

theCHEMICALbulletin

FEBRUARY • 2000

CHICAGO SECTION AMERICAN CHEMICAL SOCIETY

Regular Monthly Meeting

FRIDAY, FEBRUARY 25, 2000

THE DIPLOMAT WEST
681 W. North Avenue
Elmhurst, IL

DIRECTIONS TO THE MEETING

FROM DOWNTOWN CHICAGO: Take Eisenhower Expressway (290) West; exit at North Ave. westbound (exit 13B). Go west on North Ave. to Route 83. The restaurant is located on the northwest corner of North Ave. and Route 83.

FROM THE WEST: Take I-88 east to Route 53 north to North Ave. Go east on North Ave to Route 83. The restaurant is located on the northwest corner of North Ave. and Route 83.

FREE PARKING

TOPICAL GROUP 5:00 PM to 6:00 PM

Elmhurst College Science Center
190 Prospect Avenue
Elmhurst, IL

DIRECTIONS

FROM CHICAGO: Take Interstate 290 west to St. Charles Road West and proceed to Prospect Avenue. Turn right on Prospect Avenue. The Science Center with parking is on the corner of Prospect and Church.

FROM THE SOUTH: Take Interstate 294 north to Interstate 290 West (to Rockford) and follow directions above.

FROM THE NORTH: Take Interstate 294 south to the exit marked "I-290 West/ U.S. 20-Lake/ Ill. 64- North Avenue". Exit immediately at "Ill 64- North Avenue" and proceed west approximately 1.5 miles to Maple Avenue. Turn left on Maple Avenue proceed across the tracks to the campus. (Maple Avenue becomes Prospect Avenue south of the tracks. The Science Center with parking is on the cor-



ner of Prospect and Church.

Prof. Duncan J. Wardrop, Assistant Professor University of Illinois at Chicago, "Natural Product Synthesis through Template-Directed C-H Bond Insertion Reactions: Approaches to the Synthesis of Zaragozic acid A and Mycestericin D".

During the last two decades, the dirhodium(II)-catalyzed intramolecular insertion of metal carbenes into unactivated C-H bonds has emerged as a particularly powerful method for the construction of both carbocyclic and heterocyclic systems. Recent work from our laboratory has uncovered a novel method for the simultaneous desymmetrization and functionalization of meso-1,3-diols utilizing a C-H bond insertion reaction. We are currently applying this strategy to the synthesis of a diverse range of biologically relevant target molecules, including the antihypertensive agent zaragozic acid A and the potent immunosuppressant mycestericin D.

Dr. Wardrop received a BSc (Hon-

ors) from Glasgow University in 1991, and a Ph.D. from Glasgow University in 1994. He did Postdoctoral study at Oregon State University during the years 1995-1997.

SOCIAL HOUR 6:00- 7:00 P.M.

DINNER 7:00 P.M.

Dinner reservations are required and should be received in the section office (847/647-8405) by noon on Tuesday, February 22, 2000. Dinner cost is \$25.00 to Section members. Cost to

(continued on page 2)

JOB CLUB

The next meeting of the Chicago Section Job Club will be held on Friday, February 25 at The Diplomat at 5 p.m. The Job Club provides a continuing opportunity for unemployed members of the Section to meet with one another, share their experiences and develop a network that may help in identifying employment opportunities. Bring plenty of resumes and business cards to distribute to your colleagues.

Should you wish to attend the Section meeting following the Job Club, the fee for unemployed members is only \$12, and you can continue your networking activities. Please call the Section office for reservations and indicate that you are eligible for a discount.

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(continued from page 1)

non-Section members is \$27.00. Seating will be available for those who wish to attend the meeting without dinner. **PLEASE HONOR YOUR RESERVATIONS.** The section must pay for all dinners ordered. No-shows will be billed.

The menu consists of Vegetable Soup, Sliced tomatoes with green onions, roast turkey, whipped potato, peas and carrots, peppermint ice cream, and beverage. White Fish entrée available upon request at the time of reservation.

GENERAL MEETING 8:00 P.M. THE TOPIC:

Christopher L. Marshall, Chemical Technology Division of Argonne National Laboratory, Argonne, IL, "New Mesoporous Supports for the Desulfurization of Diesel and Heavy Oils".

Hydrodesulfurization (HDS) represents a crucial component of current petroleum refining operations in terms of both environmental and economic considerations. At the same time that crude oils are becoming heavier with increasing amounts of sulfur, product regulations are becoming increasingly more stringent. Therefore, new support materials and new active phases for high performance HDS catalysts are needed. Because of the large size of the organic molecules in the heavy oil fractions, HDS catalyst supports contain primarily mesopores and macropores. At present, a focus of intensive effort has been the development of new support materials with pore diameters optimized for desulfurization of heavy oil molecules.

Two types of synthetic mesoporous materials were investigated as size selective supports for HDS catalysts. In the first, mesoporous synthetic clays (MSCs) were synthesized in the presence of a neutral polymer, polyvinylpyrrolidone (PVP), to systematically vary the pore size (in the mesoporous range of 40-100 Å). The second material, M41S is a new family of mesostructured molecular sieves patented by Mobil scientists in the early 90's. M41S has a uniform, one dimensional and hexagonal pore structure in the range of 20-100 Å. Both materials have very uniform pore size distributions and show great promise as a catalyst support for HDS purposes.

The pore diameter of the MSC catalysts was found to have a strong effect on both the HDS activity and selectivity. An increasing pore diameter led to a nearly linear increase of activity and a boost in selectivity. The activity profile

may indicate that the internal diffusion of large molecules (such as dibenzothiophene) still plays a critical role in the HDS reaction. The higher selectivity was achieved in larger pores because larger pores make it easier for primary products to diffuse out of the pores preventing further hydrogenation and hydrocracking.

The Si/Al ratio of the M41S catalysts has an effect on HDS performance. The HDS activity at 400 °C increased with increasing Al content (to a maximum at Si/Al = 60). This suggests that increasing amounts of Al may create more sites for anchoring the Co-Mo-S within the M41S framework. Increasing the Si/Al ratio, however, results in a decrease in the HDS selectivity. The selectivity loss is probably due to an increase in acidity which shifts the reaction network from HDS to hydrocracking. Titration of the acid sites on the surface minimized this problem.

This work was performed under the auspices of the Office of Basic Energy Sciences, Division of Chemical Sciences, U. S. Department of Energy, under contract number W-31-109-ENG-38 and the Office of Fossil Energy - National Petroleum Technology Office.

THE SPEAKER:

Dr. Christopher Marshall is an inorganic chemist in the Chemical Technology Division at Argonne National Laboratory. He has nearly 20 years of experience in the field of catalyst synthesis and testing. Before coming to Argonne National Laboratory, Dr. Marshall worked in catalyst process research for

a major petroleum company. Among his accomplishments are four U.S. patents with two more currently pending, and more than 25 papers published in referred journals. He has been interested in understanding the chemistry on the surfaces of solid catalysts, with emphasis on in situ techniques for determining structure activity relationships in catalysis. Currently, Dr. Marshall's group is studying catalytic processes for hydrodesulfurization, steam reforming, and selective oxidation of aromatic hydrocarbons. He has also been a leader in the use and integration of computational chemistry with experimental catalysis research.

Dr. Marshall received his Ph.D. in 1980, and his M.S. in 1977, in inorganic chemistry from Michigan State University. His B.S. in Chemistry is from SUNY at Postdam in 1975. He is a member of the American Chemical Society Petroleum Chemistry, Fuel Chemistry, and Colloid Chemistry Divisions. Dr. Marshall's involvement with the Catalysis of Chicago (North American Catalysis Society) includes: Program Chairman, President and Board of Directors. He has also chaired several catalyst sessions at regional and national meetings including serving as General Chair of the 15th North American Catalysis Society Meeting in Chicago in 1997.

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"CHEM SHORTS" For Kids

Crayon Chemistry

Kids, did you ever wonder what crayons are made of and how all those different colors arise? You probably know that they are "wax" crayons, but let's go a little bit deeper than that. Waxes are a mixture of chemicals called esters, fatty acids, alcohols and hydrocarbons. They are for the most part natural substances and are either "animal, vegetable or mineral" in origin. There are many different kinds such as beeswax (animal), carnauba (plant), and candelilla (plant). And then there is paraffin, obtained from petroleum (or "mineral"), from which crayons are made. Paraffin in chemical terms is a straight chain hydrocarbon: one molecule has 26-30 carbon atoms in a row with 2 or 3 hydrogen atoms attached to each. Add a little color (dye or pigment) and presto, you have a crayon.

We urge you to visit a fantastic crayon empire called The Crayola Factory in Easton, PA (610-515-8000) where you can watch crayons being made. The paraffin is delivered to them in heated tanker-train cars and stored in two-story silos. When needed, the wax is pumped into large, heated kettles and mixed with pigment. This crayon mixture is pumped into a rotary mold machine that has thousands of crayon shaped holes, and chilled with cold water. An Instron testing device is used to check the barrel and tip strength of crayons because a strong crayon is a better crayon (sometimes kids grab crayons by the handful or press too hard when they draw or color).

All Crayolas contain the same amount of paraffin wax blend. But their density depends on the amount of color pigments added. Therefore, some crayons will float in water while others will not, and some will sink faster than others. Find out for yourself by performing your own experiments (although we won't be responsible for actually telling you to dump your whole box of 96 colors into a bathtub). No one is saying what pigments are really used because that information is top secret. Some examples for reds might be ocher (an iron oxide mineral), carmine (from an insect), or madder (from a plant). All we can be sure of is that several different pigments are used and that they are all non-toxic.

If you are interested in recycling, can you think of a way to re-use your broken crayons instead of throwing them away? One thing to try, with the help of an

adult, is to put all the broken pieces into an empty soup can and put this into a shallow pan of water on the stove. The adult can then heat the water enough to melt the crayons, and pour the warm wax into a new mold of some type.

Fun Facts: The average American kid uses 730 crayons by the age of 10. Red and blue are the two favorite colors worldwide. Sulphur, a yellow-green combination, is the most disliked color in the world. The name Crayola ("oily chalk") is from the French word "craie", which means chalk, and "ola" (from oleaginous), which means oily. Although there are 96 different Crayola colors, there are only 18 different label colors. Among the 20 most recognized smells in the world, crayons placed 18th (first was coffee, followed by peanut butter).

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References: The Crayola Company
website at www.crayola.com.
Past "ChemShorts" are on the internet at:
<http://membership.acs.org/C/Chicago/C>
hmShort/kidindex.html

Submitted by: K. A. Carrado
Elementary Education Committee.

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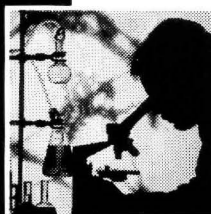
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"CALLING ALL STUDENTS (AFFILIATES)"

If you're reading this Chair's column in print, you're probably wishing that winter was over. If you're reading this on the Chicago Section Web site, congratulations! You may have a chance to do a good deed before New Years (and that Millennium business).

One of my goals as Chair of the Chicago Section was to promote ACS membership, active of course, at the college student level. A decade or two ago, due to some adjunct teaching, I was familiar with the ACS Student Affiliate Group (henceforth ACSSA) at nearby Illinois Benedictine College (now, of course, Benedictine Univ.). In the fall of 1998, I got to know the ACSSA group at North Central College and participated in a few of their activities.

Inspired by what kind of programs I knew could be offered, in March 1999, I sent a letter to all 14 known ACSSA leaders in the Chicago Section membership. Briefly, I urged ACSSA to reactivate or be more active, participate in Section activities, and communicate with other Section members and other ACSSAs, especially via the Section web site. The resulting silence was deafening - the only group or advisor I heard from was my new friends at North Central.

In the best interest of all concerned (i.e., the entire membership of the Chicago Section ACS, current or potential), I'm trying again to stir up interest in student participation in chemical activities. So, this appeal is addressed to all members. If you're in a college or university, please investigate what sort of activities are available for chemistry students. Although an ACSSA is preferred, we'd be interested in hearing about any such activities, of ACSSA, chemistry clubs, etc. If no such activities exist at your school, champion their beginning.

If you're not formally connected to a local college or university, investigate the situation at any local school of interest to you, whether your alma mater, or just a school you're interested in. Per my advice to staff members above, determine if there's some sort of chemistry student group at the school and what sort of activities they do. If no group exists, help promote the formation of such a group.

Leaders of existing groups, please tell us what you're doing. Career planning, National Chemistry Week on campus, and outreach to Elementary School kids are all programs that I'm aware of in ACSSA groups. I encourage everyone

to browse the Section web site at <http://membership.acs.org/C/Chicago>. Milt Levenberg, the Section Web Meister, has agreed to set up a Student Activities "page" on the web site. All he needs is material. Please funnel that material through either me at buntrock2@earthlink.net or the Section office at gayle@teianalytical.com.

Come on, let's make this a prime millennial resolution - show your school (chemistry) spirit!

Bob Buntrock
Chair, Chicago Section ACS

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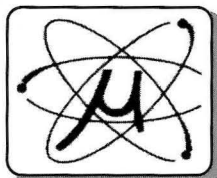
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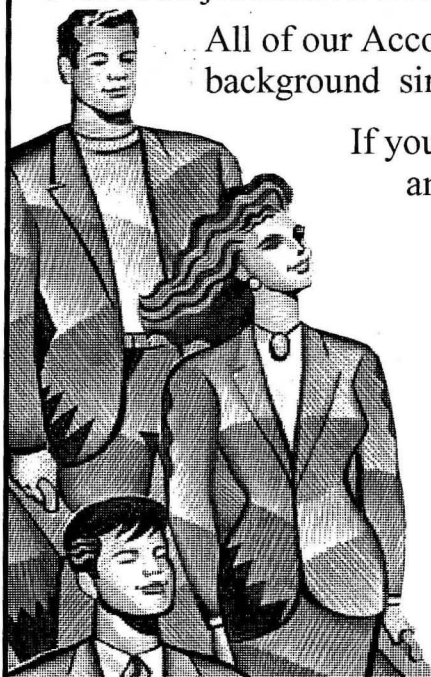
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All inquiries should be directed to the CCDG Awards Chairperson, Jim Michels (630-305-2318, jmichels@nalco.com). Copies of the applications for both scholarships are available on the CCDG web site (WWW.CCDG.ORG). Applications for both scholarships will be accepted until Friday, April 28, 2000.

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Illinois Institute of Technology's Daniel F. and Ada L. Rice Campus will showcase the interactive and diverse world of engineering in its 16th annual DuPage Area Engineers' Week program on February 26, 2000.

The Saturday event, which will be open from 12 noon to 4 pm, will emphasize interactive displays and presentations including flight simulations, cryogenics-the "coolest science," Smart Cards, the Rube Goldberg contest, the Internet, and a ScavEngineer hunt.

IIT's Rice Campus is located at 201 East Loop Road, Wheaton. For more information on the DuPage program, call 630/682-6040 or visit the program's web site at <http://www.rice.iit.edu/engineersweek>



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CALENDAR

March 7-9, 2000. The ASTM Committee E-27 on Hazard Potential of Chemicals will meet at the Clarion Hotel in Mobile, AL. For more information contact Len Morrissey, ASTM at (610) 832-9730.

March 17, 2000. The Chicago Section American Chemical Society presents Public Affairs Night to be held at Como Inn in Chicago. The speaker will be Viscount David Samuel. For additional information call the Section Office at (847) 647-8405.

March 26-30, 2000. The 219th American Chemical Society National Meeting will be held in San Francisco, CA

March 26-31, 2000. Corrosion/2000, NACE's (National Association of Corrosion Engineers) 55th Annual Conference and Exhibition will be held in the Orange County Convention Center in Orlando, Florida. For more information contact NACE Membership Services Department at (281) 228-6223.

April 14, 2000. The Chicago Section American Chemical Society presents Peter Maul on "Nanocomposites" to be held at North Shore Holiday Inn in Skokie. For additional information call the Section Office at (847) 647-8405.

April 27-28, 2000. Professional and Analytical Consulting Services (PACS) will present a conference on Environmental Laws in Pittsburgh, PA. For more information contact Barbara Sherman, PACS at (724) 457-6576 or (800) 367-2587.

April 28-30, 2000. The ASTM Committee C-28 on Advanced Ceramics will meet in conjunction with the American Ceramic Society in St. Louis, MO. For more information contact Gloria Collins, ASTM at (610) 832-9715.

May 9, 2000. The Chicago Section of the Society for Applied Spectroscopy presents Dr. David Lankin on "NMR - Where We've Been and Where We're Going." For more information/reservations contact (630) 603-5579.

May 19, 2000. The Chicago Section American Chemical Society presents the Willard Gibbs Award Banquet to be held at Windows Restaurant in Skokie. For additional information call the Section Office at (847) 647-8405.

June 11-13, 2000. The 48th American Society for Mass Spectrometry Conference on Mass Spectrometry and Allied Topics, will be held in Long Beach, California. For more information contact the American Society for Mass Spectrometry, 1201 Don Diego Avenue, Santa Fe, New Mexico 87505, at (505) 989-4517 or e-mail: asms@asms.org.

June 23, 2000. The Chicago Section American Chemical Society presents the final meeting of the 1999-2000 year to be held at Steven's in Elmhurst. The speaker will be David Piazza. For additional information call the Section Office at (847) 647-8405.

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