

THE GEOCHEMICAL NEWS

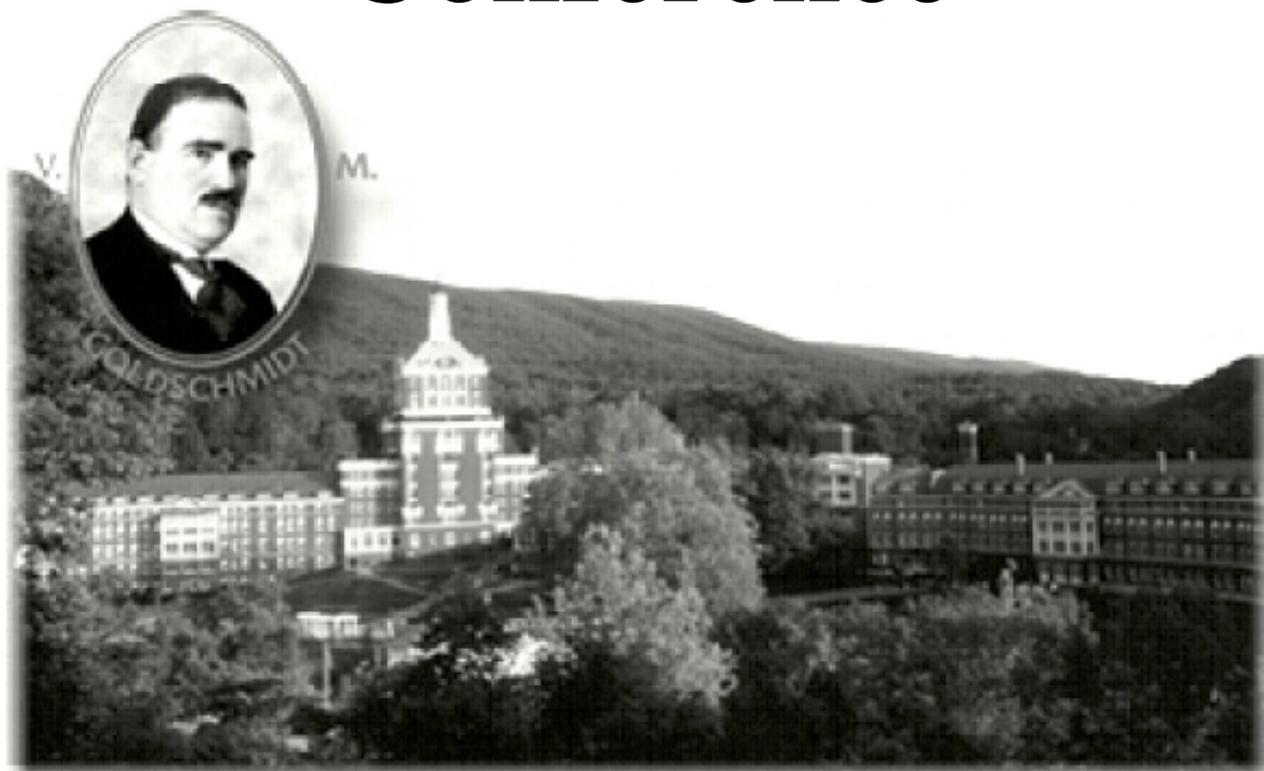
Newsletter of The Geochemical Society

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Eleventh Annual V.M. Goldschmidt Conference



**May 20-24, 2001
Hot Springs, Virginia, USA**



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THE GEOCHEMICAL SOCIETY

The **Geochemical Society** is a nonprofit scientific society founded to encourage the application of chemistry to the solution of geological and cosmological problems. Membership is international and diverse in background, encompassing such fields as organic geochemistry, high and low-temperature geochemistry, petrology, meteoritics, fluid-rock interaction, and isotope geochemistry. The Society produces a *Special Publications Series*, *The Geochemical News* (this newsletter), the *Reviews in Mineralogy and Geochemistry Series* (jointly with the Mineralogical Association of America), the journal *Geochimica et Cosmochimica Acta* (jointly with the Meteoritical Society), and co-publishes the electronic journal *G³* (jointly with the American Geophysical Union); grants the **V.M. Goldschmidt, F.W. Clarke and Clair C. Patterson Awards**, and, jointly with the European Association of Geochemistry, the **Geochemistry Fellows** title; sponsors the **V.M. Goldschmidt Conference**, held in North America in odd years and elsewhere in even years, jointly with the European Association of Geochemistry; and co-sponsors the Geological Society of America annual meeting and the American Geophysical Union spring meeting. The Society honors our first President, F. Earl Ingerson, and our first Goldschmidt Medalist, Paul W. Gast, with the **Ingerson and Gast Lectures**, held annually at the Geological Society of America Meeting and the V.M. Goldschmidt Conference, respectively. The Geochemical Society is affiliated with the American Association for the Advancement of Science and the International Union of Geological Sciences.

Members of the **Organic Geochemistry Division** are individuals with interests in studies on the origin, nature, geochemical significance, and behavior during diagenesis and catagenesis of naturally occurring organic substances in the Earth, and of extraterrestrial organic matter. GS members may choose to be affiliated with the OGD without any additional dues. The OGD presents the **Alfred E. Treibs Award** for major achievements in organic geochemistry, and **Best Paper** awards (student and professional) in organic geochemistry.

Editor's Corner

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From the President . . .

Exactly one hundred years ago this month, at the grand opening of the last century of the millennium just past, stood a rare breed of chemically-inclined geologist. These were not privileged viewers of either the molecular or global world as we are today. They were equipped with a periodic table, but had only primitive ideas of the atomic structure of matter or whole earth chemistry, and virtually no idea of the secrets of life. The first crystal structure determinations were still over a decade away, and the golden years of microscopic and spectroscopic development and whole earth chemistry/structure discovery much further still. But they made wonderfully creative use of wet chemistry and were the masters of keen observation in both the field and the lab. They were, in fact, the forerunners to the geochemists of today.



Now, in 2001, it's finally the first year of the new century and millennium. And guess what? Geochemists are everywhere, and they have something to say in every corner of the earth and planetary sciences. Whether deep mantle or deep ocean research, paleoclimate or future climate projections, the Sahara or Antarctica, petroleum or meteorites, geochemists are right in the mix and playing key roles in academics, government, and industry. The past few decades have seen the awakening of environmental and planetary geochemistry, biogeochemistry in the most common soils to extreme environments on earth to astrobiology beyond, isotope geochemistry unlocking geoprocess discovery as well as the timing of it all, and on and on, from the atomic scale to the global one and all shades of gray in between. What a privilege it is to be engaged in this science in this part of its history. May we continue along this path of service to the planet, and be recognizable to those geochemists that open the twenty-second century one hundred years from now.

And, speaking of cutting-edge science ---

The 2001 Goldschmidt Conference: You're invited!

Bob Bodnar and I are the co-conveners of this year's Goldschmidt Conference. The meeting runs from May 20th to the 24th and will be held at the world-renowned Homestead in Hot Springs, Virginia, USA. Talks and poster presentations will be in the morning and early evening, allowing for participants to explore The Homestead, its vast surrounding private lands, and the many activities that it affords all its guests (visit www.thehomestead.com). This year not only has the Lunar and Planetary Institute and the European Association of Geochemistry teamed up with us again for this meeting, but we are also joined by the Mineralogical Society of America. As the traditional boundaries between mineralogy and geochemistry are blurred, we will benefit greatly from MSA's participation. To

this end, forty-one topical sessions have been organized in six major subfields, including (in alphabetical order) aqueous geochemistry, metamorphic and igneous processes, mineralogy and crystallography, ore deposits, organic geochemistry, and planetary geochemistry.

Critical deadlines for the meeting are coming up next month. Hard-copy abstract submission is due no later than February 9, and electronic submission is allowed until February 16. Detailed information on every aspect of the conference as well as all forms pertinent to the conference can be found on the conference website <http://www.lpi.usra.edu/meetings/gold2001/>. Registration and housing forms can be found in this issue of the Geochemical News if you prefer to use them. It is particularly important to get your housing registration form in now if you haven't already done so. We only have 400 lodging rooms at The Homestead, with limited accommodations off-site. If you are interested in the latter, or have any other questions about the meeting, contact the conference secretary, Ellen Mathena, at gold2001@vt.edu.

Welcome to the European Association of Geochemistry (EAG)

Also in this issue of *The Geochemical News*, you will find letters from Francis Albarède and Al Hofmann, President and Past President, respectively, of EAG. I urge you to read these letters no matter what continent you happen to be sitting on right now. The Geochemical Society is international, with members in 47 countries, but there are many highly successful regional geochemical societies like, for example, EAG and the Geochemical Society of Japan, as well as other widespread organizations like the International Association of Geochemistry and Cosmochemistry. The leaders of all of these organizations are always looking for ways to cooperate with us, as I am with them, to ultimately allow the voice of geochemistry to exceed the sum of its parts. I welcome the participation of EAG in *The Geochemical News*, both in this and future issues.

And finally . . .

Allow me to end this letter by wishing everyone a Happy New Year. May your scientific fortunes of this year, in particular, be ones of excitement and discovery. See you at The Homestead in May!

Best regards to all,

Mike Hochella

President of The Geochemical Society

Geochemical Society Business

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Geochemistry in Europe and elsewhere: strong field but weak image

Late-night ramblings of a lame-duck president

Albrecht W. Hofmann

Past-President of the European Association of Geochemistry
Max-Planck-Institute for Chemistry, Mainz, Germany

Over the past fifty years, geochemistry has grown up to become one of the major branches of Earth science, one that has infiltrated and become part of many other subdisciplines. Without geochemistry, we would know very little about the age and evolution about our planet, its crust, mantle and core, and we would have little understanding of our environment, the atmosphere and the oceans. But ask the average geochemist what his profession is, and he is just as likely to answer "geologist" as "geochemist." Ask the same question of a geophysicist, and she will probably answer "geophysicist". Somehow, our field seems to be in a permanent identity crisis. The U.S. National Academy of Sciences has sections for Geology and Geophysics but, you guessed it, none for Geochemistry. But open any recent volume of AGU Fall Meeting abstracts, and you will find a large fraction of these abstracts (20, 30, 40% ? - someone ought to count) to be primarily concerned with chemistry. And I was truly startled to learn that 32 of the 50 Earth scientists having published the largest number of "high impact papers" (i. e., 8 such papers or more) in the Earth Sciences are geochemists! I wouldn't believe those numbers if I hadn't seen them with my own eyes on a CD-ROM distributed by the Science Citation Index for papers published between 1981 and 1998. This database defines as "high impact" the 200 most often cited papers in the field of "Earth Science" for each year of publication starting in 1981 until 1998, using the total number of citations accumulated by 1999. It includes solid Earth, ocean and atmospheric science, but I did not include atmospheric scientists in the above count. You can buy this database (or a more recent version) from ISI, and I can promise you it is full of surprises, both good (see above) and bad (look for yourself). The AGU has over 35000 members, the Geochemical Society maybe 1500, and the EAG about 1000. (In case you didn't know, you are a member of EAG if you attended the recent Goldschmidt Conference in Oxford).

Why do not more of us identify more closely with our own main professional expertise? I think it is mostly for historical reasons. When geochemistry came of age, all the classical fields, paleontology, mineralogy, geology, and geophysics had already been organized in professional societies. The situation in Europe is the same as in North America. The German Mineralogical Society (of which I am a member) alone has more members than either EAG or even GS. Is this state of affairs good or bad? I think it is some of both. It's good because of the pervasiveness of geochemistry, its integration with other fields, and the new life it brings to older disciplines such as petrology or stratigraphy. It's bad for geochemists because it keeps us from gaining the recognition we should have earned by our scientific contribution in the eyes of the outside world.

This is where the Goldschmidt Conference comes in. This international event has become a scientifically rewarding, successful, and increasingly visible point of professional identification and intercourse exclusively devoted to and clearly identified with Geochemistry. Claude Allègre, who almost single-handedly started the European Union of Geosciences, and later the EAG, gave us the marching orders by planting the idea for the Trans-Atlantic alternating schedule for the Goldschmidt Conferences, which had started with a slightly more "parochial" venue in the Baltimore-Washington-Pennsylvania area. The European effort started in earnest with the Edinburgh Goldschmidt Conference in 1994. And, much to our own surprise, the European side has actually managed to take the lead (forget the weak Euro) in consistently attracting the largest number of participants in each of the four European-hosted Goldschmidt Conferences held so far. Many people, especially in Europe, are still uncomfortable with large meetings of a thousand or more people, but large meetings offer the best opportunity to meet many of your colleagues in one place, and to go poaching in unfamiliar geochemical territory to widen your scientific horizons. Large meetings are also politically important because they signal importance to the outside world. And large meetings in places like Edinburgh, Heidelberg, Toulouse or Oxford can be fun!

In recent years, our American colleagues have taken up the cue, so that Goldschmidt Conferences on both sides of the Atlantic have become the main scientific event for geochemists. And in the not too distant future, a first such meeting will be held in Japan. So perhaps geochemists are finally coming out of the closet, getting organized as a profession to become visible to the outside world. The EAG will be cooperating closely with the GS to achieve this goal. We even hope that these meetings will ultimately help to increase memberships of both societies.

Eleventh Annual V. M. Goldschmidt Conference

May 20-24, 2001
The Homestead
Hot Springs, Virginia, USA

Important Dates

Abstract Submission (hard copy) – February 9, 2001
Abstract Submission (electronic) – February 16, 2001
Meeting registration (without late fee) – April 1, 2001
Housing reservations – April 1, 2001

Additional information on the Conference Web site:

<http://www.lpi.usra.edu/meetings/gold2001/>

Or send email to the Conference secretary at:

gold2001@vt.edu

Presidential address by Francis Albarède

President of the European Association of Geochemistry

The European Association of Geochemistry has ambitions. From its initial function of providing a platform for the organization of geochemistry meetings in Europe, it has over recent years evolved into the professional society of European geochemists. Since many of us were already members of the Geochemical Society, our task now is to distribute the responsibilities of steering the common activities of the geochemical community between EAG, GS, and similar societies on different continents. GS is legitimately proud of *Geochimica* and *Cosmochimica Acta*, while, under the EAG umbrella, *Chemical Geology* has become one of the leading journals in the field. The two societies are alternating the organization of the immensely successful Goldschmidt Conferences and we already know that soon some of these meetings will be held in the Southern Hemisphere under the aegis of other geochemistry societies. Presidents Mike Hochella and Al Hofmann, Judy Mackenzie and myself, plus some other dedicated colleagues have recently been striving to prepare a new distribution of roles so that all geochemists in the world can feel part of one society that represents, as well as possible, their regional interests. At the same time we would like to make the different societies cooperate in an intelligent and constructive way and optimize the solution to some burning issues such as a smooth organization of world-class geochemistry meetings, student travel awards, the editorial policy of geochemistry journals, books and monographs, etc. One of the most visible outcomes of this new policy is the opening of the GS Newsletter to material produced by EAG members on European issues and notably the appointment of a European Editor of the newsletter. As the new EAG President, I feel multiple responsibilities. Geochemists should see advantages in becoming members beyond just getting a more attractive registration rate to the Goldschmidt Conference. President Elect Terry Seward and myself will work hard toward adding as much value to the EAG membership as we can. Members should consider that some society activities, such as editing or contributing to a newsletter, supporting workshops, representing the geochemistry community with commercial publishers, distributing awards that make the field become recognized by our Universities and funding agencies, securing a reasonable balance of responsibilities and honors between sub-fields, are some of the less visible but indisputable perks.

The jury is still out to decide whether geochemistry would be better served by coexisting regional societies, such as is the case in the year 2000, and focus on their cooperation, or rather by one single international society with sections that would watch over regional interests in a fair and efficient manner. Although bringing societies close to each other is full of potential pitfalls and misunderstandings, my role as a President is to ensure that evolution remains possible in one direction or another but that in any case, interaction across the entire world will become as efficient as possible. GS President Mike Hochella and President Elect Judy Mackenzie have taken the full measure of the challenge and

will work with us to make the distances between geochemists shorter regardless of where in the world home is.

It is my duty as the new President of the European Association of Geochemistry to thank those who worked to improve and keep EAG alive for the best of European geochemists' interests: past-President Al Hofmann, Secretary Vala Ragnarsdottir, and Treasurer Erik Oelkers. European Geochemistry would not be the same without EAG, and these Officers had a tremendous impact on the very positive evolution of EAG in Europe and of all the professional geochemistry societies in the world. On behalf of all European geochemists, thank you.

Geochemical Aspects of Sustainable Energy Utilization

*A Symposium at the 11th V. M. Goldschmidt Conference
May 20-24, 2001, Hot Springs, Virginia, USA*

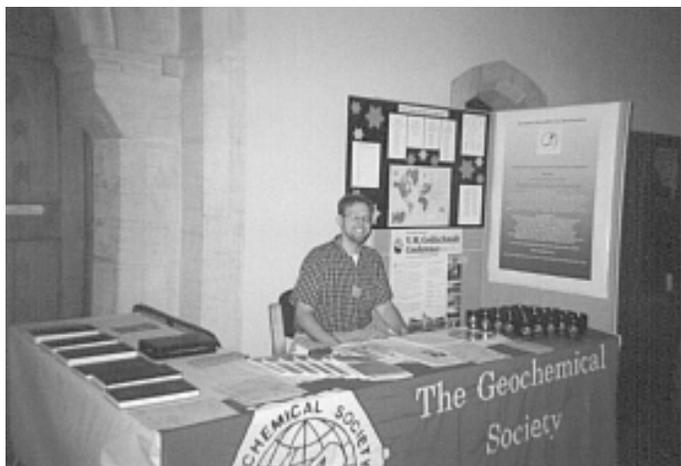
The energy sources with major geochemical vectors are **fossil, geothermal and nuclear**. It has become apparent that continued reliance on fossil fuels as the world's major energy source involves societal and environmental consequences that may not prove acceptable, even if supplies remain plentiful and affordable. Nuclear energy utilization is primarily limited by public perception of the environmental hazards associated with power plant operations and disposal/treatment of spent fuel. Geothermal energy utilization is limited by the low cost of other fuel sources, but also by technological challenges associated with exploration, reservoir dynamics, and production. In the 21st Century, geochemical and biogeochemical research will contribute fundamentally and critically to these issues.

We encourage contributions on: global warming, acid rain and mine drainage, ocean and subsurface carbon sequestration, active and fossil geothermal systems, geothermal production problems (scaling, acid volatiles, reinjection, etc.), and radioactive contaminant migration (waste form stabilities, vadose zone and groundwater transport, remediation, etc.).

Keynote speakers will include **Wallace S. Broecker** of the Lamont-Doherty Earth Observatory, who will address the fossil fuel impacts on global climate change, **Donald Langmuir** of the Colorado School of Mines (Emeritus), who will discuss various aspects of the geochemistry of nuclear waste storage-disposal-remediation, and **Marshall J. Reed** of the U.S. Department of Energy, who will provide an overview of the technological challenges facing the geothermal industry.

The organizers, D.J. Wesolowski (dqw@ornl.gov) and D.R. Cole (coledr@ornl.gov), (Oak Ridge National Lab, Tennessee, USA) would very much appreciate a note indicating your intention to participate.

From the Business Office



2001 Membership Drive

As I write this, just before the New Year, we finished 2000 with 1,413 members. Of these, about 2/3 have already renewed for 2001 and an additional 43 begin their first year with the Society. Thank you all for your excellent support!

For those members who have not yet renewed for 2001, this will be your last issue of *The Geochemical News*. Please contact the Business Office and renew as soon as possible. Remember that if you are going to the Goldschmidt Conference this year, it actually *saves you money* to join the Geochemical Society.

Missing Issues?

If you have paid for a GCA subscription for 2000 (v.64, issues 1-24) and have not received all of your issues, please contact the Business Office and I will send a back issue request to Elsevier. It may take some time to get your issues to you, so act early. Back issue requests are only available for the 1999 and 2000 year.

Goldschmidt Short Course Registration

This year, I will be processing the registrations for the Reviews in Mineralogy and Geochemistry Short Course titled *Molecular Modeling Theory and Applications in the Geosciences* being held in Roanoke, Virginia, U.S.A on May 19-20, 2001. Please register early, as the course is limited to 120 people (see ad on page 5 of this issue).

Best wishes to you in 2001! Please contact me if you have any questions or concerns with your membership. And as always, check out the GS website at <http://gs.wustl.edu> for convention dates, archives, announcements and more.

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National Science Foundation Announces a New Funding Opportunity:

Biocomplexity in the Environment

The National Science Foundation released on December 15, 2000 a Program Announcement describing research opportunities for Biocomplexity in the Environment (BE): Integrated Research and Education in Environmental Systems. This special competition promotes comprehensive, integrated investigations of environmental systems using advanced scientific and engineering methods. The concept of biocomplexity stresses the richness of biological systems and their capacity for adaptation and self-organizing behavior. By placing biocomplexity studies in an environmental context, this competition emphasizes research with the following characteristics: (a) a high degree of interdisciplinarity; (b) a focus on complex environmental systems that include interactions of non-human biota or humans; and (c) a focus on systems with high potential for exhibiting nonlinear behavior.

Four interdisciplinary areas will be emphasized and supported in this competition during the next five years depending on available funding. These topical areas are:

1. *Dynamics of Coupled Natural and Human Systems* (CNH), emphasizing quantitative understanding of the short- and long-term dynamics of natural capital and how humans value and influence ecosystem services and natural resources, including consideration of landscapes and land use and the influences of uncertainty, resilience and vulnerability in complex environmental systems on societal institutions.

2. *Coupled Biogeochemical Cycles* (CBC), focusing on the interrelation of biological, geochemical, geological, and physical processes at all temporal and spatial scales, with particular emphasis on understanding linkages between cycles and the influence of human and other biotic factors on those cycles.

3. *Genome-Enabled Environmental Science and Engineering* (GEN-EN), encouraging the use of genetic information to understand ecosystem functioning and the adaptation of organisms to ecological roles.

4. *Instrumentation Development for Environmental Activities* (IDEA), supporting the development of instrumentation and software that takes advantage of microelectronics, photonics, telemetry, robotics, sensing systems, modeling, data mining, and analysis techniques to bring recent laboratory instrumentation advances to bear on the full spectrum of environmental biocomplexity questions.

The goal of this program is to encourage research in these emerging areas by integrating quantitative approaches, educational elements, and global perspectives. The Deadline/Target Dates for full proposal submission are March 16, 2001 (Deadline for CNH and IDEA) and March 29, 2001 (Deadline for CBC and GEN-EN). Details and a copy of the program solicitation (NSF 01-34) are available on the NSF web page at the Internet address: <http://www.nsf.gov/pubs/2001/nsf0134/nsf0134.htm>. Researchers interested in submitting proposals, or for additional information, are encouraged to contact the cognizant program officers listed in the announcement.

Geochemical Society and Mineralogical Society of America Short Course

Molecular Modeling Theory and Applications in the Geosciences

Molecular modeling has become an important tool in many areas of geochemical and mineralogical research. The purpose of this course will be to introduce molecular modeling to researchers considering moving into this growing field and to familiarize experimentalists with the type of information available from computer simulations. Although one may never become a full-time molecular modeler, it will be increasingly important to understand these techniques in order to merge experiment and theory. This course will focus on techniques and applications for modeling a wide variety of problems in mineralogy and geochemistry. Techniques covered will include energy minimization (determining structures), lattice dynamics (calculating thermodynamic properties), Monte Carlo (generating configurations in complex systems), and molecular dynamics (predicting dynamic properties such as diffusion rate and viscosity). Important theoretical concepts of quantum mechanical calculations (both molecular orbital and density functional theories) will be introduced. Applications will run the gamut of geochemistry—from atmospheric reactions to properties of mantle and core phases. Throughout the course, emphasis will be placed on the comparison of simulations with experimental data and the synergy that can be generated by using both approaches in tandem. Those interested in using molecular modeling in research or understanding papers in computational chemistry should attend.

Dates

Saturday and Sunday May 19 and 20, 2001 (preceding the Goldschmidt Conference in Hot Springs, Virginia, USA)

Location

Hotel Roanoke and Conference Center in downtown Roanoke, Virginia, USA; 110 Shenandoah Avenue, Roanoke, Virginia 24016, USA; Phone: 540-985-5900; Fax: 540-853-8290

Conveners

Randall T. Cygan, Geochemistry Department, Sandia National Laboratories, Albuquerque, New Mexico 87185-0750, USA; Phone: 505-844-7216; E-mail: rtcygan@sandia.gov

James D. Kubicki, Pennsylvania State University, University Park, Pennsylvania 16802, USA, Phone: 814-865-3951; E-mail: kubicki@geosc.psu.edu

Speakers/Authors and Topics

Randall T. Cygan, *Sandia National Laboratories*

Molecular modeling in mineralogy and geochemistry

Mihali Felipe, *Yale University*

Transition state theory in geochemistry

Julian D. Gale, *Imperial College*

Simulating the crystal structures and properties of ionic materials from interatomic potentials

Stephen H. Garofalini, *Rutgers University*

Molecular dynamics simulations of silicate glasses and glass surfaces

Gerald V. Gibbs, *Virginia Polytechnic Institute*

Quantum chemical study of bonded interactions in earth materials and related molecules

Andrey G. Kalinichev, *University of Illinois*

Molecular simulations of liquid and supercritical water: Thermodynamics, structure, and hydrogen bonding

James D. Kubicki, *Pennsylvania State University*

Calculation of vibrational properties for geoscience applications

Steve Parker, *University of Bath*

The application of lattice dynamics and molecular dynamics techniques to minerals and their surfaces

Kevin M. Rosso, *Pacific Northwest National Laboratory*

Structure and reactivity of semiconducting mineral surfaces: Convergence of molecular modeling & experiment

James R. Rustad, *Pacific Northwest National Laboratory*

Molecular models of surface relaxation, hydroxylation, and surface charging at oxide-water interfaces

David Sherman, *Bristol University*

Quantum chemistry and classical simulations of metal complexes in aqueous solutions

Lars Stixrude, *University of Michigan*

First principles theory of mantle and core phases

John A. Tossell, *University of Maryland*

Calculating the NMR properties of minerals, glasses and aqueous species

Yitian Xiao, *ExxonMobil Research*

Modeling petroleum and natural gas generation: A first principles approach

Short Course Volume

As customary for Geochemical Society and Mineralogical Society of America short courses, a short course volume will be published and will be distributed at the course. The book *Molecular Modeling Theory and Applications in the Geosciences* includes fourteen chapters authored by the speakers.

Schedule

Friday evening, May 18: Welcoming reception, 7:00 PM – 9:00 PM

Saturday May 19: Continental breakfast, 8:00 AM – 8:30 AM
Morning session, 8:30 AM – 12:00 PM
Buffet lunch, 12:00 PM – 1:30 PM
Afternoon session, 1:30 PM – 5:00 PM
Evening open

Sunday May 20: Continental breakfast, 8:00 AM – 8:30 AM
Morning session, 8:30 AM – 12:00 PM
Buffet lunch, 12:00 PM – 1:00 PM
Transport to Goldschmidt Conference

Fees

	<i>by April 2, 2001</i>	<i>after April 2, 2001</i>
Professional registration	\$150	\$200
Student registration	\$100	\$150

Registration form on page 10 of this issue

Practical Information

Registration fee includes GS-MSA short course session costs, welcoming reception, breakfasts, lunches, break refreshments, and *Reviews in Mineralogy and Geochemistry* volume. All short course sessions will be at the Hotel Roanoke and Conference Center. There will be an informal welcoming reception at 7:00 PM Friday evening May 18, 2001 at the same location. Complimentary bus service to the Hotel Roanoke is available from the Roanoke airport. Registration fee does NOT include room costs, other meals, or transportation costs to or from the main Goldschmidt Conference at The Homestead. Short course attendees planning on attending the Goldschmidt Conference and needing bus transportation should make bus reservations using the conference web page (<http://www.lpi.usra.edu/meetings/gold2001/>). These buses will be picking up short course attendees at the Hotel Roanoke after lunch on Sunday May 19. A block of discounted rooms at the Hotel Roanoke are available for both Friday and Saturday nights. Rates are \$92.00 plus taxes per night (single occupancy), \$102.00 plus taxes per night (double occupancy), plus \$10.00 per night (plus taxes) for each additional person. Attendees must make their own room reservations by calling the hotel at 540-985-5900 and asking for the Molecular Modeling Short Course room block, or by making a reservation via the hotel web site (<http://www.hotelroanoke.com/>). Reservations must be made by Friday April 20, 2001 in order to guarantee the discounted room rates. All short course information and registration materials can be obtained at the short course web site (<http://www.sandia.gov/eeselector/GScourse.htm>).

Goldschmidt Conference Session

A session entitled *Molecular Modeling in Geochemistry* will be scheduled for Monday and Tuesday May 21 and 22, 2001 as part of the Goldschmidt Conference. You are welcome to submit a contributed abstract and participate in the formal meeting.

The Geochemical Society

Minutes of the 2000 Board of Directors Annual Meeting

The meeting was convened at Christ Church, Oxford, UK, on September 3, 2000 and came to order at 9:00 AM

Present: Mike Hochella (President), Judith McKenzie (Vice President), Mike Drake (Past President), Becky Lange (Treasurer), Dave Wesolowski (Secretary), Mike Engel (OGD Chair), Peggy Ostrom (OGD Secretary), Frank Podosek (GCA Editor), Al Hofmann (Director), Keith O'Nions (Director), Vala Ragnarsdottir (Director), Everett Shock (Director), Seth Davis (GS Business Manager), Linda Trower (GCA Manuscript Manager), Gunter Faure (representing IUGS) and Yukihiko Matsuhisa (President, Geochemical Society of Japan).

President's Report: Mike Hochella stated that the mission of the Geochemical Society is to encourage and promote the application of chemistry to the solution of geological and cosmological problems. The Society executed that mission well in the last year, although the GS is always looking for ways to improve and several new initiatives are in the works. Highlights of the last year include:

- The production schedule for GCA has caught up with the calendar.
- The V.M. Goldschmidt Conferences continue to grow in attendance and scientific quality.
- The *Geochemical News* continues to improve in content and style.
- The new Business Office at Washington University is fully functional, and is in fact expanding its service base.
- A new investment strategy for the Society's reserve fund has been successfully implemented.
- The first issue of the new Reviews in Mineralogy and Geochemistry Series (jointly published with the Mineralogical Society of America) is now available and entitled "Transformation Processes in Minerals".
- The new electronic journal, *G³*, which the Society co-publishes with the American Geophysical Union, is off to an excellent start, and 85% of the current manuscripts and papers deal with geochemistry.
- Our Medals and honors are more prized than ever.
- Our new website is up and running (gs.wustl.edu).

Hochella also reported that membership in the Society has dropped from 1579 in 1998, to 1497 in 1999, to 1418 in 2000, or approximately 8% per year recently, and suggested strategies for reversing this trend. Although the pure numbers are obviously not pleasing, all other indicators are up, and "rebuilding" the membership is not only desirable, but in Hochella's opinion, clearly achievable.

International Secretary's Report: Ross Taylor was unable to attend, but submitted a report indicating that his major activity for the last year was the successful completion of extensive negotiations involving GS, the European Association for Geochemistry and the Geochemical Society of Japan, related to the site

and timing of the 2003 Goldschmidt Conference (see below). Taylor wished to express his thanks to Dr. Yukihiko Matsuhisa and his colleagues in Japan for their patience and understanding during this process. Taylor was also heavily engaged in the organization of a number of GS-sponsored symposia at the 31st International Geological Congress (IGC) in Rio de Janeiro, August 6-17, 2000.

Gunter Faure volunteered to sit in for Taylor at the Executive Committee meeting of the International Union of Geological Sciences held on August 8 in conjunction with the IGC, as a representative of both GS and IAGS, two of the 36 affiliated member societies of IUGS. At this meeting, IUGS presented its new strategic plan, which is available on the web at (iugs.org/iugs/news/stratplan01). Faure reported that IUGS invites proposals from the Affiliated Societies for projects lasting two to three years that result in an identifiable product. The level of funding is expected to be about \$10,000, and proposals involving interdisciplinary science and which respond to the needs of developing countries are especially welcome. Faure also reported that Affiliated Societies that do not respond to requests for information from the IUGS Secretariat and do not benefit from affiliation with IUGS will be dropped. Finally, Faure reported that the next IGC will be in Florence, Italy in 2004, that the new president of IUGS will be Dr. Ed de Mulder of the Netherlands, who is advocating the organization of an "International Geological Year", that IUGS would like to co-sponsor the scientific meetings of its affiliated societies and encourages the use by them of its logo, and that individual IUGS memberships are now possible with annual dues of \$50 US, which includes four issues of *EPISODES* per year.

Current and Future Goldschmidt Conferences: Keith O'Nions reported that over 800 abstracts had been received for the 2000 conference in Oxford, and that approximately 1000 registrants were expected. At this level of attendance, the conference budget was expected to achieve close balance between expenditures and registration fee receipts.

Mike Hochella reported that planning was well underway for the 11th Goldschmidt Conference in Roanoke, Virginia, USA, May 20-24, 2001. They are planning for a maximum attendance of 1000, and have already obtained commitments from over 450 invited and keynote speakers for more than 40 individual symposia. Financial backing and logistic support for the conference, from co-sponsor MSA, Virginia Tech and the Lunar and Planetary Institute are strong, and the meeting and lodging facilities will be affordable and first rate. An extensive accompanying guest program is planned. Payment for registration and lodging will be possible electronically by secure credit card transactions.

Judith McKenzie then presented a report by Alex Halliday, Jan Kramers and Rainer Weiler, organizers of the 12th Goldschmidt Conference in Davos, Switzerland, Aug. 17-23, 2002. The meeting site is the Davos Conference Center, in a ski resort area about 3 hours drive from Zürich. Up to 2000 participants can be accommodated and facilities are well equipped for technical sessions. The Lunar and Planetary Institute will provide logistic support for communications, abstract receipt and publication, etc. **The organizers requested that GS and**

EAG provide a letter indicating that they would assume financial responsibility for the necessary cancellation fee of \$20,000 US, and the Board agreed to share this responsibility equally with EAG. Several field trips will be planned for the conference, and the technical program committee is now being organized.

Yukihiro Matsuhisa, President of the Geochemical Society of Japan, then submitted a formal proposal for the 13th Goldschmidt Conference to be held Sept. 7-12, 2003 at Kurashiki-Sakuyo University in Japan. Kurashiki is located about 200 km west of Osaka, and is served by the *Shinkansen* "bullet" train system. **After extensive discussion regarding the practicalities of hosting the meeting in Kurashiki, the Board unanimously approved a motion made by Mike Drake and seconded by Vala Ragnarsdottir to accept the proposal.**

Secretary's Report: Dave Wesolowski summarized a number of motions approved by the Board since the 1999 Board of Directors meeting in Boston, including:

- A shortcourse and RIM&G volume for the 2001 Goldschmidt Conference entitled "Molecular Modeling Theory and Application" by R.T. Cygan and J.D. Kubicki;
- Co-publication of *G³* jointly with AGU;
- The formation of an Executive Committee consisting of the President, Vice President, Past President, Treasurer and Secretary;
- Appointment of Susan Brantley to the Joint Publications Committee, which oversees GCA;
- Special Publication #8 in memory of Werner Giggenbach;
- The recommendations of the Treibs, Goldschmidt, Clarke and Patterson medal committees and the Fellows Selection committee;
- The nomination of Eiichi Takahashi as the next International Secretary, and Roberta Rudnick and Ed Sholkovitz as new Directors (these nominees have since been ratified by the membership and will take office Jan. 1, 2001);
- Appointment of new committee chairs and members, and David Lambert of NSF to serve as liaison with the American Association for the Advancement of Science.

Treasurer's Report: Becky Lange reported that the liquid assets of the Society, as of 12/31/99 were \$486K, down slightly from the previous year. In addition to the traditional investment of reserves in certificates of deposit, an account was opened in 1998 with Solomon Smith Barney, with a balance of \$274K as of 12/31/99, invested in conservative stocks, bonds and money market vehicles. Lange reported that the projected expenses of the Society for 2000 are expected to total approximately \$121K, down from last year's projection of \$144K, due mainly to reduction in the cost of maintaining the GS website. Major expenses of the Society for 2000 include the GS Business office in St. Louis (\$53K), production of the newsletter (\$26K), support for student travel to the Goldschmidt Conference (\$10K), and a number of smaller expenses, including the purchase of new medals, insurance, support for meeting attendance, the GS/MSA reception at the GSA annual meeting, auditing fees, etc. Income from GCA royalties, dues, and interest has totaled \$187K through August of 2000. **Lange recommended that the soci-**

ety work with our financial advisors at Solomon Smith Barney to increase the level of risk (and potential reward) of our investment portfolio, which the Board unanimously endorsed.

Geochimica et Cosmochimica Acta Executive Editor's Report: Frank Podosek reported that the transition from Karl Turekian's Editorship is still going on, in the sense that many of the manuscripts currently appearing in the printed journal are still those originally processed at Yale. Podosek reported that the former system of Associate Editors has been re-established and is functioning extremely well, with 54 active AE's at present. The new editorial office website (gca.wustl.edu) provides ready access to information about the journal and the editorial office, and facilitates the electronic submission and transmission of manuscripts, reviews, AE recommendations, etc. Podosek has set a target of three months from manuscript submission to the AE recommendation, and this has been achieved in more than half the cases.

Podosek reported that Elsevier's decision to move production management to its own offices in New York and Stamford, Connecticut, coordinated by John Fotia, has worked out very well and the journal is now up to date and being delivered on time, with few complaints regarding delays, reprints, copyediting, etc. Podosek reported that his own editorial staff (Linda Trower, Manager; Karen Pollard, Assistant; and Robert H. Nichols, Jr., Webmaster) has done an outstanding job of receiving and posting manuscripts and tracking the enormous volume of communication among authors, editors and reviewers. Finally, Podosek reported that the editorial office has made significant progress in the plan approved last year to offer GS and Meteoritical Society members who subscribe to the journal a free CD containing the entire contents of the 1998 volume of GCA. The cost of this activity is expected to be approximately \$10K per GCA volume (24 issues). The Board recommended that the Joint Publications Committee be charged with assessing the perceived benefit to member/subscribers, relative to its cost to the societies, before any additional volumes are prepared for CD distribution.

The Board voted unanimously to accept Podosek's proposal to include citation and acceptance speeches of the Goldschmidt, Clarke and Patterson medallists in GCA, as well as the newsletter. Immediately subsequent to the Board meeting, the Executive Committee approved extension of this motion to include the scientific lectures presented by the medallists in conjunction with their award, a practice newly introduced at the Oxford conference. Finally, the Board unanimously approved Podosek's recommendation to set the GCA subscription rate at \$122 for professional GS and Meteoritical Society members in 2001, and \$45 for student members, the same as the past two years, subject to approval by the MS Council. (Since the Board meeting, the MS Council has approved these rates.)

The Geochemical News: Newsletter editor Neil C. Sturchio was unable to attend the meeting, but submitted a report indicat

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Continued from page 11

ing that the quality of presentation and content of the newsletter continues to improve, and production costs have decreased significantly due to identification of a lower-cost printer. The "prominent geochemist" interview series continued with interviews of Keith O'Nions and Harold Helgeson appearing in 1999 and 2000 issues, and more are on the way. The Board discussed the desirability of increasing the frequency of the newsletter to six or eight issues per year. EAG President Al Hofmann indicated that EAG may be interested in co-sponsoring the newsletter, and that this might help in providing material for an expanded publication schedule. OGD Chair Mike Engel and Secretary Peggy Ostrom also indicated an intention to utilize the newsletter more extensively in communicating to its members and the society at large.

Sturchio arrived at the conference later in the week and expressed interest in increasing the production rate of the newsletter, particularly if EAG and the OGD can provide more material, and if he could be assisted with printing and distribution. Transferring these activities to the GS Business Office, or to a third party vendor, were discussed, but no decisions were made.

Special Publications Editor's Report: Scott Wood was unable to attend, but submitted a report indicating that he has taken a more aggressive marketing approach to sales of the six existing volumes in this series, including offering them as a set at a greatly reduced price and advertising the volumes on several electronic bulletin boards as well as the GS website, the newsletter, GCA and in a Royal Society of Chemistry publication, *The Analyst*. Wood reported that the majority of manuscripts have been reviewed for SP#7, in memory of David Crerar (S. Wood and R. Hellmann, eds.), with a projected publication date in early 2001. Wood also reported that negotiations are underway with the Society of Economic Geologists and the New Zealand Institute of Geological and Nuclear Sciences to finance the production of SP#8 in honor of Werner Giggenbach (Ian Graham, ed.). The projected publication date is 2002, pending successful completion of the negotiations.

Volumes in the new RIM&G series are handled by Series Editor Paul Ribbe if sponsored by MSA, and by Scott Wood if sponsored by GS. Wood reported that the first GS-sponsored volume, "Molecular Modeling Theory and Applications in the Geosciences" (R.T. Cygan and J.D. Kubicki, eds.) is on track for completion in May of 2001, and will be accompanied by a short course immediately prior to the Goldschmidt Conference in Roanoke. Wood then proposed the second GS volume in this series, "Noble Gases in Cosmochemistry and Geochemistry" (D. Porcelli, C. Ballentine and R. Weiler, eds.) to appear in 2002 without an associated short course. **The Board unanimously approved a motion made by Al Hofmann and seconded by Judith McKenzie to accept this proposal, but encouraged the authors to consider a special symposium on the same subject at the 2002 Goldschmidt Conference.** Finally, another RIM&G series volume, entitled "Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Science" (P. Fenter, M. Rivers, N. Sturchio and S. Sutton, eds.), with an associated short course prior to the 2002 GSA

annual meeting, was discussed by the Board, but no decision was made, due to lack of sufficient documentation and questions regarding the scope of the subject coverage.

Finally, Wood reported that *Geochemical Transactions*, sponsored by the Geochemistry Division of the American Chemical Society and published by the Royal Society of Chemistry, is off to a slow start, but that submissions are increasing. The Geochemical Society was asked to appoint a member to the editorial board of this journal, and Wood, who is now the Editor in Chief of the journal, was the Board's appointee.

GS Business Office: Frank Podosek, as GS Board member and GCA Editor, is also supervisor of the GS Business Office at Washington University in St. Louis, Missouri, USA, which is staffed by Business Manager Seth Davis. Podosek and Davis reported that the main function of the office is to maintain the list of active members of the Society and subscribers to GCA, including solicitation of new members, sending annual renewal notices to existing members, and collecting all dues and individual GCA subscription fees. The office also produces mailing labels for the newsletter and for individual subscriptions to GCA. The other major activities of this office are maintenance of the GS website and sales of volumes in the Special Publications Series. Podosek reported that transition from the former business office in Columbus, Ohio was somewhat difficult, but that the new office is now functioning smoothly and that Seth Davis is doing an outstanding job.

Podosek then reported that membership in the society currently totals 1418, including 177 students. More than half the members are from the USA, and Japan, with 84 members, is the next highest. Great Britain, France and Germany all have more than 50 members each, and the remainder are spread throughout the world. Podosek was surprised to note that nearly half of the GCA AE's are not members of the society, and that 19 of the 29 symposium organizers at the Oxford Goldschmidt Conference are not members. He suggested a word-of-mouth campaign to encourage prominent geochemists to join the society, and has taken the initiative of inviting authors who send manuscripts to GCA to consider joining the Society.

Podosek reported that sales of the Special Publications Series volumes has increased significantly, primarily due to the offering of all six volumes at a greatly reduced rate. However, he noted that shipping costs for the entire set are high, and suggested a \$15 shipping and handling fee, which the Board approved. Podosek also reported that, with the added responsibilities of Special Publication book sales, and updating of the Society's website, the Business Manager position is clearly a full time job, though the duties are not evenly spread over the year. Fortunately, juxtaposition of the Business Office and the GCA Editorial Office permits sharing of resources, such that the work load can be spread more evenly among the available staff. **Podosek noted, however, that GCA webmaster Robert Nichols, Jr., spent a considerable amount of time helping to construct the GS website, and requested an additional \$5K of budget authority to compensate Nichols as a consultant for his service to the society in 1999 and \$3K for 2000, which the Board approved unanimously. Podosek then requested a budget of \$54K for the Business Office for**

2001, which the Board unanimously approved.

Discussion then ensued on several issues related to the Business Office. Podosek and Davis were encouraged to contact Elsevier regarding preparation of the biennial hardcopy GS membership directory, which has traditionally been distributed along with subscription to GCA. The cost versus benefit of staffing a Geochemical Society Booth at international meetings (travel and lodging being the major costs) was also discussed. It was decided that GS would no longer maintain a booth at the spring AGU and GSA annual meetings, but that the Society would maintain active participation in these meetings through symposia and theme sessions promoted by our Program Committee and the Organic Geochemistry Division. Finally, Podosek invited input into the content of the GS website, indicating that the Board had not provided an official statement of what it really wants for this site. The Board expressed overall satisfaction with the current style and content, offering minor suggestions, such as addition of a button specifically for Goldschmidt Conference information. Podosek indicated that he has been contacted about listing job offers on the web site, and after Board input, agreed to begin listing job postings for a period of one month from date of receipt, unless the initiator requests additional postings.

Immediately after the conference, GS and the Meteoritical Society agreed to keep their membership dues for 2001 at their current levels, \$25 for professionals, and \$5 for students.

Miscellaneous Items: The Board discussed a number of issues related to member services, including member discounts for registration at the Goldschmidt Conferences. This is complicated by the fact that EAG co-sponsors each meeting, and MSA will also co-sponsor the 2001 conference in Roanoke, USA. The Goldschmidt Forum (Presidents and Vice Presidents of GS and EAG) was encouraged to discuss this issue and formulate mutually acceptable recommendations.

Mike Hochella then lead a discussion of the desirability of introducing one or two new GS medals, indicating that the number of active scientists is growing rapidly, while the number of medals offered by all scientific societies within a given discipline is growing at a much slower rate. This discussion was sparked by earlier email communication from Francis Albarede, advocating a special medal to recognize technical advances that have revolutionized our ability to study geochemical processes using new instrumentation. Hochella pointed out that the Society currently awards the Goldschmidt and Clarke medals for lifetime and early career achievement in any (or more than one) subdiscipline of geochemistry, as well as the Treibs and Patterson medals for significant achievements in organic and environmental geochemistry, respectively. Dave Wesolowski then presented a proposal for a medal named for Robert M. Garrels, and intended for major achievements in aqueous geochemistry. Board members had mixed response, with Judith McKenzie pointing out that Garrels was equally well known for his contributions to global geochemical cycles, and others suggesting that aqueous geochemistry might be too narrow a subdiscipline. Al Hofmann suggested that perhaps the Fellows title was sufficient for recognizing major achievements, and that additional medals would

not benefit the society. Mike Hochella suggested two new medals, one related to the general theme of "water", perhaps named for Garrels, and another related more to "rocks" or the solid earth, perhaps named for A.E. Ringwood. A subcommittee composed of Wesolowski, McKenzie, Vala Ragnarsdottir and Peggy Ostrom was charged with formulating recommendations for the Board to consider. **During this discussion, Ostrom made a motion, seconded by Ragnarsdottir, to increase the frequency of the Treibs medal to an annual award, which was unanimously approved. Finally, the Board unanimously approved a motion by Mike Drake, seconded by Everett Shock, to provide honoraria for the Treibs, Clarke and Patterson medallists, as well as registration fee waiver for all of our medallists at the meeting at which they receive their award.**

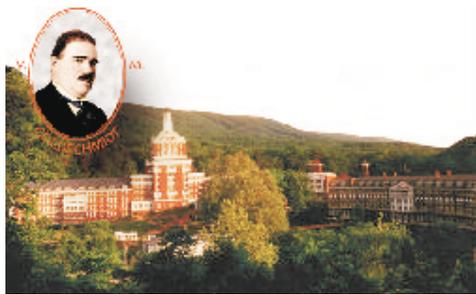
A discussion was then lead by Mike Hochella and Peggy Ostrom concerning the GS support for symposia at scientific conferences and special GS-sponsored meetings. This lead to an inconclusive discussion regarding the balance between income and expenditures, which ended with Hochella suggesting that our goal should be to slowly grow our cash reserves, while providing as many member services, and funding as many efforts to strengthen our discipline internationally, as possible. **The Board then unanimously approved a motion made by Dave Wesolowski and seconded by Peggy Ostrom, to allocate \$10,000 annually for support of geochemistry sessions/symposia at any scientific conference of geochemical relevance. The Program Committee, which will receive and evaluate proposals, should keep in mind the discipline distribution of the GS membership in awarding these grants.** It is noted that the \$10,000 annual allocation of funds for support of student travel to the Goldschmidt Conferences will remain in place, and will be granted to each Goldschmidt organizing committee.

Ways to recognize long-time commitment to the society were also discussed, including lifetime memberships, service awards, and reduced rates for retirees. Suggestions included a 25 year service pin and reducing membership dues to \$10 or waiving dues for members over 65 who had maintained continuous membership for 20-30 years. The Business Office was asked to identify those individuals who have been members of the Society for 25 years or more, but no specific actions were approved by the Board.

The last item of business was introduced by Vala Ragnarsdottir, who indicated that the International Union of Geodesy and Geophysics (IUGG) was interested in having the Geochemical Society as one of their affiliates. One of their interests in approaching the GS is to facilitate a name change to the International Union of Geosciences (IUG). This item was tabled, pending a more detailed report and recommendation.

The meeting adjourned at approximately 4:00 PM.

These minutes were prepared by David J. Wesolowski, Secretary of The Geochemical Society, and submitted on September 30, 2000.



Eleventh Annual V. M. Goldschmidt Conference

May 20–24, 2001 • Hot Springs, Virginia

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European Research Facilities: The Bayerisches Geoinstitut

David Rubie and Stephen Mackwell

Experimental studies at high pressures and temperatures are essential for understanding the composition, structure and dynamics of Earth's interior through measurements of the chemical and physical properties of Earth materials. Obvious examples include phase equilibria, phase transitions, elastic properties of minerals and equation-of-state determinations, element partitioning, fluid-melt-mineral interactions, diffusion, electrical conductivity, thermal diffusivity, rheology and other transport properties. In 1986, a research institute was founded at the University of Bayreuth, Germany, by the State of Bavaria for the specific purpose of developing and pursuing such investigations. The Bayerisches Geoinstitut (or Bavarian Research Institute for Experimental Geochemistry and Geophysics) was the result.

In the last 14 years, the Bayerisches Geoinstitut has developed into one of the best-equipped and most productive institutes of its type in the world. The high pressure-temperature facilities include multianvil, piston-cylinder, diamond-anvil cell and deformation laboratories. The multianvil laboratory currently includes 4 multianvil presses that routinely enable experiments to be performed at conditions up to 26 GPa and 2800 K. The deformation laboratory contains a state of the art Paterson gas-medium apparatus as well as 1-atmosphere and solid-medium apparatus. In addition to the high-pressure laboratories, a wide range of analytic and spectroscopic facilities are available for characterizing the structure and composition of materials, including powder and single-crystal X-ray diffraction, transmission electron microscopy, and Raman, infrared and Mössbauer spectroscopy. As described below, all facilities are potentially open to visiting scientists, especially those coming from countries and associated states of the European Union.

Compared with most other institutes, the staffing and structure of the Bayerisches Geoinstitut are unique. The scientific staff are very international and originate from as many as 10 different countries. Out of about 45 scientific staff and graduate students, 9 scientists have permanent positions. The majority of scientists are postdocs who are funded by the Visiting Scientists Program of the Institute as well as by other sources such as European Union and German Science Foundation grants and the Alexander von Humboldt Foundation. There is no group structure within the institute, little formal direction from above, and postdocs are encouraged to define their own research projects and also to collaborate freely with others.

Since 1994, the Bayerisches Geoinstitut has been funded by the European Union as a facility for high-pressure research, originally under the old "Large Scale Facility" programs and, since 2000, under the current "Access to Research Infrastructures" program. Under these programs, scientists from countries and associate states of the European Union (except for Germany) can visit for periods of up to three months to perform experiments and/or use analytical equipment with full financial support. Currently, 360 "experiment days" per year are

available to such visitors. In terms of numbers of visiting scientists, the broad range of nationalities involved and the number of publications that have resulted from the research, these programs have been highly successful in promoting exciting international collaboration. Although most visitors have been Earth Scientists, the number of chemists, physicists and material scientists supported under these programs has been significant.

We briefly give three examples of some typical research projects in the field of high-pressure geochemistry and geophysics.

(1) The solubility of silicon in liquid iron has recently been determined up to 23 GPa and 2473 K at constrained oxygen fugacities through multianvil experiments. The results, combined with a thermodynamic model, show that silicon solubility initially increases with increasing pressure and reaches a maximum of several wt% at 25 GPa. Above 25 GPa, the solubility then decreases as pressure further increases and becomes negligible at the core-mantle boundary. These results suggest that if the formation of the Earth's core involved metal-silicate equilibrium at the base of a 700 km deep magma ocean, as has been proposed recently, the core could currently contain several wt% Si that is out of equilibrium with the overlying mantle (Gessmann et al., 2000).

(2) The OH content of nominally anhydrous minerals of the Earth's mantle has become an important topic in recent years because of the consequences for the transport and storage of water in the mantle, as well as its influence on physical and chemical processes. Until recently, studies of the solubilities of OH in mantle minerals involved mainly olivine, wadsleyite, ringwoodite and garnet; at high pressures, application of results to the mantle is difficult because values of water fugacity are unknown both in the experiments and in the mantle. To overcome this problem, Bolfan-Casanova et al. (2000) have determined the partitioning of OH between mantle minerals up to 25 GPa through multianvil experiments and infrared spectroscopy. A notable result is that silicate perovskite does not contain any detectable OH, in strong contrast to other mantle minerals. This result is valid for both the MgSiO₃ end member and Fe- and Al-bearing perovskites. Obvious consequences are that the capacity for water storage in the lower mantle is extremely limited and subducting slabs are likely to dehydrate and lose their remaining water where they enter the lower mantle.

(3) All tectonic processes are driven ultimately by the convective transfer of heat and material from the deepest mantle to the Earth's surface. At the Bayerisches Geoinstitut, several experimental programs are investigating the mechanical behavior and textural evolution of mantle minerals and rocks in order to understand the nature and rate of mantle convection. Experimental deformation of mantle rocks in shear has shown that significant changes in microstructure and mechanical behavior develop at high strains, producing textures that are consistent with seismic observations of shear-wave splitting in the uppermost mantle. In addition, very high-pressure stress relaxation of transition zone and lower mantle mineral minerals in the multi-anvil apparatus has illuminated details of the microstructural deformation mechanisms in these materials, which cannot be studied in conventional deformation apparatus.

A recent technological development at the Bayerisches Geoinstitut has involved the construction and installation of a 5000 ton multianvil press. This enables experiments to be performed on samples that are about 10 times larger than those in the conventional smaller systems. For example, at 24 GPa, samples of up to 30 mm³ are now possible, compared with ~1 mm³ in a conventional multianvil. This development has enabled the first in-situ measurements of thermal diffusivity of ringwoodite and wadsleyite to be made, at conditions up to 18 GPa and 1400 K (Xu et al., in preparation). Current technological projects involve the construction of a cubic multianvil press designed for controlled deformation experiments at high pressures (e.g. 10 GPa) and the development of the Drickamer-type opposed anvil apparatus for experiments up to 40 GPa.

More information about the staff, facilities and research activities of the Bayerisches Geoinstitut, including annual reports, can be found on the internet (<http://www.bgi.uni-bayreuth.de>).

Bolfan-Casanova, N., Keppler, H., Rubie, D.C. (2000) *Earth Planet. Sci. Lett.* 182, 209-221.

Bureau, H., Keppler, H. (1999) *Earth Planet. Sci. Lett.* 165, 187-196.

Gessmann, C.K., Wood, B.J., Rubie, D.C., Kilburn, M.R. (2000) *Earth Planet. Sci. Lett.* (in press).

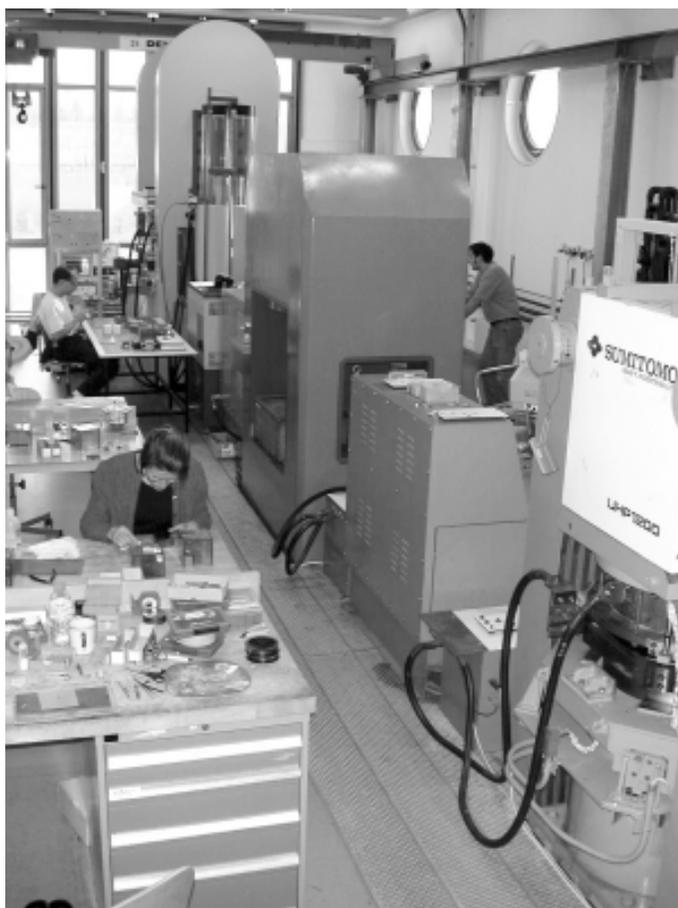


Fig. 1. Multianvil laboratory at the Bayerisches Geoinstitut showing (from rear to front-right) 5000 ton, 1000 ton and 1200 ton multianvil presses.

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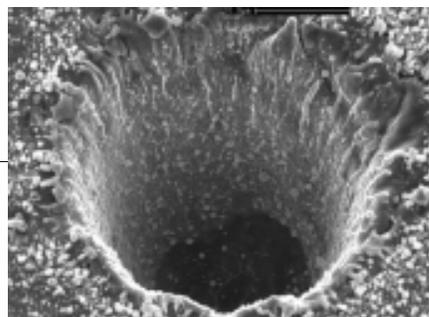
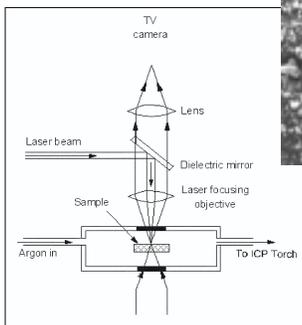
26-27 MAY 2001

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LASER ablation-ICPMS is arguably the most exciting new analytical development in geochemistry in the last decade, opening up approaches to pure and applied geologic problems that were only dreamed of before. The goal of this course is to teach graduate students and post-graduate researchers how laser ablation-ICPMS works, what is being done in the Earth sciences with the method now, and what could be done in the future. It will appeal to all those Earth scientists who are interested in solving geologic problems with chemical data. Material will be presented at the level of understanding of most graduate students in the Earth sciences and will be assembled in a short-course volume.

Technical topics discussed include: Nd-YAG and excimer laser instrumentation; laser beam delivery systems; ablation cell design; quadrupole, magnetic sector and time-of-flight ICPMS instrumentation; collision cell technologies; sample preparation; data acquisition, calibration and quantification strategies; laser ablation phenomena and element fractionation.

Examples of Earth sciences applications: whole rock geochemistry using fusion disk analyses; lithophile element studies of silicate and oxide minerals in the mantle and crust; noble metal element studies of sulphides, oxides and metals in ores and rocks; experimental mineral-melt partitioning; melt inclusions and magmatic processes; fluid inclusions and ore genesis; metamorphic minerals and diffusion-rate processes; trace-element geothermometry/geobarometry; environmental pollution tracing and monitoring; radiogenic isotope systematics of minerals; U-Pb accessory mineral geochronology.



Registration costs: CAN\$250 for professionals and CAN\$150 for students (includes short-course volume and two cold lunches).

To register and for other information, visit the St. John's 2001 GACMAC website at www.geosurv.gov.nf.ca/stjohns 2001 or contact Dr Paul Sylvester at pauls@sparky2.esd.mun.ca for answers to specific questions. Online registration will commence on 1 March 2001.

Scheduled Lecturers

Detlef Günther, Professur für Analytische Chemie und Spurenanalytik, ETH Zürich, Switzerland

Simon Jackson, Lecturer, School of Earth Sciences, Macquarie University, Australia

Jan Kosler, Lecturer, Department of Geochemistry, Charles University, Czech Republic; and Research Associate, Department of Earth Sciences, Memorial University of Newfoundland

Henry Longrich, Professor Emeritus, Department of Earth Science, Memorial University of Newfoundland

Nuno Machado, Professeur associé et Agent de recherche et de planification, Sciences de la Terre, Université du Québec à Montréal

Paul Mason, Research Officer, Faculty of Earth Sciences, University of Utrecht, The Netherlands

Marc Norman, Senior Research Fellow, School of Earth Sciences, University of Tasmania, Australia

Paul Sylvester, Associate Professor, Department of Earth Sciences, Memorial University of Newfoundland

Geoff Veinott, Research Scientist, Department of Fisheries and Oceans, Environmental Sciences Division, Northwest Atlantic Fisheries Centre

Student Registration Grants

A limited number of awards is available to students to cover the registration fee. Applicants should send a brief statement outlining their interest in the short course and explaining how their attendance will enhance their academic studies or research to Dr Paul Sylvester by email at pauls@sparky2.esd.mun.ca. APPLICATIONS MUST BE RECEIVED BY 1 MARCH 2001.



**Mineralogical
Association of Canada**
Association minéralogique
du Canada

Earth System Processes Conference

Edinburgh, U. K., June 24-28, 2001

A joint meeting of the Geological Society of America
and the Geological Society of London

For further details see the web page at
www.geosociety.org/meetings/edinburgh/index.htm

Sessions of particular interest to members of the GS:

Role of Hydrothermal Systems in Biospheric Evolution
Integrated Approaches to Water Quality Issues
Coupled Earth Processes: Deformation, Chemical Reaction
and Heat in Fault- and Fracture-Dominated Fluid
Flow
Archean Earth and Contemporary Life: The Transition from
an Anaerobic to an Aerobic Marine Ecosystem
Sedimentary Systems and Microbial Communities:
Dynamic Interactions
Critical Transitions in Earth History and Their Causes
The Snowball Earth Hypothesis: Theory and Observations
Global Change in the Late Paleozoic
The Role of Natural Gas Hydrates in the Evolution of
Planetary Bodies and Life
The Coupling of Fluid Reservoirs within the Earth
Role of Tropical Oceans in the Earth System
Causes of Rapid Climate Changes in the Quaternary
Feedbacks and Coupling between Geosphere, Biosphere,
Hydrosphere and Atmosphere
Anthropogenic Modifications to the Earth System
Geological Evolution of the Earth System: Precambrian to
Early Paleozoic
Geological Evolution of the Earth System: Mesozoic to
Cenozoic
Earth Resources
Timing and Rates in Earth System Processes

Arkansas State University

Graduate Research Assistantship

The Environmental Sciences PhD Program at Arkansas State University seeks a PhD student to conduct research in Hydrochemistry/Aquatic Ecology. The USGS-AWRC funded project is focused on investigating the linkages between habitat contraction and basin hydrology. Our goal is to conduct field, laboratory and numerical studies to examine the contraction of endemic species habitat and changes in basin hydrology. We seek a motivated student with a degree in either geology or biology and a strong background in the other science. Interested students are encouraged to apply for Fall 2001 admission.

For information see our website (<http://www.cas.astate.edu/evs>) or contact Dr. Robyn Hannigan, Department of Chemistry, Arkansas State University, State University, AR, tel: (870)972-3086, e-mail: hannigan@navajo.astate.edu.

The Center for Environmental Chemistry and Geochemistry of The Pennsylvania State University announces the second year of:

The **Biogeochemical Research Initiative for Education (BRIE)**

BRIE is an initiative funded by the National Science Foundation/IGERT program to support 30 Ph.D. students, 5 post-docs, and 30 undergraduate summer interns in a multi-year program of biogeochemistry in one of five departments (Agronomy, Biochemistry and Molecular Biology, Civil and Environmental Engineering, Geosciences, and Materials Science and Engineering). Students work in teams investigating the cultivation of extremophiles, physical chemistry of biofilms, biologically enhanced mineral reactivity, bioavailability of organic compounds, and the biogeochemistry of anoxic environments. Interested students at all levels should write L. Spangler, 2217 Earth Engineering Science Bldg., University Park, PA, 16802 (spangler@essc.psu.edu) or check <http://www.essc.psu.edu/BRIE> for information. The Pennsylvania State University is an equal opportunity/affirmative action employer. Women and minorities encouraged to apply.

Eleventh Annual V. M. Goldschmidt Conference

May 20-24, 2001
The Homestead
Hot Springs, Virginia, USA

Important Dates

Abstract Submission (hard copy) – February 9, 2001
Abstract Submission (electronic) – February 16, 2001
Meeting registration (without late fee) – April 1, 2001
Housing reservations – April 1, 2001

Additional information is on the Conference Web site:

<http://www.lpi.usra.edu/meetings/gold2001/>

Or you may send email to the Conference secretary at:
gold2001@vt.edu

SUBMIT YOUR ABSTRACT NOW!!!

Preregistration and Lodging Reservation Forms
are available on pages 14 and 15 of this issue

Meetings Calendar

March 11-16, 2001: Gordon Conference Polar Marine Science. Field Analyses and Numerical Modeling of Coupled Physical, Chemical and Biological Systems, Four Points Sheraton Ventura, Harbortown, Ventura, California, USA. Web site: <http://www.grc.uri.edu/programs/2001/polar.htm>

March 20-25, 2001: European Geophysical Society XXVI (EGS 2001) General Assembly, Nice, France. <http://www.copernicus.org/EGS/egsga/nice01/nice01.htm>

April 1-5, 2001: 221st National Meeting of the American Chemical Society, San Diego, California. Web site: <http://www.acs.org/meetings/sandiego2001/>

April 8-12, 2001: Biennial Meeting of the European Union of Geosciences (EUG-11), Strasbourg, France. Web site: <http://eost.u-strasbg.fr/EUG/EUG11.html>

April 19-23, 2001: Third IAEA Symposium on Isotope Techniques in the Study of Environmental Change, Vienna, Austria. Contact: Pradeep K. Aggarwal, Isotope Hydrology Section, International Atomic Energy Agency, P.O. Box 100, Wagramer Strasse 5, A 1400, Vienna, Austria; Ph. +43-1-2600-21735; Fax +43-1-26007; e-mail: p.aggarwal@iaea.org; www.iaea.org/worldatom/Meetings/Planned/2001/

May 2-4, 2001: ECROFI-16. European Current Research on Fluid Inclusions, Porto, Portugal. Abstract deadline: January 5, 2001. Contact: XVI ECROFI, Departamento de Geologia, Faculdade de Ciências, Praça Gomes Teixeira, 4099-002 Porto, Portugal; Phone: +351-22-3401471; Fax: +351-22-2056456 E-mail: ecrofi@fc.up.pt. Web site: <http://www.fc.up.pt/geo/ecrofi/>

May 19-25, 2001: Impact Markers in the Stratigraphic Record: 6th workshop of the ESF-IMPACT Programme. Contact: Francisca C. Martinez-Ruiz, Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Fac. Ciencias, Fuentenueva s/n., 18002 Granada (Spain); Fax: 34 958 243384; e-mail: fmruiz@ugr.es. <http://www.ugr.es/~impact/>

May 19-20, 2001: Molecular Modeling Theory and Applications in the Geosciences, Geochemical Society and Mineralogical Society of America Short Course, Roanoke, Virginia, USA. Convenors: R. T. Cygan and J. D. Kubicki. Web site: <http://www.sandia.gov/eeselector/GScourse.htm>; *Registration form on page 7 of this issue.*

May 20-24, 2001: Goldschmidt 2001, Roanoke, VA, USA. Contacts: Mike Hochella (hochella@vt.edu) and Bob Bodnar (bubbles@vt.edu), Department of Geological Sciences, Virginia Tech, Blacksburg, VA 24061-0420. Web site: www.lpi.usra.edu/meetings/gold2001/. *Preregistration and Lodging forms, page 14-15 of this issue*

May 23-June 3, 2001: Strength From Weakness: Structural Consequences of Weak Interactions in Molecules, Supermolecules, and Crystals, Erice, Italy. <http://www.geomin.unibo.it/orgv/erice/strength.htm>

May 29-June 2, 2001: Spring Meeting of the American Geophysical Union, Boston, MA, USA. Web site: www.agu.org/meetings/

June 10-15, 2001: 10th Water-Rock Interaction Symposium, Tanka Village Congress Centre, Villasimius, Sardinia, Italy. Contact: WRI-10 Scientific Committee Secretariat (Prof. L. Fanfani, secretary general), Department of Earth Sciences, University of Cagliari, Via Trentino 51, I-09127 Cagliari, Italy; Phone.: +39 070 6757724; Fax: +39 070 282236; E-mail: wri10@unica.it. Web Site: <http://www.unica.it/wri10/>

June 10-15, 2001: Gordon Conference on the Interior Of The Earth, Mount Holyoke College, South Hadley, MA, USA

June 24-28, 2001: Earth System Processes, Edinburgh, U. K. Joint conference of the Geological Society of America and the Geological Society of London. Web site: <http://www.geosociety.org/meetings/edinburgh/index.htm>

June 25-29, 2001: 4th International Symposium on Applied Isotope Geochemistry (AIG-4), Asilomar Conference Center, Pacific Grove, California, U.S.A. Contact: Tom Bullen, tdbullen@usgs.gov

July 24-27, 2000: International Symposium on Isotopomers (ISI 2001), Yokohama, Japan. Web site: <http://nylab.chemenv.titech.ac.jp/ISI2001/isi2001.html>

Aug. 19-24, 2001: Gordon Research Conference "Formation, Modification and Preservation of Ore Deposits", focusing on geochemical aspects of tectonic, climatic and surficial processes. Proctor Academy, New Hampshire, U.S.A. Co-chairs, John Thompson, Jean Cline and Jeff Hedenquist. Application information at website: www.grc.uri.edu. Click on 2001 Meetings, "Inorganic Geochemistry" for session and speaker updates.

Aug. 25-31, 2001: 20th European Crystallographic Meeting (ECM-20): Crystallography in Natural Sciences and Technology, Kraków, Poland. The Jagiellonian University. In collaboration with Stanislaw Staszic University of Mining and Metallurgy. Contact: ECM20, Conference Secretariat, Faculty of Chemistry, Jagiellonian University, Ul. Ingardena 3, 30-060 Kraków, Poland. E-mail: ECM2001@chemia.uj.edu.pl Web site: <http://www.ch.uj.edu.pl/ECM2001.htm>

Aug. 26-29, 2001: 6th Biennial SGA Meeting -- Mineral Deposits at the Beginning of the 21st Century, Krakow, Poland. Contact: 6th Biennial SGA Meeting, Dr. Wojciech Mayer, University of Mining and Metallurgy, Faculty of Geology, Geophysics & Environmental Protection, av. Mickiewicza 30, 30-059 Kraków, Poland; Phone: +48-12-6172385; Fax:+48-12-6332936, E-mail: wmayer@geol.agh.edu.pl Web site: <http://galaxy.uci.agh.edu.pl/~sga/>

September 3-7, 2001: Écorad 2001 -International congress on the radioecology-ecotoxicology of continental and estuarine environments, Palais des congrès, Aix-en-Provence, France. Abstract deadline: October 2000. Contact: ECORAD 2001 - IPSN-DPRE – Bât. 02, Rue Auguste Lemaire B.P. n°6 / 92265, Fontenay-aux-Roses cedex, France; Phone: +33 1 46 54 79 06; Fax: +33 1 46 54 72 90; E-mail:ecorad.2001@ipsn.fr <http://www.ipsn.fr/ecorad2001>. Web sites: <http://www.ipsn-dpre.com/ecorad2001> and <http://www.ipsn-dpre.com/ecorad2001/>

September 10-14, 2001: 20th International Meeting on Organic Geochemistry (IMOG 2001), Nancy, France. Abstract deadline: December 1, 2000. Contact: E-mail: imog2001@g2r.uhp-nancy.fr. Web site: <http://www.imog.uhp-nancy.fr>

September 15-20, 2001: The Deep Earth: Theory, Experiment and Observation: Mantle Processes, Espinho (near Porto), Portugal. Contact: J.A.M. Paulssen, Earth Sciences, University Utrecht, Budapestlaan 4, 3584 CD UTRECHT, The Netherlands; Phone: +31 30 2535089; fax: +31 30 2533486; E-mail: paulssen@geo.uu.nl. Web site: <http://www.esf.org/euresco/01/lc01125a.htm>

Sept. 17 - 21, 2001: 7th International Conference on Paleoceanography (ICP7), Sapporo, Japan. Abstract Deadline: March 10, 2001 Co-Conveners: Hisatake Okada (Dept. of Earth and Planetary Sciences, Graduate School of Science, Hokkaido University, Sapporo, 060-0810, Japan. Phone: 81-11-706-3537. Fax: 81-11-746-0394. E-mail: oka@cosmos.sci.hokudai.ac.jp), Itaru Koizumi, and Tadamichi Oba

Nov. 5-8, 2001: Geological Society of America Annual Meeting, Boston, MA USA. Contact: GSA Meetings, Box 9140, Boulder, Colo. 80301-9140. Tel: +1-303-447-2020, ext. 164; Fax: +1-303-447-1133; WWW: <http://www.geosociety.org/meetings/index.htm>

December 10-14, 2001: Fall Meeting of the American Geophysical Union, San Francisco, California, USA. Web site: <http://www.agu.org>

Sept. 9-13, 2002: Mineralogy for the new millenium (IMA 2002), 18th General Meeting of the International Mineralogical Association, Edinburgh, United Kingdom. Contact: Mr K. Murphy, Executive Secretary, Mineralogical Society of Great Britain and Ireland, 41 Queen's Gate, London SW7 5HR, United Kingdom: Phone: +44 171 584 7516; E-mail: IMA@minersoc.demon.co.uk.

October 27-30, 2002: Geological Society of America Annual Meeting, Denver, Colorado, USA. Contact: GSA Meetings, Box 9140, Boulder, Colo. 80301-9140. Tel: +1-303-447-2020, ext. 164; Fax: +1-303-447-1133; WWW: <http://www.geosociety.org/meetings/index.htm>

The Deep Earth: Theory, Experiment and Observation

Mantle Processes

Espinho (near Porto), Portugal, 15 - 20 September 2001

Supported by the European Commission, Research DG, as a EuroConference under TMR contract ERBFMMACT n° 98-0381

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3	Stable Isotope Geochemistry: A Tribute to Samuel Epstein, edited by H.P. Taylor <i>et al.</i> (1991) (ISBN 0-941809-02-1)	25.00		
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*Student Certification

For student application/renewals, a faculty member in the student's department must either sign below or must write a letter of certification to be included with this form.

"I hereby certify that the individual herein applying for GS Membership is a student in good standing in my department."

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- (10) Mantle mineralogy, petrology, trace elements
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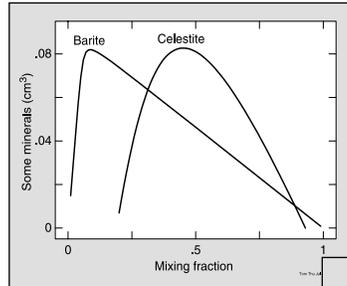
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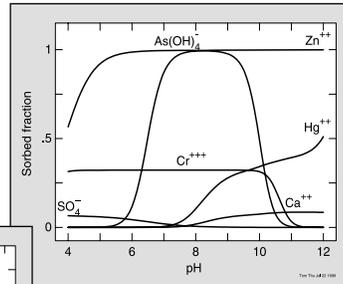
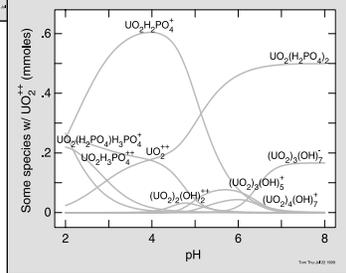
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