



AICHE Orange County

NEWSLETTER OF THE ORANGE COUNTY SECTION, AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

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March 2005

Orange County Meeting MARCH DINNER MEETING

Overview of Fuel-Processing Technologies for Fuel Cells

Dr. Ke Liu, GE Global Research

Tuesday, March 22, 2005
5:30 PM

One of the most important factors required to make large-scale introduction of fuel cells a reality is the development of cost-effective fuel-processing systems that convert today's fuels into hydrogen. Integration of the fuel-processing system with the fuel cell and choosing the correct fuel-processing technology for specific applications is the key to successful development. Dr. Liu will discuss the development of a state-of-the-art on-board gasoline fuel processor, the result of a significant Hydrogen Source R&D program funded by UTC, Shell and Nissan. The key attributes of the technology are its compact size, integrated design and rapid start time, which are the keystones to producing affordable fuel processors for all applications. The fuel processor was designed to fit under the chassis of a fuel cell-powered automobile, enabling the car to be operated on currently available fuels. The 75-liter system required less than 4 minutes for startup from room temperature to production of fuel-cell quality hydrogen, a significant milestone in the catalysis and reaction engineering arena.

The key findings of this program have resulted in technology development that may have even greater application in other areas of chemical engineering practice. Advances in the water-gas shift catalysts developed for the on-board fuel processor have already begun to find a market in a variety of Chemical Engineering applications. Development efforts were also extended to

stationary fuel-processing systems for fuel cell power plants or H₂-fueling stations. The development of a highly integrated 5-KW fuel-processing system and a 150-KW fuel-processing system will also be described.

Dr. Ke Liu has a Ph.D. in Chemical Engineering from City University of New York (City College). He spent seven years working for Exxon-Mobil in their Corporate Research Lab on various catalysis and reaction engineering technologies. In recent years, he worked with UTC Fuel Cells (a UTC joint venture with Shell) on fuel-processing technologies for fuel cells before joining GE Global Research-Irvine in early 2004. Currently, Dr. Liu is leading a multi-million dollar R&D project funded by the U.S. DOE and GE. He is also helping to set up a Clean Coal Technology R&D team in GE's Shanghai, China Technology Center. Dr. Liu has more than 30 publications and numerous patents. Due to his active role in the field, he was elected as a member of the editorial board of the International Journal of Hydrogen Energy. He has chaired sessions in several AICHE Conferences, and is currently writing a book on H₂ production for John Wiley & Sons, Inc. Dr. Liu was invited to give a keynote speech in the 2004 AICHE Spring National Meeting on this topic.

Meeting Schedule:

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| 5:30 p.m. | Social Hour |
| 6:30 p.m. | Dinner |
| 7:20 p.m. | Break |
| 7:30 p.m. | After-Dinner Program |

Place: Wyndham Garden Hotel, Costa Mesa

Directions: From Interstate 405, go north on Bristol Ave., right on Anton, left on Avenue of the Arts. The Wyndham is on the right at 3350 Avenue of the Arts, Costa Mesa.

Reservations: *Please make a reservation at (949) 261-2622 by voice by Friday, **March 18, 2005**. Or, you may email your reservation to west@research.ge.com.*



Cost: Members, \$20 with a reservation, \$25 at the door; Non-Members, \$25 with reservation, \$30 at the door; Students **Free** with reservation, \$5 at the door, Unemployed/Retired, \$5 with reservation, and \$10 at the door.

Starting with the month of January 2005, every third meeting a member attends is FREE with reservation

Legal Corner

“KEEPUS” Committee Status (Newsletter FY05-04) Bob Katin

The Sunrise Hearing before the Joint Committee on Boards Commissions and Consumer Protection (JCBCCP) was conducted on 6 JAN 2005. I did not think the hearing went well for us ChEs. Apparently it went worse than I thought. Senate Bill 246 (SB 246) was introduced by Senator Figueroa on 15 FEB 05. We expected it was going to be just a placeholder (or “spot bill”) until the words were developed, however, we hoped it would specifically recognize chemical engineering. It did not! We were told that the Sunrise Hearing on 6 JAN 05 was going to be the one and only Sunrise Hearing to decide if chemical engineering should be recognized. There appears to be wavering. We may have to elevate the issue to a higher level and possibly bring it to the Governor’s desk. Our opposition, PEGC and CELSOC are very influential and appear to have stopped Senator Figueroa from taking action.

I need letters addressed to Senator Liz Figueroa (cc Bob Katin) that say three things: 1. Due to public health and safety, recognize chemical engineering as a practice. 2. Allow ChEs to overlap and conduct activities, which we consider to be chemical engineering, but by State law are defined to be the exclusive area of expertise of civil engineers. 3. Allow ChEs to be principals in charge of groups and projects.

Modifying the bill will require strong support from the marketplace. To do so, I need:

1. Letters on letterhead from major industrial companies, regulatory agencies, and associations. The letters need to be submitted now, preferably in MAR 05. Contact me for a sample letter.
2. I need letters of support from organizations such as Sierra Club, Chamber of Commerce, WSPA, CMTA, IEA, etc now, preferably in MAR 05 to maintain ChEs to protect public safety.
3. I need letters that say that regulators either require or prefer ChEs due to specific regulations or due to CCPS or other specific ChE books that become industry guidelines.
4. I need companies that have a lobbyist in Sacramento to identify to me their name and point of contact so that your lobbyist can work with the CLCPE lobbyist on a coordinated approach.
5. In APR 05, I will need people from major companies willing to testify to say that their company wants the legal right to hire any consultant that they choose, rather than being told they have to hire a civil engineering firm. I currently have none.
6. If you know other ChEs, please let me know their name and e-mail address so I may count them as constituents. Another argument by PEGC was there just aren’t many ChEs in CA.
7. Please see the attached list of names of people that have either written or committed to write a personal letter or on company letterhead. If you thought I knew you supported the effort, but never sent an e-mail to me saying you would write a letter on personal or company letterhead, please be more explicit and send me an e-mail. If you have mailed a letter directly to Senator Figueroa but it is not indicated on the attached list, I do not have a copy. Without it, there is no record that Senator Figueroa has it. It can be ignored, if it is not presented at the next hearing. Send me a signed copy.

IN REPLY PLEASE ADDRESS:

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STUDENT CORNER

Please contact the newsletter editor if you would like to publish any AIChE student chapter meeting summary or contribute any articles related to science/engineering.

Newsletter Contributors Wanted

The newsletter editor would like to hear from you if you have one or more brief articles to contribute, especially a review or brief discussion of a good website, technical book, etc.

Professional Engineering Employment Update

Job Seeking Members can receive a list of web sites of area companies that sometimes hire ChEs. Contact the Senior Member Everett Knell at EWKnell@aol.com to receive this list by e-mail. Put "OCAICHE Company List" in the subject line of your email request.

- ① If you have an employment opportunity in Southern California for a chemical engineer, the newsletter will advertise it for free.

2005 Orange County AIChE Officers

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|---------------------------------|--|
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Got Environmental Headaches?

- *Contaminated Soil & Ground Water?*
- *Health Risk Issues?*
- *Compliance Issues?*
- *Suing?*
- *Being Sued?*

We Can Help

- *Turnkey RI, FS, RA*
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DATED MATERIAL

ADDRESS SERVICE REQUESTED

