeting!

For Registration and Information:

http://www.cvent.com/d/yvqh5b/



Keynote /Plenary Speakers Match Game

Match the keynote/plenary speaker with their presentation title! (For Solution: see conference website - www.tinyurl.com/MRC2017)

- 1. **Sangtae Kim**, *Professor and Chair, Purdue University*
- David G. Barton, Principal Research Scientist, Dow Chemical
- 3. **Lisa Long**, Director, Office of Engineering Safety, OSHA
- 4. **Jacob Oberholtzer**, Director of Specialties Process Technology, SABIC
- 5. **Pete Ludovice**, Comedian and Professor Georgia Tech
- 6. **Anne Evens**, CEO, Elevate Energy
- 7. **Eric Brey**, *Professor*, *Illinois Tech*
- 8. **James Rawlings**, *Professor*, *University of Wisconsin*
- 9. **Mary Ellen Ternes**, Environmental Attorney, Crowe & Dunlevy

- a. "Adjusting to EPA Policy Changes with the new Trump Administration"
- b. "OSHA's Process Safety Management— Cause and Effect"
- c. "Feel the Power of the Dork Side"
- d. "Application of Economic Model Predictive Control to Large-Scale HVAC Energy Systems
- e. "Engineering Vascularized Tissues"
- f. "Contract Manufacturing: Increasing the Speed of Innovation While Managing Market Uncertainty"
- g. "Shale Gas Influence on Industrial Catalysis R&D"
- h. "Doing Good and Doing it Well: Smarter Energy Use for All"

MRC Technical Sessions and Social Events:

Tuesday, February 28, 2017

- Bio-fuels
- Process Modeling & Optimization
- Fluid Dynamics & Transport I & II
- Catalysis I & II
- Process Safety I & II
- Electrochemical Energy Storage
- Renewable Energy
- Job Search Essentials
- Poster Session & Mardi Gras Networking Mixer

Wednesday, March 1, 2017

- Biomedical Engineering I, II & II
- Refining | & II
- Sustainability
- Carbon Capture
- Process Control & Optimization
- Environmental Compliance & Remediation
- Reaction Engineering
- Local Section Dinner (ticketed event)

Bonus Game: Match the picture to the keynote/plenary speaker (Solution: www.tinyurl.com/MRC2017)



For more information about the AIChE 2017 Midwest Regional Conference, including registration and sponsorship/exhibitor information, visit the <u>Midwest Regional Conference Website</u>.

Conference Sponsors

The Chicago Section of the AIChE is grateful for the generous support of our Conference Sponsors!















AIChE Chicago Section Scholarship Fund

My fellow AIChE members;

Someday we shall all want to retire and enjoy the fruits of our labors. Toward that goal, we need to plan and train our replacements to follow our example. You can do that with little effort by encouraging the next generation of engineers to enter and continue their education in our field and practice chemical engineering as a professional.

For this purpose, the AlChE Chicago Section has established a Scholarship, available to currently enrolled or planning to enroll in an ABET credited college or university of their choice in a chemical engineering discipline. The scholarship is also available to the immediate family of AlChE Chicago section members.

By contributing to the principal of the Scholarship Fund, which is separate from the section operating funds, you can help us make that happen. We, as a technical society, need to continually find and encourage the talented students to become engineers and bring them into our profession. Small contributions now will pay big dividends in the future.

Please consider a donation to the AIChE Chicago Section Scholarship Fund by:

- a. funding immediate need,
- b. contributing to the endowment of the scholarship program, or
- c. both.

Students or parents affiliated with the AIChE Chicago local section (students attended a high school or attending an ABET credited college or university in the serving area and participant parents in the local section events) can apply for this scholarship. The total amount of the scholarship for each individual is a maximum of \$2000 over four (4) years of enrollment, which needs to be renewed annually.

To contribute, please make your check payable to AIChE Chicago Section Scholarship Fund, and mail it to:

AICHE Chicago Section Scholarship Committee

13964 Doral Lane

Homer Glen, IL 60491

aichechicago@gmail.com

or:

Visit http://www.cvent.com/d/j4q7yv/4W and click on the Donate button, and make your contributions using a credit card.

When making a contribution, please provide your name and address. The section will send a thank you letter to document your contribution to a AIChE, a nonprofit organization under the IRS code at section 501(c)3 (Tax Deductible).

Thank you in advance for your consideration and contribution.

Very truly yours,

Azita Ahmadzadeh

AIChE Chicago Section Scholarship Development Team

Scholarship Program

I. PURPOSE

One of the purposes of the Chicago Section as stated in the By-Laws is to foster engineering education. The scholarship program is one way this is accomplished.

II. ELIGIBILITY

Eligibility for a scholarship is limited to persons who are:

- 1. Undergraduate or graduate student membership shall not be sufficient qualification for either the student member or a member of their family, unless they have attended at least 4 meetings in one AIChE-Chicago programming year (Sept-May).
- Closely related to an AIChE Chicago Section member in good standing at the time of application. "Closely related" means: A) Children and grandchildren, whether natural, adopted, stepchild, or ward; B) Parents; or, C) Legal spouses.
- 3. High school seniors, who are applying for the scholarship, should demonstrate their interest in the chemical engineering practice and discipline.
- 4. Beginning or currently engaged in a course of study leading to a first degree in an ABET (or equivalent) accredited chemical engineering program.
- 5. The recipient of no more than (3) AIChE Chicago Section scholarship awards prior to this year's application.

III. THE AWARD

- 1. Each award shall be in an amount of \$2000 for those who are in a Chemical Engineering program over four (4) years.
- 2. The maximum number of awards to be made in any AIChE Fiscal Year (FY) shall be set by the Board of Directors (BOD) no later than March 31 of each FY.
- The Selection Committee shall advise the BOD of their recommendations and the BOD shall have the authority to approve all or reduce the number of awards.

IV. APPLICATION

1. Application for the scholarship must be made using the application form and in the manner prescribed by the Selection Committee.

- 2. Each application packet is required to include a personal statement requesting the scholarship award as well as academic and personal references.
- 3. Applications must be received by the AIChE Chicago Section not later than March 1st for the next academic year.

V. SELECTION

- 1. The AIChE Chicago Section Scholarship award is intended to be competitive.
- 2. Evaluation of applicants will be based on the information provided in the application materials.
- 3. Applicants will be ranked according to selection committee evaluation criteria, which are mainly based on the applicant's credentials.

VI. NOTIFICATION

Notice of any award, or decline to award, will be sent by USPS first class mail or electronic mail to all applicants no later than May 30th.

VII. ADMINISTRATION

- 1. There shall be a Selection Committee of five members established and maintained for the purpose of evaluating applicants and determining awards to be made.
 - A. The AIChE Chicago Section Chair shall be a member, and shall appoint the Selection Committee, and preside over the Selection Committee meeting.
 - B. The Immediate Past-chair shall be a member, and serve as the Secretary of the Selection Committee.
 - C. The AIChE Chicago Section Board of Director (BOD) shall annually select, by majority vote, one section member to replace the longest serving member of the Selection Committee.
- 2. No member selected by the BOD shall serve more than three (3) consecutive years, except to serve an unexpired term.

VIII. RULES

- 1. The AIChE Chicago Section Secretary will verify the eligibility of each applicant.
- 2. All scholarship awards, including renewals, will be made competitively, based on the information provided in the application.

- 3. In the event an award is declined, the Selection Committee may, at its option, make an award to the applicant having the next highest evaluation.
- 4. All AIChE Chicago Section scholarships must be used in the first academic year following the award.
- 5. The awards made shall be presented, on behalf of the recipient, to the ABET accredited engineering institution. If the studies or admission of the recipient of an AIChE Chicago Section Scholarship are delayed for any reason the Chair of the section must be notified within 30 days. Failure to do so may disqualify the applicant for the following years.
- 6. The AIChE Chicago Section Scholarship is to be independent of any and all other awards, scholarships, and/or grants-in-aid accruing to the benefit of the student.
- 7. In making any award the committee shall not discriminate against any individual on the basis of any legally protected status under the applicable laws of the United States of America.
- 8. All recipients and alternates are subject to these same rules.

Attention Students and Parents!



If you are an undergraduate chemical engineering student or have a son or daughter that plans to study chemical engineering you may be interested in the Chicago sections scholarship program. Applications are due March 1st. Please see rules for eligibility in above pages.

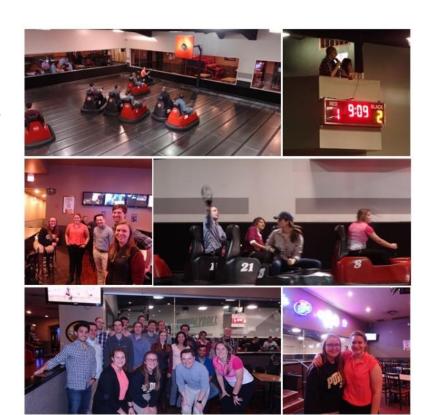
For a Link to the Electronic Version of the AIChE Chicago Scholarship Application Form, Click on the Link Below:

http://form.jotform.us/form/42814483647159

Young Professionals News

On Feburary 1st, 2017 YPC had its 9th annual whirlyball tournament at the Lombard location of Whirlyball. 20 attendees (4) teams) got the chance to play Whirlyball with fellow young professionals and undergrads, while sharing pizzas. Team 4 won, and we had many new people attending this event. Everyone had a very good time, and they had the opportunity to get to know each other in a casual setting. YPC events are a good opportunity for networking, so we hope to see a few more new faces at our next event!

You can check out pictures from the event by clicking <u>here</u>.



ERNEST W. THIELE AWARD

The Ernest W. Thiele award is sponsored by BP and recognizes the outstanding contributions to our profession by a Midwest region chemical engineer. This award was established by the AIChE Chicago Section and is presented annually to a Midwest region AIChE member. This internationally recognized award consists of an engraved plaque and \$1000 honorarium presented at our sectional meeting.

Nomination forms and additional information can be obtained from the Thiele Committee

Chair. Completed nominations are due to the committee chair no later than <u>May 1, 2017</u>

One of the highest honors a distinguished chemical engineer can receive is our Chicago Section Thiele award. Please consider nominating a deserving engineer for this prestigious award.

Jim Simnick

BP Amoco Complex, J-8

150 W. Warrenville Road, Naperville, IL 60566

Ph 630-420-5936, fax 630-420-4832

email: james.simnick@bp.com

PROFESSIONALS NEEDED

2017 AIChE North Central Student Regional Conference

Illinois Institute of Technology

April 7-8th, 2017

With over 350 students and 20 universities expected to attend the North Central Student Regional Conference is an excellent opportunity to network with emerging Chemical Engineers!

The IIT AICHE Student Chapter is looking for professional volunteers to help with:

- Organizing/Hosting Workshop Presentations
- > Organizing/Hosting Plant Tours
- Judging Chem-E Car
- Judging Chem-E Jeopardy
- Judging Paper and Poster Competitions

For more information please contact Brianna Koning at ncrc.aiche.iit @gmail.com.

The conference organizers are also looking for Corporate Sponsors. For more information about sponsoring the conference, please contact Alex Blankenheim at ablanke1@hawk.iit.edu.





Conference Website: tinyurl.com/northcentral2017

Why Renew Your AIChE Membership?

Renew your membership now to keep learning and growing. Stay Connected to 40,000+ international members who take advantage of:





- Subscription to AIChE's flagship publication: CEP*
- Education—Access to e-learning courses and instructor-led training, offering Continuing Educations
 Units and PDHs
- Access to CareerEngineer—a comprehensive job site tailored to chemical engineers
- Access to the AIChE eLibrary—a wealth of information from Knovel Life Sciences and the McGraw-Hill AccessEngineering Library collections

View COMPLETE benefits

Visit our website!

Be sure to check out our website to make sure you have the latest information on meetings and events! Miss a meeting? You can even find old newsletters and past events!

If you want to help us improve our website, please give us feedback, or even better, volunteer to help us with the website!



Thank you for being part of AIChE Chicago!

www.aiche.org/Chicago

AICHE Chicago is now on Facebook and LinkedIn!



Like us on Facebook <u>www.facebook.com/AIChEChicagoSection</u>



Join our group on LinkedIn!

Upcoming AIChE Conferences, Meetings and Webinars

Chicago Section Monthly Meetings						
Feb 16, 2017	February Monthly Meeting, Argonne National Laboratory, Lemor					
Mar 1, 2017	March Monthly Meeting, UIC, Chicago					
AIChE Conferences						
Feb 18-19, 2017	Engineering Solutions for Sustainability: Materials and Resources 3, Denver, CO					
Feb 28 - Mar 1, 2017	9th Midwest Regional Conference, UIC, Chicago					
Mar 12 - 15, 2017	5th International Conference on Accelerating Biopharmaceutical Development, Scottsdale, AZ					
Mar 19 - 22, 2017	7th International Conference on Bioengineering and Nanotechnology, Chicago, IL					
Mar 26 - 30, 2017	2017 Spring Meeting and 13th Global Congress on Process Safety, San Antonio, TX					
Jun 6-8, 2017	2017 Process Development Symposium, Toronto, Canada					
Sep 10-14, 2017	62nd Annual Safety in Ammonia Plants and Related Facilities, Sympsium, Brooklyn, NY					
AIChE Webinars						
Feb 8, 2017	Process Control Considerations in Process Design					
Feb 22, 2017	The Importance of Operating Procedures					
Mar 1, 2017	Management of Change: What You Should Know					

Officers and Contact Information				
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AICHE CHICAGO SECTION

American Institute of Chemical Engineers
Chicago Section
13964 Doral Lane
Homer Glen, IL 60491
aichechicago@gmail.com

We are on the web www.aiche.org/Chicago

We want you for AIChE-Chicago!

We need your help!

How many opportunities can you find to learn project management, delegation and leadership skills for free? Becoming an officer in the Chicago Section of AIChE is such an opportunity. While you're learning new skills, your local network grows. Just about all of us are either undergoing a career change, contemplating a career change, or are wondering if our career will be changed for us. Volunteering with AIChE is a way to add skills and accomplishments to your resume.

aichechicago@gmail.com

http://www.aiche.org/community/sites/local-sections/chicago/announcements/volunteerism

Submitting Articles to AIChE Columns

We welcome email submissions for our monthly newsletter. Commercial announcements are subject to the fee schedule below. News stories, editorials, technical or career related non-commercial contributions are always welcome with no charge. We consider job postings, announcements of for-fee training courses, expositions, conferences as commercial. Categorization of announcements is at the sole discretion of the Chicago AlChE Board of Directors. Chicago AlChE may publicize activities of interest to our members by cooperating professional societies and other non-profits without charge.

AICHE Publicity Committee	Academic (non-AICHE)		Company		Recruiters	
Fees	Per Month	Per Year	Per Month	Per Year	Per Month	Per Year
Advertisements (3X3)	100	450	150	675	N/A	N/A
Half-Page (~7"x 4.5")	280	1260	420	1890	N/A	N/A
Job Posting (Size?)	50	225	100	450	250	N/A
Special Sizing	Contact Publicity Committee aichechicago@gmail.com					

For the purchase of a year ad, customers have the option of changing ads/jobs month to month. Online payment can be done using http://www.cvent.com/d/9cq5pw/4W



