January 2016
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American Institute of Chemical Engineers
Knoxville-Oak Ridge Section

For additional information see our Web site at: http://www.ornl.gov/sci/aiche/
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Inside this issue

January 2016 Meeting

Date: Thursday, January 21, 2016
Cost: $20 (Cash or Check)
Location: Rothchild Catering and Conference Center, 8807 Kingston Pike, Knoxville TN
5:30 pm Social/Networking (Cash Bar Available)
6:00 pm Dinner – Menu
7:00 pm Program – Dr. Bruce Moyer, Distinguished Research Scientist and Group Leader, Chemical Separations Group at Oak Ridge National Laboratory,
Diversifying the Supply of Critical Materials for Clean Energy

Abstract – Clean energy technologies include energy-efficient lighting, electric vehicles, photovoltaic solar panels, and wind power. A major risk to their full implementation lies in the reliability of supply of the critical materials (CMs), upon which such technologies depend. From this standpoint, the US Department of Energy identified five rare earth elements (REEs) as CMs and several other elements, such as lithium, as near-CMs. Various studies in other countries have come to similar conclusions. Despite the current oversupply of REEs, supply risk stems from the lack of diversity in the sources of raw materials as well as in the separations and processing of the materials within the supply chain feeding the manufacture of finished clean-energy products. This presentation will provide a brief overview of the newly funded Critical Materials Institute (CMI) and examine US technology gaps in the supply chain for CMs for clean energy and the technology-development program being undertaken within the CMI to address those gaps. To open new sources of CM, projects seek to improve REE ore beneficiation using froth flotation, to develop methods for recovering REE from phosphate ore, and to find better methods for recovering lithium from geothermal brine. Enhanced separation technologies are being developed to separate adjacent lanthanides, to convert purified intermediates to REE metals and alloys, and to dissolve and separate REE from ore concentrate. A computational effort seeks to substantially accelerate the design of novel separation agents for CM. Taking an indirect tack to diversify the supply of critical REE, we are also developing new uses for the abundant REE, La and Ce, which will improve the economics of recovering and purifying the less abundant critical REE.

Bio – Bruce Moyer holds the position of Distinguished Research Scientist and Group Leader of the Chemical Separations Group at Oak Ridge National Laboratory. (Continued on page 3)

Please make your reservations by noon, January 19, by contacting

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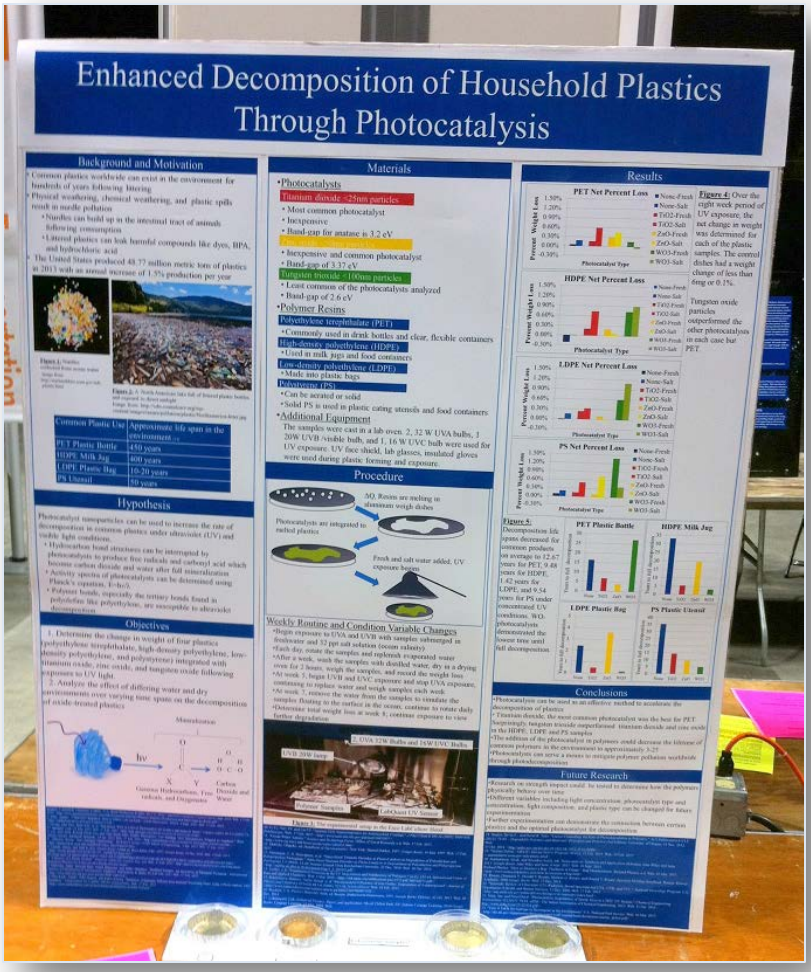
Students are encouraged to attend and will be subsidized

Update from the Southern Appalachian Science and Engineering Fair

Last Spring, Thomas Colburn of Oak Ridge High School won the AIChE senior award was for his project, **Enhanced Decomposition of Household Plastics Through Photocatalysis**. Thomas melted four types of plastic resin and incorporated three different photocatalysts into the resin samples. He then exposed the samples to UV light in fresh water, salt water, and air and measured the weight loss of the samples. Tom was recently named one of 300 semifinalists for the Intel Science Talent Search, and was awarded a $1000 scholarship for himself and $1000 for Oak Ridge High School. The 40 finalists, who will compete for the top three awards of $150,000 each, will be announced on January 20, 2016.

(Article courtesy of Pau Taylor)



Thomas Colburn's awarding winning poster on Enhanced Decomposition of Household Plastics through Photocatalysis

Local Section Election Results

The ballots have been counted and the results of the Local Section election sanctioned. Of the voting members, a total of 13 ballots were received to elect the following local section officers and directors for 2016:

Chair: Mark Swientoniewski (automatic succession)
Chair Elect: Jae-Soon Choi
Secretary: David DePaoli
Treasurer: Paul Taylor
New Directors 2016-2017: Kyle Mack (past chair), Bonnie LaPierre, and Sharon Robinson
Continuing Directors 2015-2016: Stuart Daw and Bamin Khomami

Please congratulate our newly elected officers and directors and continue to support the local section by participating in section activities.

Every vote counts, so please don't forget to exercise your right to vote whenever the opportunity arises.

January 2016 Meeting (continued)

Bio (continued) – He leads the Diversifying Supply Focus Area of the Critical Materials Institute and the Sigma Team for Advanced Actinide Research for the US Department of Energy. In his "spare time" he is Co-editor of the journal Solvent Extraction and Ion Exchange as well as the book series Ion Exchange and Solvent Extraction. His research deals with fundamental and applied aspects of molecular recognition as pertains to separations for critical materials supply, nuclear-fuel recycle, environmental remediation, and waste treatment.

Opportunities to Volunteer

Throughout the year volunteers are needed to fulfill a variety of needs in our community. Volunteering is one way to represent AIChE values in the local community. Please consider assisting the following three volunteer opportunities.

Tennessee Science Bowl - Feb. 26-27

Volunteers are needed to work during the DOE sponsored Tennessee Science Bowl at the Blount County Pellissippi State campus. Fifty-six teams from across Tennessee are expected to participate. More than 200 volunteers are needed to help conduct this year's competition. Information about volunteer opportunities can be accessed at http://www.orau.gov/sciencebowl/volunteers/index.html. As a volunteer, you will be helping advance STEM education for students from across Tennessee and giving back to your state and local communities. For more information, contact Jennifer Tyrell at Jennifer.Tyrell@orau.org.

Southern Appalachian Science and Engineering Fair – April 4-7

Our Section awards two $75 prizes for the best chemical engineering related posters in the Junior and Senior Divisions. Anyone who would like to help should visit the SASEF website at https://ag.tennessee.edu/sasef/Pages/judges.aspx and register as a judge. If you want to help judge for the AIChE awards, register as a special judge. SASEF also needs judges for the category awards, such as biology, chemistry, engineering, physics, etc. Judging will occur the afternoon of April 5th. SASEF is the premier science and engineering competition for students in middle and high school in the 23-county service area of East Tennessee.

Call for EDP Reviewers for the AIChE Chem-E-Car Competition®

AIChE's annual Chem-E-Car Competition® engages college students in designing and constructing a car powered by a chemical energy source that will safely carry a specified load over a given distance and stop. The competition increases awareness of the chemical engineering discipline among the public, industry leaders, educators, and other students.

In addition to an onsite review, each student team is required to submit an engineering documentation package (EDP) in advance of the competition. **The Chem-E-Car Competition® Committee is in need of volunteers to review at most 2 such packages; ensure they have been completed correctly, and that the safety rules of the competition have been followed. The total anticipated time estimate is 3 hours at the most.** This is a great opportunity for those who are not able to make the competition in person due to travel restrictions to see the creativity displayed by the students in the competition. All of the EDP packages and instructions on how to review them are sent to volunteers electronically.

Online volunteers are sent a short copy of the safety rules, and would be reviewing the EDPs for compliance with safety rules and completeness. Volunteers are asked to provide general comments regarding the safety of the vehicle and the completeness of the package, which are passed along to the students who will have a chance to remedy any safety concerns before their car is judged onsite by a live safety inspector. A safety evaluation form will be provided to guide the review process.

EDP reviews will begin during the month of February, and over 120 EDPs are expected to be submitted for the 9 upcoming Regional Competitions in April 2016. If you are interested in helping AIChE conduct a safe Chem-E-Car program again this year, please send an email to Sarah Ewing at sarae@aiche.org. This competition could not exist without the help of volunteers, and this review process will help keep students and bystanders safe before, during and after the competition. If you are aware of anyone that might be also interested in assisting, please pass this email on to them.

Below are the locations for the upcoming 2016 Regional Chem-E-Car Competitions. On Site Volunteers are always welcome! Please email Sarah Ewing for more details (sarae@aiche.org)

April 1st Weekend: University of Alabama-Tuscaloosa, Kansas State University and University of Arizona
April 8th Weekend: University of Houston and University of Delaware
April 15th Weekend: Miami University of Ohio, University of California-Riverside and University of Washington
April 22nd Weekend: University of Massachusetts-Amherst

Activities Calendar

Date	Time	Topic	Speaker	Location
Jan 21	5:30 PM	Critical Materials Institute	Bruce Moyer, ORNL	Rothchild's, Knoxville TN
Feb	5:30 PM	Joint with ANS	TBD	TBD
Mar 17	4:30 PM	Joint meeting with UT – Urban Forestry Program	Kasey Krouse	UT Ag Campus
Apr 14	5:30 PM	Energy Choices and Consequences	Harold "Lee" Dobbs, UT	Rothchild's, Knoxville TN
Apr XX		UT Department of Chemical & Biomolecular Engineering Awards Banquet		TBD
May 12	5:30 PM	Super Hydrophobic Coatings	TBD	Rothchild's, Knoxville TN

Sponsoring Opportunities

We continue to accept advertising in the newsletter in order to provide funds to support student participation in the meetings.

Rates per newsletter are:

$80 full-page advertisement

$45 half-page advertisement

$25 quarter-page advertisement

The section will also continue to accept individual or corporate sponsors to provide student meals at section meetings. The sponsor will be recognized at the meeting and in the Newsletter.

The cost to sponsor one meeting is **$200**. It's a great way to encourage students to attend the local meetings and become future members in the Institute!

(ANL – Pyroprocessing Laboratory glovebox - Source: DOE Digital photo archive at: https://www.flickr.com/photos/argonne/19760520531/in/photostream/)

Officers

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"Even if you're on the right track, you'll get run over if you just sit there."

William Penn Adair "Will" Rogers
American cowboy, humorist, vaudeville performer, social commentator, and actor (1879-1935

Knoxville - Oak Ridge Section

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We're on the Web!
See us at:
http://www.ornl.gov/sci/aiche/

Editor: B. Lewis

About Our Organization – AIChE Academy - Spreadsheets

AIChE Academy brings a full array of education and training resources to chemical engineers and the companies they work for. You'll find courses, webinars, conference presentations, and more from AIChE, CCPS, SBE, IfS, and ISWS. You can search by topic, availability of CEUs and PDHs, delivery method, skill level—even location. Start learning today.

One of the featured courses is *Spreadsheet Problem-Solving for Chemical Engineers.* The course description follows.

Many chemical engineers are self-taught in the use of spreadsheets for day-to-day problem-solving, which is testimony to the inherent usefulness of this tool. Although spreadsheet software was developed for financial calculations, engineers and scientists in all fields have found spreadsheets to be their tool of choice. In this online course, Dr. Clough will provide instruction using Excel 2010 to illustrate a wide range of spreadsheet applications and skills that are relevant to the calculations and problem solving encountered by practicing chemical engineers. Lectures will include frequent live spreadsheet demonstrations. There will be ample opportunity for participants to practice and perfect the sound techniques and the methods taught.

Topics will include:

- Excel basic skills – improving your efficiency
- Working with tables of data and information
- Process calculations including flowsheeting and economic analysis
- Applied statistics including regression analysis
- Solving equations – algebraic and differential
- Programming in Excel using VBA

Although the spreadsheet version used by Dr. Clough in the course is Excel 2010, participants using Excel 2007 and earlier versions will be able to extract full benefit from the course.

(Source: AIChE web site: http://www.aiche.org/academy)

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