



THE CHESAPEAKE CHEMIST

MARYLAND SECTION
AMERICAN CHEMICAL SOCIETY

VOL. XXXVIII

SEPTEMBER, 1982

NUMBER 6

W. R. GRACE



WASHINGTON RESEARCH CENTER

THE EDITOR NOTES

Another lively season of lecture and dinner meetings is about to begin. The opening meeting will be held at the Washington Research Center of W. R. Grace.

The October meeting will feature Dr. Fred Basolo, president-elect of the ACS. Dr. Basolo has agreed to participate in an informal discussion of ACS affairs.

The November speaker will be Dr. Alfred Bader, Chairman and Chief Executive Officer of Aldrich Chemical Company, who will discuss chemistry in art. Dr. Bader has also volunteered, preceding his talk, to offer advice regarding restoration or identification of any old paintings which members may have.

ACS BUYS ELKRIDGE CONFERENCE CENTER

The ACS has announced its purchase of the 82-acre Belmont Conference Center in Elkridge. The center has been owned and operated by the Smithsonian Institution for the past fifteen years. Settlement is scheduled for November, but the amount ACS will pay is still being negotiated. The estate's value has been appraised at \$1.25 million.

Belmont has been a popular meeting place for small groups, and ACS plans no change in the present operation. The property consists of a large mansion with several tenant houses on rolling land. Maximum occupancy is about 30, and ACS plans to publicize Belmont's availability to the scientific community.

SUNY FALL INSTITUTE IN SCIENCE AND TECHNOLOGY

The State University of New York at New Paltz will again sponsor a Fall Institute in Science and Technology. Courses will cover adhesion, scanning electron microscopy and x-ray microanalysis, and polymers.

Further information is available from the Institute Director, Dr. Angelo V. Patsis, Chairman, Department of Chemistry, CSB 209, State University of New York, New Paltz, New York 12561; telephone (914) 257-2175.

FACSS ANNUAL MEETING

The ninth annual meeting of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) will be held September 19-24, 1982 at the Franklin Plaza Hotel in Philadelphia.

The sponsoring organizations for the meeting are: Association of Analytical Chemists, Inc.; Analysis Instrument Division, Instrument Society of America; ACS Division of Analytical Chemistry; Society for Applied Spectroscopy.

The meeting will feature about forty symposia with 350 papers covering all areas of analytical chemistry. Further information can be obtained from Publicity Chairman Richard J. Knauer, Armco, Inc., P.O. Box 1697, Baltimore, Maryland 21203.



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Student Awards.....Donald Hoster
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396-7991

Remsen Award.....Dean Robinson
The Johns Hopkins University
338-7430

Finance.....Harold Klapper
653-3351

MEMBERS-AT-LARGE

Paul Gabbert
Cheryl Manger
John Roach

Joseph Topping
William Zeiger

ALTERNATE COUNCILORS

Linda Sweeting
Robert L. Caret

Timothy J. McNeese

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COUNCILORS' REPORT FROM LAS VEGAS

The two most discussed and debated issues at the March 31 Council meeting dealt with the proposed increase in member dues and a surcharge for members living in foreign countries to help off-set the cost of mailing them the C & E News.

According to the bylaws, ACS dues are increased automatically with inflation unless the Council votes otherwise. This built-in escalation would have added eight dollars to the dues for next year.

As to members living abroad, the Council agreed that a surcharge equal to 50% of the additional postage should be placed on these members.

A bylaw change setting up procedures to insure that in national or regional elections there are two candidates for every position, even in the case of a withdrawal or death of a candidate, passed.

Another bylaw amendment passed was one allowing national ACS affiliation with other technical organizations. The bylaws already provide for this type of affiliation by local sections and divisions. This bylaw change provides a formal mechanism for the national organization.

There were several items that were not acted on that will come up at future meetings. These include a bylaw change to drop a member for conduct injurious to the Society and a proposed change in the way local sections receive funding.

The latter question would increase the allotment per member, from \$4 to \$6, for the first five hundred members. This proposed increase was devised to help primarily the small sections. There is some sentiment that the larger sections need help as well.

The Council also voted to accept the proposed increases in the price of journal subscriptions.

As well as these items, which resulted in substantive discussion or action, a number of other interesting items were presented.

National membership was 122,377 in 1981, a new record; the society's finances are in good order, thanks to high returns on short term investments and Chemical Abstracts. The Board of Directors has formed a committee to find a replacement for Executive Director Mariella who retires at the end of 1982. At the next national meeting some of the technical sessions will be available via telecommunications at selected sites including Washington, D.C.

Last, but not least, the Council has nominated F.A. Cotton and G.C. Pimentel for president-elect in 1983.

D. E. Jones
D. F. Roswell
C. Rowell

ACS CONGRESSIONAL FELLOWS

The ACS is seeking candidates for a one year appointment for its two ACS Congressional Fellowships. The deadline for applications is January 31, 1983, and the fellowship term will begin in September 1983. Further information can be obtained from ACS Headquarters in Washington, the Department of Public Affairs: telephone (202) 872-4384.



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Gwan Kim, a native of South Korea, joined W. R. Grace & Co. in 1966 as a research chemist in the Research Division. He recently transferred to the Davison Chemical Division, where he is a research associate largely responsible for research on three-way catalysts. Prior to joining W. R. Grace & Co. he received his M.S. degree in chemical engineering from Purdue University after post-doctoral study at Princeton University. He earned his B.S. and Ph.D. degrees from Seoul University and the University of Pennsylvania, respectively.



AUTO EMISSION CATALYSTS

Supported platinum-group metal catalysts have been used to control noxious emissions from automobile exhaust since 1975. To meet the federal auto emission standard (g/mile) of 0.41 hydrocarbon, 3.4 carbon monoxide, and 1.0 nitrogen oxides, nearly every passenger car now sold in the U.S. is equipped with a catalytic converter system. Some of the essential features of the current catalyst, the so-called "three-way catalyst", will be described along with a display of three-way catalysts currently manufactured by Davison Chemical Division of W. R. Grace & Co.

THOMAS BITTERWOLF

Thomas Bitterwolf did his undergraduate work at Centenary College of Louisiana. His graduate work at West Virginia University dealt with the protonation of basic metal complexes, a subject which he continues to pursue. After joining the Navy in 1972 he served as an instructor at the Naval Nuclear Power School until 1977 when he was transferred to the Naval Academy Chemistry Department. This fall he joined the Academy as an Assistant Professor in Chemistry.

BINUCLEAR HOMOGENEOUS METAL CATALYSTS FOR HYDROGEN PRODUCTION

Chemical catalysis by transition metals can be broadly divided into categories determined by the relative solubilities of the catalytic species. Homogeneous catalysts, such as Wilkinson's catalyst, are usually soluble, simple metal complexes containing one metal atom which is the site of catalytic activity. Heterogeneous catalysts, such as palladium on charcoal, are usually insoluble particles in which scores of surface metal atoms are catalytically active.

While the mechanisms of catalyst activity by heterogeneous catalysts are generally difficult to determine, there are several instances where it appears that cooperative interactions by two adjacent metal atoms is necessary for the observed reactions. A similar observation has been made for certain biological enzymes in which two, or more, metal atoms are closely adjacent in the active site.

The research to be described explores the chemical consequences of having adjacent metal atoms in simple molecular systems. It has been found that adjacent metals exhibit reaction pathways not found in monomeric species opening the possibility of rational design of homogeneous catalysts that mimic heterogeneous behavior.

SEPTEMBER MEETING

DATE:

Wednesday, September 22, 1982

PLACE:

W. R. Grace Research Center
Rte. 32 west of Rte. 29
Clarksville, Maryland

SCHEDULE:

6:00 Gwan Kim
W. R. Grace & Co.
"Auto Emission Catalysts"

Thomas Bitterwolf
U. S. Naval Academy
"Binuclear Homogeneous
Metal Catalysts for
Hydrogen Production"

6:45 Social Hour

7:30 Dinner

8:30 Bruce Gates
University of Delaware
"Supported-metal Catalysts
with Simple Structures"

Dinner \$9.50 per person, except retired chemists and students may attend the dinner for \$7.50



DR. BRUCE C. GATES

Dinner reservations are necessary and should be made by mailing checks to

Charles Rowell
Chemistry Department
U. S. Naval Academy
Annapolis, MD 21401

by September 13. Checks should be payable to Maryland Section of ACS. Late reservations may be made by calling Lynn Cheong at

(301) 355-3600 ext 208

by September 15.

It is not necessary to be a member of the American Chemical Society to attend. You may attend the lectures without attending the dinner.

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BRUCE C. GATES

Bruce C. Gates is Professor of Chemical Engineering and Director of the Center for Catalytic Science and Technology at the University of Delaware. He received his B.S. degree from the University of California at Berkeley in 1961 and his Ph.D. from the University of Washington in Seattle in 1966. Following a year as a Postdoctoral Fellow at the University of Munich and two years as a Research Engineer with the Chevron Research Company, he joined the University of Delaware faculty in 1969.

Dr. Gates has received two Fulbright grants for research at Munich (1966-67 and 1975-76) and in 1979 he received the Distinguished Scientist Award of the University of Delaware chapter of Sigma Xi. In 1983-84 he will be Deutsche Forschungsgemeinschaft Visiting Professor at the University of Munich.

He has published about seventy-five research and review articles, with several more in press, and has co-authored one book, *Chemistry of Catalytic Processes*. Dr. Gates's research interests are in areas of catalysis, reaction kinetics, chemical reaction engineering, related areas of zeolites and transition metal complexes and clusters, and applications of catalysts in petroleum refining, petrochemical processing and coal conversion.

Dr. Gates has also been active in organizing conferences and chairing symposia on catalysis and related subjects for several organizations including the American Institute of Chemical Engineers, Catalysis Society of North America, NSF and ACS.

SUPPORTED-METAL CATALYSTS WITH SIMPLE STRUCTURES

Supported metals are among the most widely applied industrial catalysts - and among the least well understood. The difficulty arises from the complicated structures, consisting of various sizes and shapes of metal crystallites dispersed on high-surface-area supports such as alumina.

Our topic is supported-metal catalysts with simple structures - analogs of organometallic molecules anchored to the metal-oxide supports. These offer prospects of new fundamental understanding of structure-property relations of metal catalysts and, ultimately, selective catalysts rivaling molecular catalysts in solution.

The well-defined supported-metal catalysts are illustrated by oxide-supported osmium carbonyls, prepared from $[Os(CO)_2]$, $[Os_2(CO)_4]$, and related organometallics. These have been characterized structurally by transmission electron microscopy, infrared spectroscopy, and extended x-ray absorption fine structure spectroscopy (EXAFS).

The catalysts are stable at high temperatures and active for a number of reactions of industrial interest. They have been characterized for hydrogenation of ethylene and of CO and isomerization of olefins.

AGRICULTURAL AND FOOD CHEMISTRY

The ACS Division of Agricultural and Food Chemistry is planning a large program of general papers for the Seattle ACS meeting of March 20-25, 1983, and is consequently soliciting contributions of papers.

Persons interested in presenting a paper should contact Dr. Steve Nagy, Florida Department of Citrus, P.O. Box 1088, Lake Alfred, Florida 33850.

MARYLAND SECTION FUTURE PROGRAM

Date	Location	Speakers	Topic
October 20	College of Notre Dame	Fred Basolo Northwestern Univ.	Synthetic Oxygen Carriers of Biological Interest
November 17		Alfred Bader Aldrich Chemical Co. Poster Session	Chemistry in Art
December 15	College of Notre Dame		Maryland Chemist Award
January	No meeting		
February 23	College of Notre Dame	Mark Elert U. S. Naval Academy	
		Ahton Peterlin NBS	Deformation of Semi-crystalline Polymers
March 30	College of Notre Dame	V. Frank Boyd Litton Bionetics	Pesticides - Chemistry and Politics
		Dorit Noether CHEMTECH	H ₂ O - a 360° View
April 20	U. S. Naval Academy	Nina Roscher American University	Careers in Chemistry
		Charles Braun Dartmouth College	
May			Remsen Award

POLYMER SAMPLES NEEDED

A committee has been established by the Joint Polymer Education Committee of the Polymer Chemistry Division and the Organic Coatings and Plastics Chemistry Division of the ACS in order to determine how best to introduce polymers into the undergraduate core curriculum. One of the major conclusions of this committee was that teachers desperately need polymer samples (polymers themselves, or fabricated fibers, plastic parts, elastomers, inorganic polymers, etc.) and suitable photographs. This can also include product brochures and technical descriptions. A subcommittee has been established to put together a list of names and addresses where teachers can write to obtain samples and literature for classroom use. If you or your company can supply any of this material please send the name and address and what you can offer to either of the co-chairmen listed below. These will then be included in the list for teachers aids. Your help is greatly appreciated and essential.

Professor Raymond B. Seymour
Department of Polymer Science
University of Southern Mississippi
Southern Station Box 10076
Hattiesburg, MS 39406-0076

Dr. Gerald S. Kirshenbaum
Celanese Plastics and Specialties Co.
86 Monis Avenue
Summit, NJ 07901

EXECUTIVE COMMITTEE MINUTES

The Executive Committee, Maryland Section, American Chemical Society, was called to order by the Chairman, Merle Eiss, at 7:40 p.m. on Tuesday, April 6, 1982, at the Knott Science Center, Notre Dame College. The following members were present: R. L. Caret, M. Eiss, H. C. Freimuth, E. Freedman, P. Gabbert, D. Hoster, F. Hummel, D. Jones, H. Klapper, E. Penski, R. Petersen, N. Phillips, D. Roswell, C. Rowell, Sister M. Vincent.

The meeting minutes of February 3, 1982, were read and approved; the Secretary distributed corrected lists of officers.

Treasurer. Mr. Phillips distributed a statement of the Section's financial condition January 1 to April 6, 1982. The balance in checking is \$1,298.32; balance in savings is \$19,649.00; total balance: \$20,947.32.

Awards and Nomination. Dr. Silversmith was unable to be present. Merle Eiss reported that the Remsen lecture will be June 2, 1982, at the Johns Hopkins University. Dr. Harlan McConnell of Stanford University will speak.

Education and Safety. Sister Mary Vincent announced that notices have been sent out for the Seminar at Notre Dame College on May 8, 1982. Subject: Chemical Reaction Mechanisms.

Program. Dr. Charles Rowell announced his nearly complete program for 1982-1983.

House. Mr. Phillips distributed the report for Mrs. Manger.
February: 46 dinners, attendance approximately 50.
March: 81 dinners, attendance approximately 110.

Membership. Dr. Kirk sent a report read by Sister Mary Vincent; twenty-one letters were sent inviting new members to attend the March meeting. There were seven replies.

Publicity. Dr. Jones stated that publicity is sent regularly to the papers. He asked for suggestions.

High School Activities. Mr. Roach and Mr. Bober are working on this project. Carroll County High School teachers have been invited to the April meeting. Dr. Rowell stated that the National Society is concerned about the quality of high school chemistry teaching. This is a problem which requires much thought by local sections.

Finance. Mr. Klapper reported that the finances of the Section are in good shape. He is now concerned with reducing costs. Mrs. Eiss announced that they are trying to locate lower priced dinners.

Student Awards. Dr. Hoster announced that there are twelve winners this year from four-year colleges and seven from two-year colleges. The subscriptions to the Journal of Chemical Education have been ordered; awards will be presented on April 28, 1982.

Chesapeake Chemist. Mr. Harmon does not have sufficient funds to last until May. He will need about \$300 to complete publication until summer.

Marm. Dr. Caret announced that everything is moving according to plan. Dr. Roswell announced that every Division is expected to have an ACS contact in every region to help plan regional meetings. Dr. Jones mentioned that ACS

will have a short course in Polymer Chemistry at the 1983 MARM in Hershey, Pennsylvania.

Old Business. Dr. Roswell sent a written report from National meeting to the editor of *The Chesapeake Chemist*. Items discussed were:

Dues will be increased \$4.00 next year.
International members dues will be increased to compensate for postage.
Amendments all passed.
Section Allotments increased from \$4.00 to \$6.00 for the first 500 members.
Journal subscriptions will be increased next year.

The Society's finances are in good order. F.A. Cotton and George Pimentel have been nominated for Chairman-elect in 1983. Chemical Abstracts is obtaining a new computer for on-line searches. The National Society also expect to start new journals to cover growing fields.

The Section authorized Councilor expenses for National Meetings.

New Business. The report of the Nominating Committee was presented by Elwin Penski:

Chairman-elect	Nolan Phillips
Treasurer	Harold Klapper
Secretary	Cheryl Manger
Alternate Councilor	Merle Eiss
Members-at-large	Paul Gabbert
	John Roach
	Timothy McNeese
	Alice Zeiger
	Thomas Bitterworth

The secretary was instructed to supply the National Office with the slate.

Frances Hummel has resigned as secretary; Cheryl Manger will replace her as of April 15, 1982.

The Maryland Section needs suggestions for projects. It was mentioned that the Northeast Section has an annual round-table meeting of secondary school chemistry teachers with university teachers to discuss mutual problems. Funds are available for such projects if approved by National.

Mr. Penski had requested that a 1990 National meeting be held in Baltimore. However, the Society will not promise a National meeting until 10,000 hotel rooms are available in grade A hotels.

Mr. Charles Rowell, Chairman-elect, then proposed the following resolution:

Resolved that the Executive Board of the Maryland Section of the American Chemical Society express its deep regards and best wishes to Frances Hummel on the occasion of her retirement and forthcoming marriage. The loss of her support will be sharply felt, but the reason gives us great pleasure.

The resolution was approved; the meeting was adjourned at 9:15 p.m.

Respectfully submitted,

Frances C. Hummel, Secretary

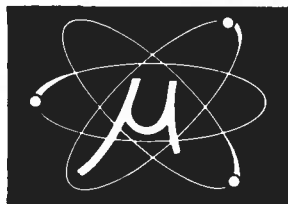
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