

Perspectives of Chemistry at Hanford Series

October 15, 2002
5:30 p.m. – 7:30 p.m.
CREHST Museum



John Swanson (second from left) discusses his poster on fuel element cladding removal with several local section members.

The third in a four part series on the pioneering chemistry done at Hanford over the past 50 years will be held on October 15, from 5:30 to 7:30 pm, at the CREHST Museum located at 95 Lee Blvd, Richland. The focus of this poster session will be: "Chemistry in the Vadose Zone." Topics will include the 200 Area Plateau Vadose Zone investigations, bismuth phosphate process simulation studies to track Tc-99, and the mechanism of Cs and U binding to Hanford Soils.

A wine and cheese buffet will

be provided for attendees. Group tours through the museum will be available. There is no charge for this activity.

The first two sessions in this series, which centered on plutonium separation and fission product recovery, were very well attended and informative. If you missed them, or would just like the information in hard copy, our section Chair, Milt Campbell, has compiled the poster sessions into a booklet, which is available at cost, \$25. If interested in a copy, please contact Milt; (509) 946-1985 or campsoup@gte.net.

September Meeting

Speaker:

Dr. R. Bruce King,
University of Georgia

Topic:

"An Oxygen-17 NMR
Study of Uranyl
Hydrolysis and Gelation"

Date:

September 24, 2002

Time/Place:

7:30 p.m.
Battelle Auditorium, Richland



Abstract: The unusually sharp ^{17}O resonance of aqueous uranyl ion (e.g., $\Delta W_{1/2} = 6$ Hz in aqueous $\text{UO}_2(\text{NO}_3)_2$) allows the use of ^{17}O NMR for observing hydrolysis and gelation processes in uranyl solutions. Thus distinct uranyl ^{17}O resonances are observed for monomeric UO_2^{2+} , dimeric $(\text{UO}_2)_2(\mu_2\text{-OH})_2^{2+}$, and trimeric $(\text{UO}_2)_3(\mu_3\text{-O})(\mu_2\text{-OH})_3^{3+}$ in hydrolyzed solutions. The assignment of the ^{17}O NMR resonance to the dimer is confirmed by X-ray structure determination on $[\text{Me}_4\text{N}]_2[(\text{UO}_2)_2(\text{OH})_2(\text{NO}_3)_4]$ obtained from the

hydrolysis of uranyl nitrate with $[\text{Me}_4\text{N}]\text{OH}$. Hydrolysis of uranyl chloride with hexamethylenetetramine (HMTA) in HMTA/ UO_2^{2+} ratios above 0.6 leads selectively to $(\text{UO}_2)_3(\mu_3\text{-O})$ trimer formation. Gelation of such solutions in the presence of urea leads to no essential changes in the ^{17}O NMR spectrum. Sharp uranyl ^{17}O resonances are also observed in a strongly alkaline gel obtained from $\text{UO}_2(\text{NO}_3)_2$ in 1 M $[\text{Me}_4\text{N}]\text{OH}$. This ^{17}O NMR study thus suggests two different pathways for uranyl gelation, one involving condensation of $(\text{UO}_2)_3(\mu_3\text{-O})$ trimers and the other involving condensation of $\text{UO}_2(\text{OH})_{n-1}$ units.

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Meeting Continued

Biographical Sketch: R. Bruce King was born in Rochester, New Hampshire, attended Oberlin College (B. A. 1957), and was an NSF Predoctoral Fellow with Prof. F. G. A. Stone at Harvard University (Ph. D. 1961). After a year at du Pont and 4 1/2 years at the Mellon Institute he joined the faculty of the University of Georgia where he has been Regents' Professor of Chemistry since 1973. His research interests have ranged from synthetic organometallic and organophosphorus chemistry to homogeneous catalysis and applications of topology and graph theory in inorganic chemistry. He was the American Regional Editor of the Journal of Organometallic Chemistry from 1981 to 1998 and was the Editor-in-Chief of the Encyclopedia of Inorganic Chemistry,

published by Wiley in 1994. He is the recipient of American Chemical Society Awards in Pure Chemistry (1971) and Inorganic Chemistry (1991). In recent years he has published chemistry books entitled Applications of Graph Theory and Topology in Inorganic Cluster and Coordination Chemistry (1993) and Inorganic Main Group Element Chemistry (1994) and a mathematics book entitled Beyond the Quadratic Equation (1996). Prof. King's nonchemical interests include the 19th century mathematics of algebraic equations, musical composition, and contract bridge.

If you wish to have dinner with the speaker before the meeting, please contact Janet Bryant; (509) 375-3765 or janetlbryant@pnl.gov.

Counselor's Report

from the 224th National ACS Meeting in Boston by Richard A. Hermens

The ACS council met at 8:00 A.M. on August 21 in Boston. The following constitutes a summarized report to better inform the Richland Section members of ACS business, some of these decisions will affect you individually and some will affect the Richland section.

For the year 2003, the registration fees for national meetings for ACS members will be \$275. The annual membership fee for members will be \$116 for the 2003 year. Last year there was a surplus of funds in the ACS but the budget for 2003 will be negative more than one million dollars. Within three years the projection is that there will be a zero deficit. The Society is also affected by the economic mood of the nation after September 11, 2001.

On Wednesday morning at the council meeting, it was announced that there were 17,121 registered at the meeting. There were 409 booths sold at the exposition and the exposition was sold out.

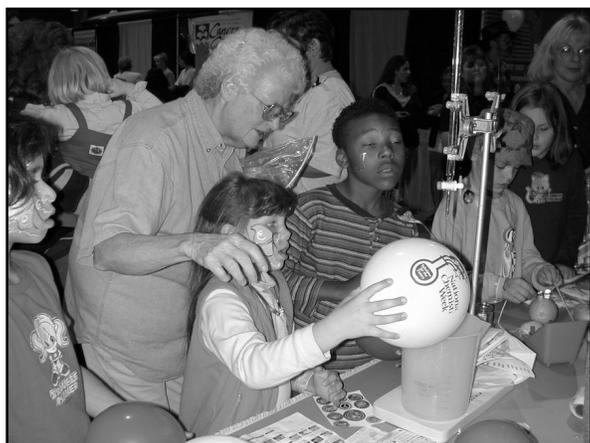
The career and placement center advertised that 512 jobs were available at the convention and that 1242 job-seekers applied. This is reversal of the ratio in past years where the ratio of jobs to job-seekers has been always greater than 1.4. A total of 4600 interviews were reported from this pool. All interviewers and all interviewees must register on-line in advance of the meeting. No on-site applications are accepted. This reduces the employment of local people for handling this service and reduces cost to the ACS.

A petition was ready for the ACS Board to consider that will add some funds to Local Sections and a significant amount for Divisions. The total package would increase funding about \$900,000 each year. Some of the smaller divisions did not have sufficient funding to program at national meetings and the members of divisions initiated this. With this increase, divisions would be obligated to have more programming at regional meetings also. At Boston, the Budget and Finance Committee voted 5-0 against this petition due to the lower than expected revenue for the Society. The chair of the Board, Nina McClellan, said she would appoint a task force to review the proposal and it will surface again at the spring meeting in New Orleans.

The theme for National Chemistry Week for the year 2002 is "Chemistry Keeps Us Clean". For the year 2003, the theme is "Chemistry of the Earth, Atmosphere and Beyond". For the year 2004, the theme is "Chemistry of Toys".

Finally, I submitted a preliminary proposal for qualifying the Hanford Site as a Chemical Landmark. The proposal will be acted on in October of this year. If it passes the committee's attention then we will be challenged to write and defend a full proposal. I will keep you posted on this matter.

If you have any questions concerning my report, I may be contacted at rhermens@granderonde.com, or (541) 963-6716.



Children approach the local section's booth at last year's Family-A-Fair

Volunteer Opportunities

Volunteers Needed for NCW Activities

Want to help put into action the ACS's goal of "Increasing public awareness of chemistry"? Volunteers are now being accepted to help with this year's public outreach during National Chemistry Week, October 20-26. This year's theme is "Chemistry Keeps Us Clean". As we have in previous years, the Richland Section will sponsor a booth at the Family-A-Fair exposition. Volunteers wishing to donate half a day helping on either Oct 26 or 27 should contact Rich Lucke; (509) 376-9060 or richard.lucke@pnl.gov. The section is also looking for members to visit local high school chem classes. Don't worry, they are a friendly audience and you don't have to do it alone - we always send two to each class. To volunteer to visit a class, contact James Campbell; (509) 376-0899 or james.campbell@pnl.gov. For more information on NCW, visit our section's website, www.pnl.gov/acs/.

Chemistry Olympiad

The following high school chemistry students qualified for the American Chemical Society National Competition of the International Chemistry Olympiad by being the top eight contestants who competed in the Regional Competition of the Chemistry Olympiad.

Ben Cowin	Southridge High School
Jeff Davis	Sunnyside High School
Chris Carlson	Southridge High School
Craig Weirdet	Kennewick High School
Sonya Ramos	Sunnyside High School
Joshua Barr	Sunnyside High School
Melissa Hinman	Kennewick High School
David Williams	Davis High School, Yakima

These students represented the best of 254 contestants who competed in the regional competitions which were conducted in their individual schools and monitored by their chemistry teachers. The contests were scored by Science and Engineering Education Programs staff at Pacific Northwest National Laboratory.

The National International Chemistry Olympiad competition was held at Columbia Basin Community College on Saturday, April 20. The all-day event consisted of a multiple-choice section, a discussion and problem-solving section, and a hands-on laboratory section. Although not selected for the US team, we certainly thank these students for their hard work and wish them the best in their future studies.

The results of the 2002 International Chemistry Olympiad, held July 5-14 in The Netherlands, places the teams from China, Thailand, and Taiwan as the top winners. The US team was seventh, overall, out of 57 countries.

Award Winners

Student Affiliates Win Academic Award



The Student Affiliate Chapter at Eastern Oregon University received an outstanding award for the activities performed during the 2000-2001 academic year. This is the fourth outstanding award received in the last five years. Twelve students and four chemistry faculty traveled to Orlando. Students presented nine research posters in the undergraduate poster session. An additional poster describing the EOU SAACS activities was also presented at the Sci-mix. Club members raised over \$6,000 for the trip throughout the school year with many fund raising activities including goggle and molecular kit sales, candy sales, dances and a golf tournament. They also received a small travel grant from ACS and a generous donation from the Richland local section.

Hail & Farewell

We would like to welcome the following new members of the Richland Section: **Wibe Dejong, Carey Haas, Mohammad Rezaee, Tim Snider, April Carman, Therese Clauss, P Lee Ferguson, Uljana Mayer, George Nieman, Jeffrey Sumner and James White.** We look forward to seeing each of you at future Richland Section functions!

We wish departing members **James Lowe, Thomas Bellus, Paul Majors and James Russo** the best of luck in their future endeavors.

Coming Events

- September 19** AIChE Talk, Space Applications of Chemical Engineering, contact Adam P. Poloski, (509) 376-1684, for more information
- September 24** Tour Speaker, Dr. R. Bruce Kind, An Oxygen-17 NMR Study of Uranyl Hydrolysis & Gelation
- October 15** Third "Perspectives" session at the CREHST, Chemistry in the Vadose Zone
- October 20-26** National Chemistry Week
- October 26-27** Family-A-Fair
- November** Local Section Elections
- December 10** Final "Perspectives" session at the CREHST, Uitrification Feed

Member Benefit

Chemical & Engineering News Online (<http://pubs.acs.org/cen>) offers free links to journal articles in a growing number of publications. Links to journal references in C&EN articles include not only ACS journals, but also journals published by the Royal Society of Chemistry (such as Chemical Communications) and Angewandte published by Wiley-VCH. Readers do not need to be subscribers to these journals to read the linked journal articles. Please contact me if you have any questions: Melody Voith, Online Editor, Chemical & Engineering News, 1155 16th St., NW, Washington, DC 20036 <http://pubs.acs.org/cen> phone: 202-872-4406; fax 202-872-8727

Section Elections

In November we will be having elections for the section positions of Chair, Secretary, and Treasurer. Please give some thought about running for these positions. You can make a difference! Please contact Brian Rapko; (509) 376-1571 or brian.rapko@pnl.gov if you would like more information.

Richland Section
Home Page www.pnl.gov/acs/



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Point To Ponder

See things as you would have them be, instead of as they are. —Robert Collier