

Vol. 79

2000

The
REGISTER

OF PHI LAMBDA UPSILON

HONORARY CHEMICAL SOCIETY



NATIONAL OFFICERS 1999-2002

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THE REGISTER

OF PHI LAMBDA UPSILON
HONORARY CHEMICAL SOCIETY

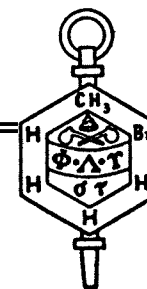
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From The Retort

Welcome to the newest addition of the Register. I continue to solicit articles of general interest for publication. See instructions for authors on p. 22. It is with sadness that I include a memorial to Dr. James George, Secretary of PLU who died in Oct. 1999. His participation in our organization will be missed.

I would like to welcome Dr. Charles Campbell from the University of Washington as the new National Vice President, Dr. Jeffery Fieberg from Hillsdale College as the new national Secretary and Dr. Manuel Soriaga from Texas A&M University as the new National Treasurer. Thank you for your willingness to serve in these positions. Dr. Campbell has already created a new Web site for PLU which can be found at: <http://www.cpac.washington.edu/~campbell/plu/>

You will also find copies of some of the Chapter reports I have received this year. Please continue to send me copies of your reports. I have also included information for those students who received travel grants through the PLU travel Grant program. See page 15 for how to apply to this program.

Congratulations to this years Fresenius Award winner, Dr. Joseph M. DeSimone. Information on nominating persons for this award are on page 4. Finally, congratulations to all the new inductees to PLU.

Richard M. White
Editor

In Memorium

The National Officers of Phi Lambda Upsilon are saddened to report the death on October 25, 1999 of Dr. James George of DePauw University. Jim had done an excellent job as National Secretary during the 1996-1999 Triennium and had been selected to serve as National Vice-President for the 1999-2002 Triennium.

Jim was born on July 25, 1938 in Pittsburgh, Pennsylvania and grew up in that area. He attended Allegheny College, obtaining a B.S. degree (cum laude) with honors in chemistry in 1960. Jim went on to the University of Illinois where he obtained a Ph.D. in inorganic chemistry working with Dr. John Bailar, Jr. in 1964.

Jim left U of I before his degree was awarded to teach at Oberlin College, where he was an Assistant Professor of Chemistry from 1963-1966. Jim was hired as Assistant Professor of Chemistry at DePauw in 1966. He was promoted to Associate Professor in 1968 and Full Professor in 1987. Jim also was a visiting professor at the University of Cincinnati and Indiana University during several summers.

At DePauw, Jim was active in a variety of projects involving undergraduate students and high school students. At various times Jim served as Director of Research and Program Director for a NSF sponsored undergraduate research program, Director of Environmental Studies, and Program Director for a NSF funded Summer Institute for High Ability High School Students. Jim loved teaching and enjoyed working with students. His enthusiasm for chemistry and for young people was contagious and many students chose to major in chemistry because of his influence.

Jim also was a productive research scientist. During his time at DePauw Jim worked with, perhaps, 60+ students on a variety of research projects and independent study projects. Jim conducted research with G. Gard at Portland State University, and with Russ Drago at Florida State. The latter collaboration was particularly fruitful, producing 4 publications and 1 manuscript in preparation from two sabbatical leave projects.

Jim was a member of the American Chemical Society, Sigma Xi, the Indiana Academy of Science, the Council on Undergraduate Research, and Phi Lambda Upsilon. His service to PLU as National Secretary brought him great pleasure.

In September 1998 Jim was diagnosed with a non-operable cancerous brain tumor. Despite the inevitability of his condition, Jim remained active in the department until April 1999, teaching classes and participating in departmental planning. His absence here will be greatly missed.

The National Fresenius Award

The National Constitution of Phi Lambda Upsilon states that "The object of this Society shall be the promotion of high scholarship and original investigation in all branches of pure and applied chemistry."

To fulfill this objective Phi Lambda Upsilon elects to membership those students who show exceptional promise in pure and applied chemistry. It also elects to Honorary Membership chemists who have made outstanding contributions to the science.

Phi Lambda Upsilon in keeping with its stated objectives also established an award for outstanding chemists early in their professional careers, since regular membership ordinarily goes to those at the beginning of a career and honorary membership to those at the height of or near the close of a career. This national award was established by the Society in 1965 and is known as the Phi Lambda Upsilon National Fresenius Award.

The program contains the following features: (1) The award consists of a plaque of suitable design and an honorarium, currently \$1,000.00; (2) The award recipient must be under 35 years of age at the time of nomination and to have made notable contributions to chemical research, education and/or administration; (3) Administration of the award is the responsibility of a five member committee of nationally prominent scientists who will select the recipient from nominees of the chapters and officers; (4) Not more than one award will be made each year.

The first Fresenius Award was made at the Detroit meeting of the American Chemical Society in April 1965. This award of Phi Lambda Upsilon continues and extends the traditions of the Society in recognizing and honoring excellence in chemistry. It has, as the names of its recipients testify, taken its place along with Honorary membership in the Society as an award of high merit in American chemistry.

Nominations for the Society's Fresenius Award must be submitted to the National Secretary no later than January 1. The nominating letter should include a discussion stating why the individual placed in nomination is regarded as particularly worthy of consideration for the Fresenius Award. In addition, it is also requested that a biographical sketch be furnished giving the following information:

- I. Full name
- II. Place and date of birth
- III. Educational career
- IV. Professional activities (since graduation)
- V. Publications
- VI. Honors and/or distinctions and/or noteworthy achievements

Three letters of recommendation from former teachers or professional associates shall also be submitted.

1999 Fresenius Award Recipient

Dr. Joseph M. DeSimone

Department of Chemistry

University of North Carolina at Chapel Hill

The recipient of the 1998 Fresenius Award was Dr. Joseph M. DeSimone, William R. Kenan, Jr. Distinguished Professor of Chemistry and Chemical Engineering at the University of North Carolina at Chapel Hill and North Carolina State University. The award was presented to Dr. DeSimone by Jack D. Graybeal, National President, in early March 2000.

Dr. DeSimone received his B.S. Degree in Chemistry from Ursinus College in 1986 and his Ph.D. Degree in Chemistry from Virginia Polytechnic Institute and State University in 1990. Immediately following receipt of the Ph.D. Degree he began his teaching and research career at the University of North Carolina - Chapel Hill.

Professor DeSimone's discoveries in basic science and engineering using liquid and supercritical carbon dioxide position him at the center of an international effort to replace water and organic solvents in commercial manufacturing processes. He has pioneered the development of "solvent-free" synthesis and processing pathways in CO₂ with a highly acclaimed research program (77 peer-reviewed manuscripts in the most prestigious journals). This science has in turn spawned a new technology platform (already 25 issued US patents, most of which are licensed or have options to be licensed).

It is rare to encounter a revolutionary advance in a mature field, especially one that has been thoroughly developed by industry. Yet, only two years after earning his Ph.D., Dr. DeSimone showed that fluoropolymers, previously thought to be produced and processed only from freons (chlorofluorocarbons or CFCs), could in fact be synthesized from homogeneous solution in supercritical carbon dioxide. Subsequent findings by Dr. DeSimone confirmed that CO₂ is an ideal medium for the synthesis and processing of fluoropolymers, a class of polymers widely used in low surface-tension application ranging from textile water repellants to computer-disk lubricants.

Two years later Dr. DeSimone demonstrated that, with the aid of specifically designed surfactants, emulsion/dispersion syntheses of conventional high-volume polymers such as acrylic and styrenic polymers could be readily prepared in high yields in supercritical CO₂ without the undesirable waste stream of contaminated water. Again, the potential of this basic scientific discovery was immediately apparent. Dr. DeSimone's most creative chemistry exploits the "CO₂-philic" and "CO₂-phobic" nature of designed surfactants to yield new routes to soft materials with tailored supramolecular structures (e.g., discrete, micellar-like hydrophobic/hydrophilic core-shell materials). It is apparent that many of the pre-biological features such aggregates exhibit in water can now be realized in carbon dioxide.

An Industrial Consortium was established at the University of North Carolina wherein eight

key chemical companies pledged a quarter of a million dollars each to explore synthesis and processing in supercritical CO₂ under Dr. DeSimone's leadership. Dr. DeSimone and two of his students founded MiCELL Technologies, Inc. (currently 27 employees), which is providing integrated CO₂-based processes for the garment care (dry cleaning), metal cleaning, and textile processing (coating and dyeing) industries. Dr. DeSimone launched the Center for the Utilization of CO₂ in Manufacturing, which is dedicated to cleaner manufacturing methods and basic science associated with CO₂. There are currently twenty corporate sponsors of the Center and over twenty faculty and forty students/postdocs participating between the sciences and engineering disciplines at UNC and North Carolina State University.

In sum, Dr. DeSimone's discoveries in the important field of "solvent-free synthetic chemistry" have, in just a few years, catapulted him to the center of an effort directed at environmentally sound commodity chemicals manufacturing and "green" processing strategies. In addition to the Fresenius Award he was a finalist in DISCOVER Magazines Awards for Technological Innovations, received the Presidential Green Chemistry Challenge Award, was awarded an Alfred P. Sloan Foundation Fellowship, and was presented with the Carl S. Marvel Creative Polymer Chemistry Award. Dr. DeSimone is the youngest person to hold a chaired professorship in the history of the nation's oldest state university, the University of North Carolina at Chapel Hill, received the university's Chancellors Award, and received the State of North Carolina's Governors Award for Excellence.

The Officers and Members of Phi Lambda Upsilon congratulate Dr. DeSimone on a highly successful beginning of what promises to be an outstanding career in the science of chemistry. His groundbreaking findings show exceptional imagination, vision, and insight.

Presentaion of the Fresenius Award



President Jack D. Graybeal presents the Fresenius Award to Joseph DeSimone

Recipients of the National Fresenius Award

1965	Martin Karplus	Columbia University
1966	Ronald Breslow	Columbia University
1967	Mostafa El Sayed	University of California – Los Angeles
1968	John Baldeschwieler	Stanford University
1969	Roald Hoffman	Cornell University
1970	Harry Gray	California Institute of Technology
1971	Willis Flygare	University of Illinois
1972	Charles Cantor	Columbia University
1973	Nicholas Turro	Columbia University
1974	Richard Zare	Columbia University
1975	Robert Vaughn	California Institute of Technology
1976	Joseph B. Lambert	Northwestern University
1977	William B. Reinhardt	University of Colorado
1978	Patrick S. Mariano	Texas A&M University
1979	Robin J. Marks	Northwestern University
1980	John R. Shapley	University of Illinois
1981	Richard P. VanDuyne	Northwestern University
1982	Michael J. Berry	Rice University
1983	George C. Schatz	Northwestern University
1984	Mark S. Wrighton	Massachusetts Institute of Technology
1985	Ben Frieser	Purdue University
1986	Jacqueline Barton	Columbia University
1987	Ian Rothwell	Purdue University
1988	Peter G. Wolynes	University of Illinois
1989	James L. Skinner	Columbia University
1990	Nathan S. Lewis	California Institute of Technology
1991	Peter G. Schultz	University of California – Berkeley
1992	John D. Simon	University of California – San Diego
1993	Joseph T. Hupp	Northwestern University
1994	Scott D. Rychnovsky	University of Minnesota
1995	Robert M. Waymouth	Stanford University
1996	Erick M. Carreira	Massachusetts Institute of Technology
1997	Christopher C. Cummins	Massachusetts Institute of Technology
1998	Chad A. Mirkin	Northwestern University
1999	Joseph DeSimone	University of North Carolina – Chapel Hill

Notes from Chapters

ALPHA PI CHAPTER, DUKE UNIVERSITY

It was another busy year for the Alpha Pi Chapter of PLU here at Duke. In addition to continuing our traditional get-togethers and academic programs, we have been working on redefining our graduate student recruitment strategy and on developing more sustainable sources of income for our chapter.

Instead of the traditional large weekend to attract college seniors to study chemistry at Duke, we implemented three smaller weekends, with much more personal attention given to each potential applicant. This served to increase the number of matriculating students from 10 (1998) to 38 (1999). PLU wrote the proposal for the weekends, met with the administration during the planning stages and took care of the implementation of the visits. The three weekends were fun and successful for all involved.

In the past, the PLU chapter here at Duke has sold study guides or lab manuals for the general chemistry sections. This was a good source of income, but there was some concern about a graduate organization making money from the sale of required materials. In response to this concern, we have now begun selling chemistry model kits, which are an optional study aide for those taking organic chemistry. We are solely responsible for the ordering, advertising, and sale of these kits. In addition to being a viable source of continuous income, the sale of these kits will enable PLU to be financially independent from the chemistry department.

This year our chapter created two new \$250 awards dedicated to graduate students who have shown leadership and creativity during their graduate school career and have contributed to the success of both PLU and the Duke University Chemistry Department. These new awards will reward those who are active in our department and will hopefully encourage others to take a dynamic role in promoting our organization.

Many social activities, such as volleyball, beach trips, and Durham Bulls games, were sponsored by PLU, as well as the annual Hill Lecture, given in 1999 by Dr. Dale Margerum from Purdue University. The Alpha Pi chapter of PLU, throughout the years, continues to play an important role in the social and academic life of the graduate students, and allows for the increased interactions between internationally acclaimed scientists, our members, and the Duke community at large.

ALPHA IOTA CHAPTER, AUBURN UNIVERSITY

During the past year, the chapter held two meetings. At the first, winter quarter, the group heard from the Science in Motion project. This project provides equipment for high school chemistry and physics classes throughout the state of Alabama. The speakers, who drive the vans for the regional facility at Auburn, talked about the program, and what science teachers at the high school as well as the junior high and middle school level, need. The group talked about a possible service project involving either bringing demonstrations to these students or to working with them,

such as in a science club setting or helping them prepare for Science Olympiad. We plan to carry this forward in coming years.

At the second meeting, held early in spring, Dr. Marie Wooten from the zoology department was the speaker. She talked about signaling within cells and some of her biochemical research on the topic. We attracted some additional audience for this talk other than just members.

Initiates 1999

Alpha

University of Illinois

Benter, Jeffrey M. – Cassidy, Eric J. – Gallownia, Jonathan – Heidorn, Heather L. – Lim, Sang-Hyun – Manohar, Leslie – Mehta, Sandeep A. – Moriya, Rumiko – Patel, Shefali D. – Person, Eric B. – Poppe, Kimberly B. – Sarakatsannis, Jason N. – Seiler, Jake A. – Sundaram, Sivashree – Teague, Craig M. – Thekkaniyil, Joshy K.

Epsilon

University of Washington

An, Jennifer S. – Bacus, Tamara J. – Ham, James – Hartzell, Tristan L. – Hawkins, Joshua D. – Kim, Janice J. – Lee, Jee H. – Lin, Chin-Chuen S. – Phan, Trong-Ha X.

Nu

Purdue University

Achkar, Jihane – Amegayibor, Frances S. – Becker, Robert H. – Bell, Patrice – Carney, Joel – Cartrett, David P. – Flanagan, Amy M. – Gonzalez, Alberto P. – MacNaughton, Megan – Marsh, Bervil E. – Muller, Charles E. – Odeh, Ihab N. – Orgill, Mary K. – Overdorf, Jason – Pilkenton, Sarah – Pulvirenti, April L. – Rivers, Debika L. – Schweiger, Scott W. – Vidale, Kenrick L. – Wall, Rebecca K. – Yu, Ying-Qing

Xi

University of Pittsburgh

Allen, Cassandra – Badawood, Omer M. – Bartels, Jennifer A. – Curran, Dennis P. – Fletcher, Beth A. – Fortney, Carol F. – Kamenjicki, Marta – Khan, Amina S. – Lovrencic, Michael E. – Peelen, Timothy J. – Reese, Chad E. – Rosi, Kathryn S. – Skillman, Charles I. – Spithaler, Brent L.

Rho

University of Nebraska

Bhattacharyya, Saumitri – Christensen, Michael – Dray, Zachary D. – Hartung, Ryan E. – Haycraft, James J. – Jordan, Ingrid E. – Kaspar, Ronald M. – Kraska, Jason M. – McLaughlin, Patrick D. – Park, Steven – Raible, Joseph M. – Selbo, Jon G. – Theriot, Gregory C. – Trullinger,

Tony K. – Widjaja, Lusiana

Tau

West Virginia University

Clark, Stacey L. – Lowe, Preston C. – Moser, Matthew A. – Scott, Tricia L. – Valero, Maria-Rosa – Wallace, Jeffery M. – Seagraves, Lisa E. – Wan, Honghe – Yoon, Kwansik

Chi

Washington State University

Appel, Aaron M. – Bailey, Marci J. – Boitano, Anthony – Gallaher, Benjamin – George, James – Kanagaratnam, Suganthi – Matz, Philip – Maxey, Karen – Moberly, Matthew A. – Wong, Roger W.

Alpha Alpha

Rice University

Chan, Denise M. – Chiang, I-Hui A. – Denler, Tiffany E. – Edwards, Christopher L. – Emerson, James J. – Green, Brian M. – Jennings, Marisa L. – Kacher, John E. – Kanan, Matthew W. – Kangas, Ryan R. – King, Stephanie M. – Kolle, Bracken S. – Konopka, Michael C. – Kusnoor, Anita V. – Lai, Tammy S. – Lin, Champion C. – Lam, Nilson W. – Magidin, Monica – Mistry, Amit S. – Mortis, Rachel A. – Parsons, Elizabeth C. – Patel, Neil V. – Patel, Salil H. – Paxton, Christopher S. – Petrosyy, Keiko Y. – Prabhakar, Anand M. – Resendez, Daniel – Shen, Yuetong W. – Spakovsky, Kristina – Stewart, Julie N. – To, Pok Chun J. – Tremoulet, Michael C. – Tsai, James C. – Watson, Alice R. – Weber, Erin L. – Williams, Carl L. – Williams, Kevin G. – Yager, James C. – Zhang, Wei – Ziker, Dana C.

Alpha Gamma

Northwestern University

Czlapinski, Jennifer L. – Deo, Sandhya – Dixon, Felicia M. – Eisenberg, Adam H. – Gaal, Dennis A. – Gardberg, Anna S. – Hayes, Ryan T. – Holliday, Bradley J. – Keefe, Melinda H. – Johnson, Robert C. – Just, Eric M. – Merlau, Melissa L. – Morris, Gregory A. – Vander Griend, Douglas A. – Snyder, James F.

Alpha Iota

Auburn University

Adkison, Jarrod B. – Arnold, Matthew J. – Bartlett, Jon E. – Berry, Morgan L. – Black, Susan E. – Borengasser, Stephen – Bray, Carolyn R. – Carnahan, Kristin J. – Christopher, John W. – Cleckler, J. Deven – Crawford, Jack H. – Dalvi, Samir R. – Davis, Beverly A. – Donaldson, Tracie N. – Dorminey, Johnny R. – Dowdle, Steven C. – Ellison, Dallas M. – Evans, Brian A. – Flippin, William T. – Gann, Thomas H. – Gichuhi, Anthony N. – Henson, Nicolas J. – Howell, Lucius A. – Kelly, Edward O. – King, Brett A. – Malone, Kelly – Mann, John P. – Mathison, Sally M. – Maurice, Andrea L. – Mowbray, Jenny M. – Newdome, Jeffrey T. – Norman, Meredith C. – Phillips, Brandon P. – Poole, Krista D. – Reed, Emily D. – Robinson, Michael E. – Sartain, Jennifer L. – Schulz, Ryan M. – Sizemore, Allison B. – Smith, Michele L. – Stuckey,

Jason H. – Sutton, Joel K. – Thorne, Jenny R. – Traylor, Peter D. – Wallin, Aimee R. – Weeks, Jeffrey L. – Wells, Bryan J. – Whitehead, James J. – Wilkins, Lauren E. – Wilson, Landon S. – Yarbrough, Leigh A.

Alpha Pi
Duke University

Butler-Hall, Ian N. – Charles, Joseph A.M. – Choi, Bo Y. – Clark, Elizabeth J. – Estrera, Chloeanne B. – Everheart, Drew – Flaherty, Meghan M. – Garcia, Marcos F. – Hanks, Kyle – Hannawi, Nadia – Kepler, Christopher K. – Khan, Michelle J. – Kuo, James A. – Lee, Joyce S. – Marchick, Michael R. – Mettu, Priyatham S. – Miller, Johanna L. – Mihindukulasuriya, S. – Ocon, Stephani S. – Pandarinath, Rajeev – Quandt, Kevin T. – Ransom, Carla E. – Shah, Rajiv D.E. – Silinski, Peter – Smeds, Kimberly A. – Swamy, Rajiv S. – Tamirisa, Aparna – Tang, Timothy T. – Tumey, Lawrence N. – Vermut, Don S. – Wales, Thomas E. – Wang, Haochuan – Wirgau, Joseph I. – Wolff, Sarah J.

Alpha Upsilon
University of Pennsylvania

Brandt, Benjamin M. – Brunner, Alexis R. – Caruthers, Jonathan M. – Cho, Young S. – Disbrow, Gypsy M. – Friedrich, Sarah – Gifford, Lida K. – LaMarche, Matthew – MacDonald, Douglas – Macks, Daniel E. – McVaugh, Cheryl T. – Minbiole, Kevin – Pitram, Suresh M. – Pond, Bethany – Redmore, Naomi – Rosenberg, Jennifer R. – Safonov, Igor – Uyeda, Harry T.

Alpha Psi
Wayne State University

Ahmed, Abraham – Amarasinghe, Kande K.D. – Andreana, Peter R. – Bazin, Berangere N. – Endres, Gregory W. – Halls, Mathew D. – Kowal, Przemyslaw – Li, Gang – Meroueh, May – Payen, Anne J. – Perera, Jayani R. – Radzio, Marzena E. – Wu, Xiaoyun

Beta Eta
South Dakota State University

Williams, Maria F. – Zhang, Daoning

Beta Theta
Arizona State University

Baberdure, Jeremy – Bever, Jennie – Bouszuet, Robert – Burgess, Davena M. – Cornejo, Santiago M. – Danielson, Matthew D. – Hartley, Nanette K. – Leedy, Debra E. – Mi, Dehui – Minardi, Mathew – Moser, Bryan R. – Nguye, Ha – Quistorf, Peter D. – Woods, Amber M.

Beta Iota
University of Missouri

Adams, Jennifer L. – Banner, Todd – Borrok, Martin J. – Buencamino, Raphael H. – Bhansali, Jennifer K. – Campbell, Christopher A. – Cox, Kathryn E. – Cully, Amanda C. – Dewitt, A. Conan – Farber, Michael E. – Freeman, Aaron W. – Hilgenbrink, Andrew R. – Jones, Jeremy M.

– Kenney, Robert J. – Lehmen, Jeff A. – McMann, Timothy R. – Nickell, Jason S. – Perryman, Alexander L. – Pogemiller, Mark I. – Reisenbichler, Emily – Robinson, Douglas A. – Sanzottera, Christina M. – Saporita, Anthony J. – Saucier, Nathan A. – Schoen, Keary P. – Snyder, Graham M. – Vomund, Anthony N. – Wales, Christina A. – Weiss, Katherine J. – Wicker, Jason A. – Witt, Lisa M. – Woods, Danielle J.

Beta Kappa
University of Scranton

Caucci, Michael F. – Connelly, Marc E. – Erk, Kristin M. – Fair, Amanda K. – Follette, Melanie B. – Gernhardt, Roy W. – Glucksnis, Allison M. – Grasek, Erin A. – Gvazdauskas, Marcy – Howe, Jason E. – Kupchak, Brian R. – LaCapra, Cynthia – McPherson, Deanne B. – Musewicz, Julia M.A. – Pauli, Eric M. – Walker, Kimberly J.

Beta Lambda
North Carolina State University

Ballard, Charles E. – Bodner, Scot H. – Brendle, Janet E. – Bruce, Jason M. – Bui, Hai H. – Carroll, Ben R. – Charvet, Richard A. – Ciliberto, Nathan S. – Cummings, Keith L. – Elmo, Jennifer L. – Enterline, Chris F. – Evliss, Larken E. – Galligan, Ryan C. – Gillis, Stephanie E. – Gotchev, Dimitar B. – Harris, Calliandra B. – Haynes, Denise M. – Higgins, David R. – Homer, Holly K. – Honeycutt, Hayden P. – Hudson, Arthur S. – James, Nasha N. – Jones, Curtis G. – Kim, Chae H. – Leach, Daniel A. – Lelli, Sylvia M. – Lohmeier, Mary A. – Longphre, John P.M. – Ma, Li – Maniar, Sachin G. – Marinokos, Efstathia – Miller, Theresa – Moon, C. Preston – Sandelier, Matthew J. – Sauthier, Marc L. – Sherrod, Timothy J. – Smith, Brandye M. – Smith, Dennis S. – Springsteen, Greg G. – Staples, William B. – Sun, Sophia – Tam, Michele P. – Urban, Brian – Varner, Dwan Q. – Watson, Edison N. – Whitt, Donna J. – Womack, Andrew W. – Zack, Ashlee F.

Beta Mu
Southern Methodist University

Ferris, Hedda U. – Johnson, Ralph S. – Kumar, Ramow – Lynch, Bruce A. – Mabry, Jennifer E. – Sahai, Sunil K.

Beta Xi
Xavier University

Amos, Lakicia R. – Bryant, Yolanda – Boyd, Sonia B. – Burton, Regina S. – Dean, Rashonda L. – Finch, Kisha M. – Gholar, Tiffany S. – Green, April D. – Griffin, Christina M. – Hall, Brian G. – Harris, Rashante B. – Hayes, Jason – Holmes, Danielle A. – Jackson, Rozalie V. – Johnson, L'Aurelle A. – Kilgore, Adrienne L. – McCarthy, Michelle M. – McDaniel, Christina M. – McKendall, Jared A. – Moore, Monica Y. – Prentice, Nikkisha – Rhodes, Mandisa M. – Rice, Jacqueline N. – Suber, Liza M. – Tauheed, Jannah D. – Thompson, Husan M. – Tran, Tuyetnga T. – Tutt, Tumari J. – White, Christina A. – Williams, Lashonda L. – Wilson, Heatheranne M.

Beta Omicron

Depauw/Wabash Universities

Abdalkhani, Arman – Byrn, Robert W. – Campbell, Gary J. – Dirks, Robert M. – Dombrowski, Ryan A. – Feller, Scott – Hartzell, Kevin M. – House, Darlene R. – Huffer, Christopher J. – Jennings, Meagan M. – Kiefer, Melissa A. – Klopac, Corrie E. – Kreuzmann, Theresa M. – Sheets, Clinton W. – Williams, Amie L. – Whittaker, David G. – Worth, Jennifer M.

Beta Sigma

Valparaiso University

Achatz, Julie C. – Amrozowicz, Jessica B. – Beauvais, Nicole K. – Bender, Jennifer A. – Bowling, Nathan P. – Dahlgren, Karie N. – Dimitroff, Lisa – Foelber, Jonathan R. – Hartwig, Jeffrey W. – Kaufman, Erica E. – Kerr, Heather A. – Kreeger, Pamela K. – Matson, Zachary D. – Nieto, Jennifer M. – Olsen, Grant J. – Olson, Sarah E. – Provenzano, Matthew J. – Reinicke, Kathryn E. – Scegiel, Jennifer E. – Switek, Karen A. – Wegman, Allison A. – Wenzel, Nicole K.

Procedure for Nominating Honorary Members

All chapters are urged to participate in nominating honorary members. Remember that regular membership in the Society in no way precludes consideration for Honorary membership. The procedure used for nomination and selection is as follows:

- (a) Honorary members shall be nominated by local chapters.
- (b) Each chapter shall be limited to two nominations in any one year.
- (c) The nominating chapter shall submit a letter of nomination and a biographic sketch of their nominee including publications authored, positions held, honors received, and services rendered.
- (d) Fifty (50) copies of the nomination shall be forwarded to the national Secretary by November 15 of the year of submission.
- (e) The National Secretary shall distribute the information on the nominees to the chapters by December 15.
- (f) The chapters shall return their votes on each nominee to the National Secretary by February 15.
- (g) The award shall be presented by the nominating chapter in cooperation with the National Officers.

Travel Grant Program

At the 1980 Congress the representatives established a fund for the purpose of subsidizing travel expenses of student members presenting papers at scientific meetings. I would like to urge members who are in need of support for such travel to avail themselves of this opportunity. **To improve the use of this fund the 1998 Congress removed the match requirement by the chapters.** There are two allocation periods established, July 1 to December 31 and January 1 to June 30. Applications for travel grants will not be considered earlier than November 15 for the January to June period and May 15 for the July to December period. Applications must be received by the National President no later than one month before the meeting at which the paper is to be presented.

Applications should include the following information: applicant's name and chapter; name, date, and location of the meeting to be attended; abstract of the paper to be presented; funds requested; travel mode; and signature of the applicant's chapter counselor and chapter president.

Any given chapter is eligible to have any of its members receive a travel grant up to **\$250 semiannually**. Grant applications received by the president in the two week period following the November 15 and May 15 dates shall be considered and choices made on a random basis in the event that the total requests are more than the funding available for the allocation period. Chapters which have not received funds in the given year will be given preferential consideration. Requests received after the initial two week period will be considered on a first come first served basis. Eligibility for a travel request, based on the quality of the abstract and the nature of the meeting where the paper will be presented, is to be determined by the chapter and will not be performed by the national president.

Travel Grant Recipient Abstracts

"Phosphonate Mimics of Fructose 6-Phosphate: Synthesis and Enzymatic Evaluation"

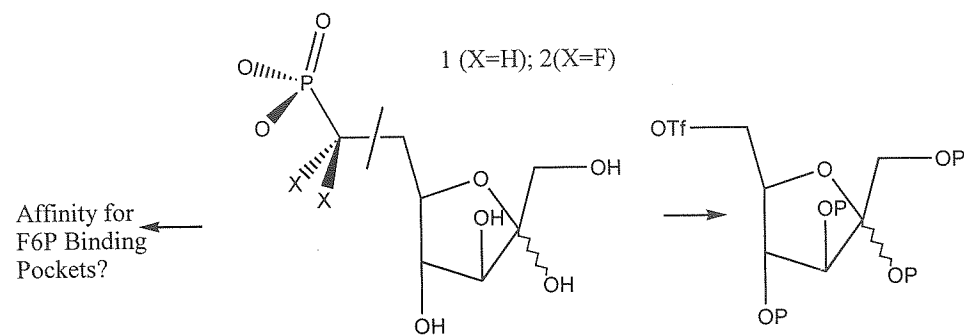
David B. Berkowitz, Debnath Bhuniya, and **Mohua Bose(Rho Chapter)**

Department of Chemistry, University of Nebraska – Lincoln, Ne 68588-0304

Bernard Badet, Marie-Ange Badet-Denisot, and Alexia Desir-Chassagne

Institut de Chimie des Substances Naturelles – CNRS, 91198 Gif-sur-Yvette, France

We have recently developed a new pair of reagents, which carry benzyl ester protection and permit for the construction of simple phosphonates and α,α -difluorinated phosphonates, such as fructose 6-phosphate analogs, **1** and **2**. Details of the synthetic methodology and preliminary data on the ability of **1** and **2** to bind to enzymatic F6p binding sites will be presented.



"Kinetics and Mechanism of the Ferrate Oxidation of Dimethyl Sulfide in Aqueous Media"

Derek F. Dormedy(Rho Chapter), Timothy R. Shepherd and James D. Carr

University of Nebraska Chemistry Department, Lincoln, NE 68588-0304

The oxidation mechanism of aqueous dimethyl sulfide (DMS) by ferrate (VI) ion to form dimethyl sulfoxide (DMSO) was studied. In addition to spectrophotometric kinetic measurements, oxygen-18 labeled water is used to track the source and destination of the oxygen atoms involved in this reaction. This is accomplished by using GC-MS to monitor the incorporations of labeled oxygen in the DMSO. Quenching the reaction at various times with hydroxylamine provides intermediate information. This work showed that an oxygen atom transfer takes place between the ferrate and the DMS with little influence or incorporation by the solvent oxygen.

"Electrospray High Resolution Ion Mobility Spectrometry – A Rapid Separation Technique"

G. Reid Asbury(Chi Chapter), Joerg Klasmeier, Ching Wu, and Herbert H. Hill

Washington State University, Pullman, WA 99164-4630

Ion mobility spectrometry (IMS) has in the past been a low-resolution technique. This lack of resolving power has primarily limited IMS' uses to those as a detector after chromatographic separations. Recently our lab has developed an IMS instrument¹ that has resolving powers similar to those seen in HPLC. With this increased resolution IMS is now capable of separating complex mixtures without the use of chromatography. By using IMS as a stand-alone separation and detection device analyses can be performed in seconds rather than several minutes to hours by traditional chromatographic separations. This decrease in analysis time would certainly increase sample throughput and likely decrease the average cost per sample.

A number of high-resolution separations (such as **figure 1**) will be demonstrated showing the potential of the technique for analyzing compounds such as explosives, chemical warfare (CW) degradation products, and biomolecules. Comparisons of IMS with other separation techniques with respect to resolving power, speed, and ease of operation will be made. In addition, certain instrumental parameters such as temperature, drift gas, and voltage will be discussed as they relate to resolving power and selectivity. Finally, detection limits for a number of compounds will be given to demonstrate the sensitivity of the technique.

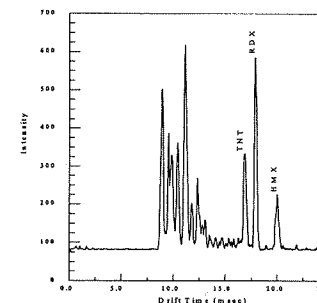


Figure 1- Separation of three common explosives by IMS.

¹Wu, Siems, Asbury, Hill *Analytical Chemistry* **1998**, 70, 4929-4938.

"Study of Plutonium Partitioning to Contaminated Sediments"

Stacey M. Loyland(Chi Chapter), Stephen P. LaMont, Sarah Herbison and Sue B. Clark

Washington State University, Pullman, WA 99164-4630

Although the seasonal cycling of Pu in warm, monomictic fresh water systems has been reported, the underlying mechanisms controlling the transfer of Pu from sediments to the water column are not well understood. Elucidation of such geochemical processes would aid in understanding and

predicting Pu mobility in aquatic systems and would be useful in developing soil remediation technologies. In this work, the mechanisms of Pu releases from sediments collected from Pond B of the Savannah River Site, SC are under investigation. The distribution of Pu in various soil fractions has been determined. The Pond B sediment has been fractionated into nine size fractions: >425 μm , 425-73 μm , and 75-53 μm representing the coarse, medium and fine sand fractions; 53-20 μm , 20-5 μm , and 5-2 μm representing the coarse, medium and fine silts; and 2-0.2 μm , 0.2-0.08 μm , and the <0.08 μm fractions representing the coarse, medium, and fine clays. We observe that the plutonium is not homogeneously distributed in the various size fractions of the sediment. Not surprisingly, the majority of the plutonium is found in the smaller fractions of the sediment. However, the nature of the Pu in the various fractions differs, but the reason for this behavior is not clear. Using fission track analysis, ^{239}Pu in the size fractions can be observed. Once particles bearing ^{239}Pu are isolated, their elemental composition will be analyzed. These results will be compared to results from sequential extractions of the bulk sediment.

"Groups 4, 5 and 6 Transition Metal Chemistry Supported by New Bulky Aryloxy Ligand"
Jonathan S. Vilardo(Nu Chapter), Phillip E. Fanwick and Ian P. Rothwell
 Purdue University, 1393 Brown Building, West Lafayette, IN 47907

The compound 3,5-di-tert-butyl-2,6-diphenylphenol has recently been shown to be immune to intramolecular C-H bond activation due to the steric hindrance of the meta substituents. In order to explore the effect of chirality in our catalytic systems, we have set out to synthesize a new series of aryloxy ligands. 3,5-di-tert-butyl-2,6-di(1-naphthyl)phenol; 3,5-di-tert-butyl-2,6-di(ortho-tolyl)phenol; and 3,5-di-methyl-2,6-di(1-naphthyl)phenol have been obtained in chiral (d,l) form utilizing bismuth arylation techniques. ^1H NMR and X-ray crystallographic studies have shown these phenols to be of the chiral form due to the orientation of the ortho substituents on the phenyl ring. The synthesis, characterization, and reactivity of Ti, Nb, Ta, and W complexes $[\text{M}(\text{Oar})_2\text{Cl}_2, 3, 4; \text{CpM}(\text{Oar})\text{Cl}_2, 3]$ supported by these aryloxy ligands will be discussed.

"Group (IV) and Group (V) Metal Alkylidene and Alkylidyne Derivatives Supported by Carbazole Ligand"

Patrick N. Riley(Nu Chapter), Philip E. Fanwick, and Ian P. Rothwell
 Department of Chemistry, Purdue University, West Lafayette, IN 47907

The alkylidyne bridged dimers $[(\text{R})_2\text{M}(\mu\text{-CSiMe}_3)_2\text{M}(\text{R})_2]$ ($\text{M} = \text{Nb, Ta, R} = \text{CH}_2\text{SiMe}_3$), react with an excess of carbazole reagents to produce the *tetra*-substituted derivatives $[(\text{N}')_2\text{M}(\mu\text{-CSiMe}_3)_2(\text{N}')_2]$ ($\text{N}' = \text{cb(1), thcb(2), cbh-3bu(3)}$). Reaction of (1) with various substituted alkynes produces novel 1,3-dimetallabenzynes. Reaction of organic isocyanides with (1) leads to insertion of the isocyanide into the bridging alkylidyne unit. The *bis*(benzyl) $[(\text{cb})_2\text{Ti}(\text{CH}_2\text{Ph})_2]$

(4) and alkylidene bridged dimer $[(\text{cb})_2\text{Ti}(\mu\text{-CSiMe}_3)_2]$ (5) are formed by adding carbazole to the *tetra*(alkyls) $[\text{TiR}_4]$ ($\text{R} = \text{CH}_2\text{Ph, CH}_2\text{SiMe}_3$). Treatment of (4) and (5) with 2,6-dimethylphenylisocyanide leads to organometallic products containing new carbon-carbon bonds. The reaction of CpTiCl_3 with potassiocarbazole (cbK) results in $\text{Cp}(\text{cb})\text{TiCl}_2$. The reaction of Cp^*TaCl_4 with cbK affords the intramolecular C-H bond activated product $[(\text{C}_5(\text{CH}_3)_4\text{CH}_2)\text{Ta}(\text{cb})_2\text{Cl}]$. The structures and spectroscopic properties of these new compounds will be discussed.

"Negative Thermal Expansion in AOMO₄ Compounds"

Tammy Amos(Alpha Beta Chapter)

The expansion properties of inorganic compounds are of considerable interest when determining possible applications for composites and other materials. Through investigation of compounds which exhibit this property, we try to gain a better understanding of the different mechanisms involved. The framework structures of tetragonal NbOPO_4 , monoclinic NbOPO_4 and TaOVO_4 , have been studied as a function of temperature using neutron and X-ray diffraction. Negative thermal expansion has been seen in the orthorhombic structure and above the transitions in the tetragonal and monoclinic structures. This property is attributed to the rocking motions of the corner-shared octahedra and tetrahedra.

"Trace Metal Analysis by Resonant Laser Ablation"

Peter Stchur(Alpha Phi Chapter), Xiandeng Hou, Chris Caporuscio and Robert G. Michel
 Department of Chemistry, University of Connecticut, 55 N. Eagleville Road, Storrs, CT 06269-3060

An optical parametric oscillator (OPO) laser was used to resonantly ablate trace metals from steel samples by tuning to a gas phase atomic transition of an element in the sample. The atomic emission signals, detected in a microwave induced plasma (MIP), were enhanced by factors greater than five. This resonant ablation approach requires less laser energy than is used for conventional ablation. The resonant ablation spectra are simpler than traditional ablation spectra, which should result in reduced spectral interferences compared to other approaches to laser ablation. This sensitive and selective technique has many possible applications for real sample analysis. For example, surface studies, such as imaging, could be employed for quantitative and qualitative chemical characterization. Possible resonant ablation mechanisms will be discussed.

"Preparation of New Materials for Secondary Batteries"

Theresa A. Hugener¹(Alpha Phi Chapter), F. Galasso¹, S.L. Suib¹, G.M. Ehrlich² and C. Durand³

(1)Department of Chemistry, University of Connecticut, U-60, 55 N. Eagleville Rd., Storrs, CT 06269, (2) Yardney Technical products, Inc., 82 Mechanic St., Pawcatuck, CT 06379, (3) Yardney Technical Products, Inc.

The development of new materials for secondary batteries is driven by the demand for new lithium insertion negative electrode materials. Good electrical and lithium ion conductivity, structural stability, high cell voltages, and practical synthetic routes are necessary for commercially feasible materials. Depending on grain size, insertion materials of tin(II) oxide have been reported to have exceptional reversible capacities of 540 mAh/g – 640 mAh/g.

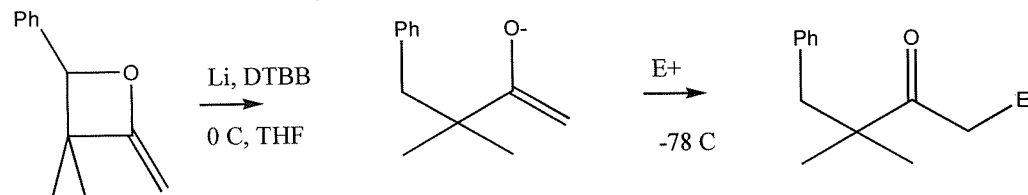
An electroless plating process successful for producing micron thick coatings of tin on a copper substrate has been used in producing composite tin oxide materials of grain size less than 500 Å. A bath solution composed of aqueous solutions of tin(II) chloride, sodium hydroxide and sodium citrate undergoes disproportionation upon addition of a powdered magnesium oxide or carbon substrate to afford composite tin(II) oxide materials. Grain size can be controlled by varying reaction conditions. The dependence of grain size versus type of substrate, reagents and temperature has been investigated.

"Enolate Dianions via Reductive Ring Opening of 2-Methylene-oxetanes"

Mehrnoosh Hashemzadeh(Alpha Phi Chapter) and Amy R. Howell

Department of Chemistry, University of Connecticut, Storrs, CT 06269-3060

Functionalized organolithium compounds are versatile intermediates in synthetic organic chemistry because they react with various electrophiles to give multifunctionalized organic structures in a one step reaction. Arene-catalyzed lithiations of oxetanes, thietanes, and aziridines have been used to prepare dianionic enolates by the reductive ring opening of 2-methyl-oxetanes. Subsequent trapping with aldehydes, ketones, and alkyl halides provides functionalized ketones in a highly regioselective and efficient process.



"Decomposition of 2-Propanol over OMS-2 Catalysts with Different Metal Cation Dopants"

Xiao Chen(Alpha Phi Chapter), Y.F. Shen, H. Zhou, S.L. Suib and C.L. O'Young

The catalytic properties of manganese oxide octahedral molecular sieve materials (OMS-2) with different cation dopants (M: Cu²⁺, Zn²⁺, Ni²⁺, Co²⁺, Al³⁺, or Mg²⁺) were investigated in the reaction of 2-propanol decomposition. Compared with other M-OMS-2 catalysts, Cu-OMS-2 catalyst has much higher conversion of 2-propanol and the highest selectivity to acetone at 300°C. As for the selectivity to propene, it is generally below 5%.

The reaction results are discussed in consideration of characterization results of the M-OMS-2 catalysts. In-situ FTIR studies suggest that Cu-OMS-2 has more active sites for 2-propanol than Al-OMS-2 and K-OMS-2. The phase transitions from cryptomelane to hausmannite, finally to manganosite were observed with XRD studies of Cu-OMS-2 catalysts during the reaction.

"Oxidative Dehydrogenation of Ethylbenzene to Styrene over Manganese Oxide Octahedral Molecular Sieve (OMS) Materials"

Hua Zhou(Alpha Phi Chapter), X. Chen, J.Y. Wang, J. Luo, G.G. Xia and S.L. Suib

Department of Chemistry, U-60, University of Connecticut, Storrs, CT 06269-3060

Dehydrogenation of ethylbenzene is still a major method for producing styrene in industry. The major drawbacks of this process include 1) high reaction temperature and 2) low yields. A great deal of attention has been given to the oxidative dehydrogenation of ethylbenzene to styrene. Manganese oxide octahedral molecular sieve (OMS) materials have been found to be unique for the oxidative dehydrogenation of hydrocarbons. A series of OMS materials doped with first row transition metal cations were synthesized, characterized, and studied in the oxidative dehydrogenation of ethylbenzene to styrene in gas phase reaction. The results showed that at 400 °C [M]-OMS-1 materials gave higher numbers in both overall reaction conversion and selectivity to styrene, which ranged from 67% to 84% and 18% to 63%, respectively. The [M]-OMS with different metal dopants gave different reaction conversions and selectivities to styrene. [Cu]-PMS-1 gave the highest reaction conversion. [Mg]-OMS-1 gave the highest selectivity to styrene.

Instructions For Authors

All members of the society are invited to submit articles for publication in **The Register**.

Articles submitted for consideration should not be highly technical ones which require meticulous reviewing but more general in nature such as: 1) Reviews of important areas of chemistry with the objective of looking at the progress which has been made and the future direction the area is likely to take. 2) General overviews of the nature of chemical research in various non-academic research institutes. 3) Articles which will acquaint the membership with the history and development of the society. 4) Articles dealing with the philosophies and politics of science.

Within the context of these four types of articles members are invited to both submit articles of their origin or encourage qualified chemists to contribute articles. The rules regarding the processing of articles for publication are minimum but include:

1. Submitting articles should be restricted to a length of 2000 words or less.(6-7 double spaced pages).
2. All articles should be typed, double spaced and submitted in duplicate.
3. The suitability of an article for publication will be determined by the Editor in consultation with members of **The Register** Committee and the Executive Committee.
4. The deadline for receipt of articles will be September 15.
5. Authors will be consulted regarding any possible revisions or changes in articles prior to publication.
6. Articles should be mailed to the Editor: Dr. Richard White, CSB/SJU, 37 S. College Ave., St. Joseph, MN 56374-2099.

The 1998 Congress established a \$500 per year award to be given to the outstanding paper presented to the Register by student PLU members. The purpose is to foster student publications. Papers must be submitted following the guidelines above. Submitted papers will be judged by five chapter presidents serving as peer reviewers.

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