

# THE GEOCHEMICAL NEWS

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in cooperation with The European Association of Geochemistry

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## **Processes in Geochemistry** *Forces, Fluxes and Structure*

### **Conference Themes**

*The Dynamic Solid*  
*The Dynamic Interface*  
*Fluids of the Earth*  
*The Earth's Surface*  
*The Deep Earth*  
*Early Earth, Moon, Planets*

University of Copenhagen  
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5 to 11 June 2004

Sponsored by  
European Association for  
Geochemistry  
Geochemical Society  
Mineralogical Society of America  
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Hosted by  
The Nordic Countries



Abstract Deadline: 26 January 2004  
Early Registration Closes: 2 April 2004

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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 quarterly newsletter), the *Reviews in Mineralogy and Geochemistry Series* (jointly with the Mineralogical Society of America), the journal *Geochimica et Cosmochimica Acta* (jointly with the Meteoritical Society), and co-publishes the electronic journal *G<sup>3</sup>* (jointly with the American Geophysical Union: AGU); grants the *V.M. Goldschmidt*, *F.W. Clarke* and *Clair C. Patterson Awards*, and, jointly with the European Association of Geochemistry (EAG), 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 EAG; and co-sponsors the Geological Society of America annual meeting and the AGU 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 GSA 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.

### GS OFFICERS - 2004

|                         |  |
|-------------------------|--|
| PRESIDENT               | <i>James I. Drever, University of Wyoming</i>                |
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|   |
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### GS EDITORS

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| GEOCHEMICAL NEWS  | <i>Johnson R. Haas, Western Michigan University</i>   |
|   | <i>Carla M. Koretsky, Western Michigan University</i> |
| INTERNET COORDINATOR  | <i>Bob Nichols, Washington University</i>             |
| SPECIAL PUBLICATIONS AND REVIEWS IN MINERALOGY AND GEOCHEMISTRY (CO-EDITOR) | <i>Scott Wood, University of Idaho</i>                |

### EAG OFFICERS - 2004

|                    |  |
|--------------------|--|
| PRESIDENT          | <i>Terry Seward, ETH, Zurich</i>           |
| PRESIDENT ELECT    | <i>Bruce Yardley, Leeds, UK</i>            |
| OUTGOING PRESIDENT | <i>Francis Albarede, Lyon, France</i>      |
| TREASURER          | <i>Catherine Chauvel, Grenoble, France</i> |
| SECRETARY          | <i>Mark Hodson, Reading, UK</i>            |

### EAG COMMITTEE

|                                  |                                    |
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## THE GEOCHEMICAL NEWS

### January 2004

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## From President Tim Drever

This is my first letter as incoming president—in fact it's a strange feeling as I am writing it in November, a full month before I take office. First, I would like to thank Judy McKenzie, our outgoing President, for her dedication and hard work on behalf of the Society. I would also like to thank Mike Hochella, who will be rotating off the Board of Directors after eight years—as director, vice-president, president, and past president, not to mention organizer of a Goldschmidt conference. I would also like to welcome Sue Brantley as incoming vice-president; I look forward to working with her in the coming two years.

The Goldschmidt Conference in Kurashiki was a great success, with almost 1200 geochemists registered. The Geochemical Society of Japan did a fine job of organization and I hope that this meeting will lead to increased cooperation between the Geochemical Society and the Geochemical Society of Japan in the future. The 2006 Goldschmidt will be held in Melbourne, which I hope will lead to even more interaction with our colleagues in the Circumpacific region. Looking closer into the future, the 2004 Goldschmidt will be held in Copenhagen in June. This promises to be an excellent meeting and I expect a turnout even larger than at Davos. The website (<http://www.goldschmidt2004.dk>) is waiting for your registration!

The Geochemical Society also had an increased presence at the GSA meetings in Seattle, with several sessions sponsored by the GS, in addition to the Ingerson lecture. I'd like to remind you that we do have funds to support geochemical sessions at national and international conferences. Contact the Chair of the Program Committee (currently Marty Goldhaber) for more information.

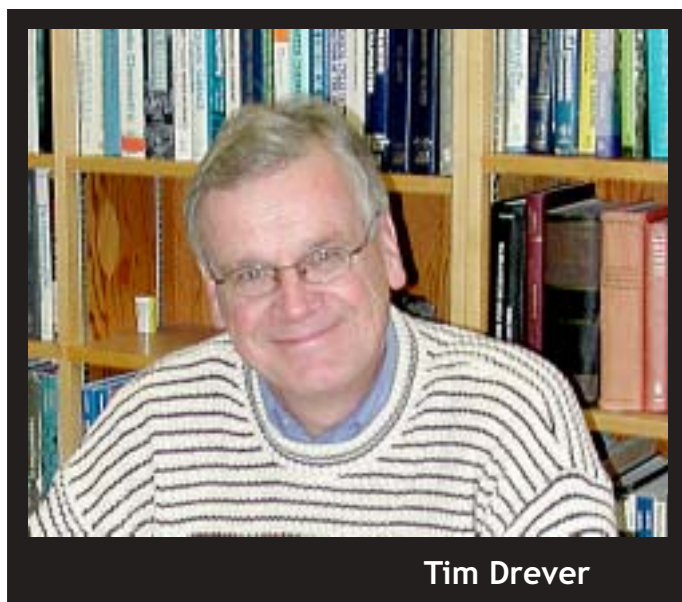
Changes may be coming to the *Geochemical News*. Discussions are currently underway with the Mineralogical Societies of America, Canada, and Great Britain to produce a joint magazine for our members. I am excited about the prospect, although I must say that the present *Geochemical News* has evolved into a really first-rate product. Congratulations to Johnson Haas and Carla Koretsky for a fine job. We'll keep you posted as plans evolve.

I am looking forward to the next two years, thanks to the great group of people who serve as officers and committee members in the Society. I welcome ideas and suggestions from all of our members as to what the Society could do to serve our membership. Our 50<sup>th</sup> anniversary will be coming up in 2005—we should be thinking about creative ways to mark the occasion.

Finally, if by any chance you haven't paid your 2004 dues, now is the time!

With best wishes for the New Year,

*Tim Drever, GS President*



**Tim Drever**

## EDITOR'S CORNER...

Alliteration is the keyword for the Geochemical Society in 2004; our new officers and directors for this year include Drever, Delaney, Dove, and Dickneider. We welcome our new officers and directors, and hope they have a happy and productive tenure in office. Although it was only yesterday that Kurashiki Goldschmidt ended, it's already time to look ahead to the 2005 Goldschmidt Conference in Copenhagen, Denmark. In this issue Susan Stipp provides an informative introduction and welcome to the next Goldschmidt Conference, this time hosted by all the Nordic Nations; Denmark, Finland, Iceland, Norway and Sweden. This is the first Goldschmidt to be held in Scandinavia (or Midgard, to the mythologically oriented), and it promises to be an enlivening and thoroughly enjoyable event. Remember, the abstract deadline is coming up!

Looking back, we also present in this *GN* issue a retrospective of the recent Kurashiki Goldschmidt, written by organizer Yukihiko Matsuhisa. And to top off the Goldschmidt theme, we have a history of the conference series, contributed by Hugh Barnes. Enjoy, and have a Happy New Year!

*Johnson R. Haas*

*Carla Koretsky*

*Editors*

## European Association of Geochemistry 2004 Awards Nominations

### H.C. UREY AWARD

The H.C. Urey Award is given annually by the European Association of Geochemistry and is intended to honour established scientists for outstanding research contributions to any field of geochemistry. The award is based solely on scientific merit without regard to nationality, and will normally be presented at the V.M. Goldschmidt Conference. Nominations for the H.C. Urey Award should be accompanied by a brief statement from the nominator outlining the reason for the nomination and should include an abbreviated curriculum vitae and bibliography of the proposed candidate, as well as several letters of support.

Recent Recipients: R.N. Clayton, S. Epstein and H.P. Taylor (1995), G. Eglington and J. Hayes (1997), J-G. Schilling (1998), J. Edmond (1999), D.J. DePaolo (2000), R.K. O'Nions (2001), G. Turner (2002), N. Shackleton (2003).

Nominations for the 2003 H.C. Urey Award should be submitted before **15<sup>th</sup> February 2004** to:

Bruce W.D. Yardley  
School of Earth Sciences  
University of Leeds  
Leeds LS2 9JT  
UK  
Tel: +44 113 3435227  
Fax: +44 113 3435259  
e-mail: [bruce@earth.leeds.ac.uk](mailto:bruce@earth.leeds.ac.uk)

### HOUTERMANS AWARD

The Houtermans Award is given annually by the European Association of Geochemistry and is awarded in recognition of an outstanding publication or series of publications by a young scientist under the age of 35, within the fields of geochemistry or cosmochemistry. The award consists of a medal and a certificate. The 2003 recipient was Jess Adkins.

Nominations for the Houtermans Award should consist of a brief statement from the nominator outlining the reason for the nomination and should include an abbreviated curriculum vitae and bibliography of the proposed candidate. They should be submitted before **15<sup>th</sup> February 2004** to:

Francis Albarede  
Ecole Normale Supérieure de Lyon  
46 Allée d'Italie  
69364 Lyon cedex 7  
France  
Tel: +33 472 72 84 14  
Fax +33 472 72 86 77  
e-mail: [albarede@ens-lyon.fr](mailto:albarede@ens-lyon.fr)

## From The Geochemical Society Business Office

### On-line Membership Registration

On-line Membership Registration went active on October 15<sup>th</sup> and has been extremely popular. I apologize for the problems some members have been experiencing in using the new on-line system. Currently this system is only available for GS memberships and GCA member subscriptions. However, we will continue to add and improve as we find and remove glitches.

### Membership Benefits

#### Publication Discounts

25% off Geochemical Society Special Publications

25% off most Mineralogical Society of America Publications

Discount rate on select GCA Special Issues (\$30 per issue)

(order forms are located elsewhere in this issue)

20% off Wiley / Jossey-Bass Publications ordered through their office

On-line: <http://www.josseybass.com/WileyCDA/>

Phone: 1-800-956-7739

Remember to use this promotional code when ordering: **JBNPD**

### 2004 Conference Registration Discounts

Goldschmidt Conference - <http://www.goldschmidt2004.dk/>

Copenhagen Denmark. 5-11 June 2004

GSA Meeting - <http://www.geosociety.org/meetings/2004/>

Denver, CO. 7-10 November, 2004

Fall AGU Meeting - <http://www.agu.org/meetings/meetings.html>

San Francisco, CA, 13-17 December 2004

### 2004 Reviews in Mineralogy and Geochemistry

#### Short Courses Registration Discounts

Non-Traditional Stable Isotopes

[http://www.minsocam.org/MSA/SC/NTSI\\_descrptn.html](http://www.minsocam.org/MSA/SC/NTSI_descrptn.html)

Montreal, Canada. 15-16 May 2004

Epidote Group Minerals

[http://www.minsocam.org/MSA/SC/Epid\\_SC\\_descrptn.html](http://www.minsocam.org/MSA/SC/Epid_SC_descrptn.html)

Copenhagen, Denmark. 3-4 June 2004

More Short Courses may be forthcoming.

### Subscriptions

Member-subscribers to GCA will continue to receive their complimentary personal on-line entitlement to GCA. Elsevier is currently overhauling the program and will be implementing changes that will make it easier for member-subscribers to access the site and they will also be expanding the number of available issues.

### Publications

In September 2003, GS and the Society of Economic Geologists co-published the book SEG Special Publication #10: *Volcanic, Geothermal, and Ore-Forming Fluids: Rulers and Witnesses of Processes within the Earth*. Edited by Simmons, Start and Graham. SEG is processing orders for this publication at: <http://segweb.org/>

### Email Announcements

Due to the increased use of our e-mail announcement program, we have changed our distribution policy to only include announcements that are related to GS related business or programs. A formal statement will be accessible on our website. As always, if you do not wish to receive these announcements, just send me an e-mail and I will remove your name from the mailing list.

### GSA Seattle

Thank you to everyone who stopped by the Geochemical Society exhibit booth at the 2003 GSA Annual Meeting in Seattle. I had a great time putting faces to names and getting comments and suggestions about the Geochemical Society from members.

The GS Business Office plans to have exhibits at the 2004 Goldschmidt conference in Copenhagen and the 2004 GSA Annual Meeting in Denver, Colorado.

Best regards,

Seth Davis, Business Manager  
The Geochemical Society  
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St. Louis, MO 63130-4899 USA  
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e-mail. [office@gs.wustl.edu](mailto:office@gs.wustl.edu)  
website. <http://gs.wustl.edu>

## 2004 Geochemical Society Personnel (also, see inside front cover)

### Joint Publications Committee

Nathaniel Ostrom, *Chair*  
Christian Koeberl  
Jun-ichi Matsuda  
Scott M. McLennan  
Bob Byrne  
Ulrich Ott

### Nominations Committee

Roland Hellmann, *Chair*  
Mary I. Scranton  
Arthur F. White  
Philip N. Froelich  
Vickie Bennett  
Carol Frost

### Program Committee

Marty Goldhaber, *Chair*  
Adina Paytan  
Briant A. Kimball  
Patricia A. Maurice  
Michael A. Velbel  
Daniele Cherniak

### OGD Executive Committee

Michael Whitticar, *OGD Chair*  
Ken Peters, *OGD Past Chair*  
Trudy A. Dickneider, *OGD Secretary*  
Lisa M. Pratt, *Committee Member-at-Large*  
Dave DesMarais, *Committee Member-at-Large*  
Keith Kvenvolden, *Committee Member-at-Large*

### OGD Nominating Committee

Phil Meyers  
Al Holba  
Barbara Sherwood-Lollar

### F.W. Clarke Award Committee

Craig M. Bethke, *Chair*  
Phillippe Van Cappellen  
Janet S. Herman  
W.F. McDonough  
Bernard Boudreau  
Laurie Reisberg

### Geochemistry Fellows Selection Committee

Lynn Walter, *Chair*  
Jacques Schott  
Liane G. Benning  
Marilyn Fogel  
Roberta L. Rudnick

### V.M. Goldschmidt Award Committee

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Robert A. Berner  
Richard Carlson  
Sigurdur Gislason  
John Valley  
Terry Seward

### C.C. Patterson Award Committee

F.J. Millero, *Chair*  
Kurt Konhauser  
Nancy Hinman  
Barbara Sherwood-Lollar  
Bob Aller  
Bernhard Wehrli

### OGD Best Paper Award Committee

Tim Eglinton  
Kate Freeman  
Clifford Walters

### OGD A.E. Treibs Award Committee

Jun Abrajano  
Mark McCaffrey  
Roger Summons  
Jean Whelan  
Matthew Collins

### AAAS Liaison

Louise J. Criscenti  
Robyn Hannigan

Michigan State University  
University of Vienna  
Osaka University  
SUNY - Stony Brook  
University of South Florida  
Max-Planck-Institut für Chemie

LGIT

SUNY – Stony Brook  
U.S. Geological Survey  
Georgia Institute of Technology  
Australian National University  
University of Wyoming

U.S. Geological Survey  
Stanford University  
U.S. Geological Survey  
University of Notre Dame  
Michigan State University  
Rensselaer Polytechnic Institute

University of Victoria  
U.S. Geological Survey  
University of Scranton  
Indiana University  
Ames Research Center  
U.S. Geological Survey

University of Michigan  
ConocoPhillips IGA  
University of Toronto

University of Illinois - Urbana  
Utrecht University  
University of Virginia  
University of Maryland  
Dalhousie University  
CRPG / CNRS

University of Michigan  
Universite Paul Sabatier  
University of Leeds  
Carnegie Geophysical Laboratory  
University of Maryland

The Pennsylvania State University  
Yale University  
Carnegie Institute of Washington  
University of Iceland  
University of Wisconsin - Madison  
ETH Zentrum

University of Miami  
University of Leeds  
University of Montana  
University of Toronto  
SUNY - Stone Brook  
EAWAG / Limnological Research  
Institute

Woods Hole Oceanographic Institute  
Pennsylvania State University  
ExxonMobil

Rensselaer Polytechnic Institute  
OilTracers, LLC  
MIT  
Woods Hole Oceanographic Institute  
Newcastle University

Sandia National Laboratory  
Arkansas State University

## Organic Geochemistry Division 2005 Alfred Treibs Award Nominations

The Organic Geochemistry Division of the Geochemical Society will be accepting nominations for the 2005 Alfred Treibs Award from January 1, 2004 until June 1, 2004.

This award is the highest honor that the OGD bestows. It consists of a gold-plated medal and certificate and is awarded for career achievements, over a period of years, in organic geochemistry. Such achievements consist of pioneering and innovative investigations which have made highly significant contributions to the understanding of the origin and fate of organic materials in the geosphere and/or in extraterrestrial environments.

To be considered for the 2005 Treibs Award, complete nomination packages, consisting of hard paper copies, must be submitted to the Secretary of the OGD by June 1, 2004. Packages received after that date will be held for consideration for the 2006 award. Complete nomination packages must contain six hard copies and a disk containing an electronic copy of each of the following:

- A nominating letter describing the career achievements of the nominee
- 3-5 additional letters supporting the nomination
- The nominee's curriculum vitae, not to exceed 2 pages in length
- A list of the nominee's most relevant publications, not to exceed 2 pages

All complete files will remain active for 3 years. After that time, the nominator will be required to request that the file remain active for an additional 3 years, or the nominator may submit a new or revised nomination. All submissions will be acknowledged, but only complete nomination packages will be accepted for consideration by the Awards Committee.

Complete nomination packages should be sent to:

Trudy A. Dickneider, Ph.D.  
Department of Chemistry  
University of Scranton  
800 Linden Street  
Scranton, PA 19510

Past Winners: Roger E. Summons (2003), Archie Douglas (2002), John Smith (2001), John I. Hedges (2000), John M. Hayes (1997), Patrick Parker (1996), Keith A. Kvenvolden (1995), Isaac R. Kaplan (1993), Jan W. deLeeuw (1991), James R. Maxwell (1989), T. C. Hoering (1987), P. Albrecht (1985), W. K. Seifert (1984), D. H. Welte (1983), J. M. Hunt (1982), G. Eglinton (1981), B. Tissot (1980), G. T. Philippi (1979).



## OGD Plans Agenda for the Future

The Organic Geochemistry Division of the Geochemical Society held its Annual Business Meeting at the recent Geological Society of America meeting in Seattle and made decisions that will strengthen the division and develop its future. The officers and executive committee were joined at the meeting by several members of the division and the Geochemical Society's business manager, Seth Davis. Ken Peters, the outgoing chair, welcomed the group and outlined the major concerns at this time, including a decision regarding the venue for the annual business meeting. Ken also discussed the diverse nature of organic geochemistry and urged that the OGD work to include the interests of all of the various fields that comprise our discipline, especially in the areas of biogeochemistry. Ken then thanked Peggy Ostrom for her years of service to the Division as Secretary and presented her with a plaque commemorating her contributions. In her acknowledgments of the award, Peggy supported Ken's comments on working to build the strength of the OGD as we move forward and she specifically thanked Keith Kvenvolden and Steve Macko for the assistance they provided her in her work as secretary.

The venue for the annual business meeting of the officers and members at large has been a concern for several years with opinions varying about possible venues. Traditionally the meeting has been held in conjunction with the GSA meeting since The Geochemical Society is an associate of the GSA. Concerns have risen in recent years about diminishing attendance by organic geochemists at the GSA meetings. After a spirited discussion with contributions by Peggy and Ken, incoming chair Michael Whiticar, as well as Mike Engel and Keith Kvenvolden, it was decided that for a trial period of four years the annual business meeting would rotate between the GSA (meeting in odd numbered years) and the Gordon Research Conference on Organic Geochemistry (in even numbered years). Also strong efforts will be made to increase programming that will be of interest to organic geochemists at the GSA. Meetings held in conjunction with the GSA will include an organic geochemistry symposium. New OGD chair, Michael Whiticar, will develop the program for the symposium at the 2005 GSA meeting. Seth Davis promised that the Geochemical Society is planning to develop more of a presence at GSA meetings and that this will also raise the geochemistry profile of this meeting.

To increase the strength of our division the Executive Committee decided to initiate several measures aimed at increasing the membership. All officers and committee members will be required to be current members of the Geochemical Society and the OGD and efforts will be made to recruit members at ACS meetings and Gordon Research Conferences. Special efforts will be made to introduce graduate students and new Ph.D.'s to the Society and the Division. Also, to increase our visibility, future issues of The Geochemistry News will include OGD announcements and news items as well as focus articles of interest to organic geochemists.

As a result of recent work by both the incoming and outgoing officers all committees of the OGD, the Best Paper Committee, Treibs Award Committee, and the Nominating Committee, as well as the members-at-large are on their proper rotation. The Nominating Committee is currently developing a list of candidates for Chair-Elect, as well as one member for the Treibs Award Committee and a member-at-large. The successful candidates will be announced in the next issue of the News.

The officers welcome your comments and suggestions for programming and activities for the OGD. For your convenience I have included the contact information below.

### Chairman

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University of Victoria, BC V8W 3P6  
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### Past Chairman

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### Secretary

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### Members-at-Large

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Dave DesMarais  
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Keith A. Kvenvolden  
Voice: 650-329-4196  
[kkvenvolden@usgs.gov](mailto:kkvenvolden@usgs.gov)

## Meet Your New GS Officers and Directors

**Peggy Delaney's** research interests are in paleoceanography and marine geochemistry, especially of sediments. One major theme in her research is the history of the oceanic mass balance of the nutrient element phosphorus and its links to the carbon cycle and climate change. She applies a multi-proxy approach to deciphering the roles of productivity and sedimentary redox in controlling the burial of phosphorus. A second major theme is the minor element geochemistry of biogenic carbonates, with a renewed and growing focus on magnesium/calcium ratios in foraminiferal calcite. Peggy Delaney is past editor of the AGU journal *Paleoceanography* (1996-1999), and is serving as a guest editor for the G3 Theme Session on Biogenic Carbonate.



Peggy Delaney

**Trudy A. Dickneider**, Ph.D. has been named as the new secretary of the Organic Geochemistry Division. Trudy is a Professor of Chemistry at the University of Scranton (PA) where she teaches organic chemistry and environmental



Trudy A. Dickneider

geochemistry and directs a vigorous undergraduate research program in organic geochemistry. Trudy received her B.A. and M.A. at St. Joseph College (CT) where she studied under Sister Mary Ellen Murphy, beginning a continuing collaboration on the geochemistry of the Connecticut River valley shales. Trudy earned her doctorate in physical organic chemistry at the University of Miami (FL) and served on the faculty of St. Joseph College. Before assuming her faculty position at Scranton she spent time at Superior Oil in Houston TX as a petroleum explorationist. During her time at Scranton Trudy has spent a sabbatical term in the lab of Jean Whelan at the Woods Hole Oceanographic Institution. Current research interests of Trudy and her students at Scranton, where Trudy is in her twentieth year, include applications of organic geochemistry to archaeological puzzles, development of analytical techniques to characterize the nature of kerogens, and simulations of abiotic chemical evolution under hydrothermal vent conditions.

Patricia Dove's research is focused upon investigations of earth processes that occur at mineral-water interfaces; with a particular emphasis on understanding the kinetics and thermodynamics of underlying reactions. Studies of the physical basis of biomineralization use calcium carbonate as a model system to investigate long-standing issues: 1) relationships between expected trace/minor element compositions of biominerals and growth environment and; 2) controls of peptides and higher order macromolecules on the biomineral polymorph at nucleation and subsequent effects on growth properties. Ongoing studies of silica polymorphs have investigated the influences of major/minor solutes on the kinetics of SiO<sub>2</sub> dissolution and surface charge properties. In new work, these principles are being extended to biosilicification processes. Patricia is the 1996 recipient of the Geochemical Society's F.W. Clark Medal and was the GS 2002 Gast Lecturer in Davos.

**Patricia Dove's** research is focused upon investigations of earth



Patricia Dove

## *In Memoriam: Mark G. Inghram (1920-2003)*

University of Chicago physicist Mark G. Inghram, who was a member of the research team that determined the age of the Earth at 4.5 billion years, died Monday, Sept. 29, at his home in Holland, Mich., with Evelyn, his wife of 57 years, his family, and volunteers and staff of Hospice of Holland. He was 83.

Inghram and his colleagues were the first scientists to use meteorites to determine the age of the Earth. In the early 1950s, astronomers had suspected that the Earth was at least 4 billion years old, but no terrestrial materials had been found that were older than 2.5 billion years. Then, in 1953, Inghram and his colleagues showed that meteorites, which are approximately the same age as the Earth, were 4.5 billion years old. The feat earned him the J. Lawrence Smith Medal of the National Academy of Sciences in 1957.

Inghram also collaborated with the late Nobel laureate Willard Libby to determine the half-life of radioactive carbon-14. Libby then used the technique to develop radiocarbon dating, which is used to determine the age of organic materials. "Inghram was a master experimentalist and an inventor and developer of mass spectrometers. These were his favorite shovels for excavating new areas," said Gerald Wasserburg, Crafoord Laureate at the California Institute of Technology. "His instruments were the vehicles for which whole new fields of science were created and explored. Leaders of the new fields of cosmochemistry and geochemistry were trained in his laboratories under his rigorous guidance and mentorship. His methods and approaches and instrument designs governed the research approach in laboratories throughout the world."

Mass spectrometry measures the abundances of different elements and different isotopes of elements-atoms of the same element with different masses. Using this technique he discovered more than a dozen naturally occurring and radioactive isotopes. His wife recalls him coming home each time he discovered a new isotope and celebrating with a dance. "He was a gifted dancer, graceful and light on his feet," said his daughter, Cheryl Inghram. Robert Gomer, the Carl William Eisendrath Distinguished Service Professor Emeritus in Chemistry at the University of Chicago, said Inghram pioneered in mass spectrometry. One major contribution was to develop an ion counting detector that proved important to the work of the atomic energy commission and in many scientific fields. "It increased the sensitivity of mass spectrometers by a factor of a million," Gomer said.

In collaboration with William Chupka, professor emeritus of chemistry at Yale University, Inghram developed the technique of high temperature mass spectrometry. "I think of Mark as one of the most gifted and energetic experimentalists I have ever known in my entire scientific life," Chupka said. Together with Chupka, Inghram made it possible for the first time to identify and quantify the composition of atoms and molecules in high-temperature vapors. "This technique was first applied to carbon vapor, resulting in the unambiguous determination of the heat of vaporization of the carbon atom from graphite. At the time, this quantity was a matter of much contention and importance since it was required for the determination of bond energies of all organic molecules," Chupka said. "It has since been applied to other systems." Speaking on behalf of the family, son-in-law Nicholas Revill said that "his memory is honored by the achievements of those he taught, collaborated with and counseled." Inghram was born Nov. 13, 1919, in Livingston, Mont. He earned his B.A. from Olivet College in Michigan in 1939 and his Ph.D. from the University of Chicago in 1947.

He was a physicist in the Manhattan Project at Columbia University from 1942 to 1945, and a senior physicist at Argonne National Laboratory from 1945 to 1947. He began his long career at the University of Chicago as a physics instructor in 1947. He was appointed the Samuel Allison Distinguished Service Professor in Physics in 1969 and retired in 1985.

Inghram held several administrative positions at the University: Chairman of the Physics Department (1959-1970), acting Director of the Institute for the Study of Metals (1960-1961), Associate Dean of the Physical Sciences Division (1964-1971); Master of the Physical Sciences Collegiate Division (1981-1985); and Associate Dean of the undergraduate College (1981-1985). He also served on two committees of the National Academy of Sciences: Nuclear Geophysics (1953-1960), and Exploration of the Moon and Planets (1958-1961).

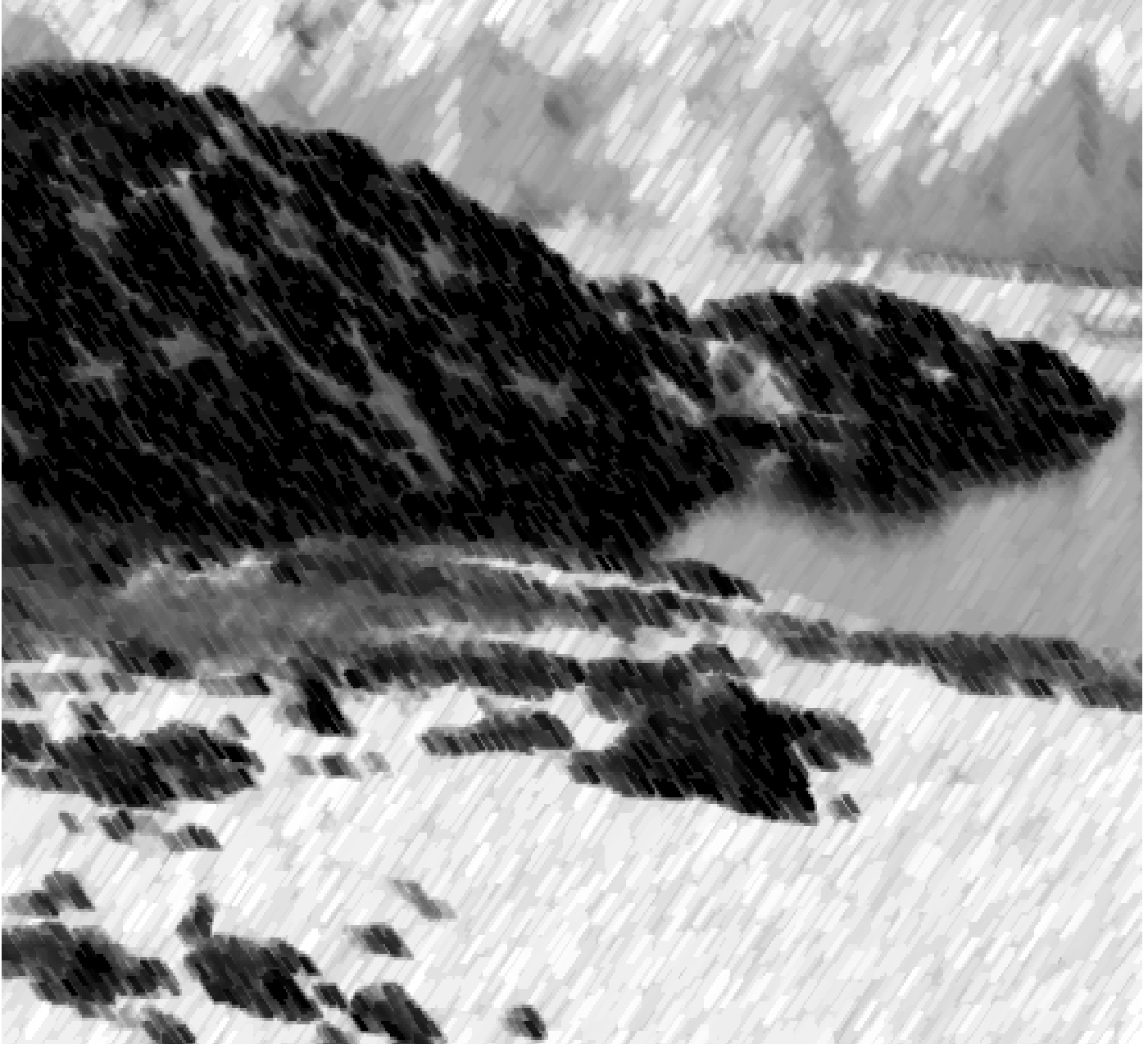
He was a member of the National Academy of Sciences, an honor that five of his former students also attained. Inghram also was a fellow of the American Academy of Arts and Letters, the American Physical Society and the American Association for the Advancement of Science. He received the University's Llewellyn John and Harriet Mancheer Quantrell Award for Excellence in Undergraduate Teaching in 1981.

Inghram is survived by his wife, Evelyn, and two children, Cheryl Inghram, Chicago, and Mark Inghram III, Eagle River, Alaska; two sisters, Martha Truesdell, Indianapolis, and Rebecca Schultheis, Minneapolis; and four grandchildren, Jared Inghram, Eagle River, Alaska; Jamie Zieba Spenser, Etna Green, Ind.; Maren Zieba, Seattle; and Joe Revill, Norwood, Middlesex, England.



***A Nordic Welcome:  
The 2004 V. M. Goldschmidt Conference  
Copenhagen, Denmark  
5 to 11 June 2004***

***Abstract Deadline: 26 January 2004  
Website: [www.goldschmidt2004.uk](http://www.goldschmidt2004.uk)***





*Canals of Copenhagen*

**On behalf** of the organising team for the next Goldschmidt Conference, I would like to invite you to enjoy the hospitality of the Nordic countries in Copenhagen. We planned a spring conference because it fits best with the holiday and university schedules in the Nordic lands, because the weather is often very good in early June, and mostly because this is the time of the “light nights” when the sun goes down around 10 and it doesn’t really get dark.

We have chosen to focus the conference on “Processes in Geochemistry” – to emphasise the dynamic nature of our field. An Advisory Board and an International Program Committee have helped us put together an exciting program. There are 53 symposia, arranged under six themes [see page 10]. The program will include parallel and poster sessions each day and field trips before and after the conference. The festive Plenary Day, “A Celebration of Geochemistry” will be the highlight event. Well-known geoscientists, chosen for their expertise, their broad scientific perspectives and especially their ability to speak to a wide and general audience, will summarise the state-of-the-art across the broad spectrum of geochemistry for conference participants, the press and the public. The day will end with dinner and the evening in Tivoli. The social program will include trips around Copenhagen, ice-breaker, possibilities for concerts, museums and the Conference Dinner, beginning with a boat tour of the harbour and continuing as a Nordic ‘fest’.

To find out more, check the web site, <http://www.goldschmidt2004.dk/>. In order to save paper and postage costs, all communication will be electronic. You can submit your abstract and register on-line. When you “log in”, it sets up a personal storage area for your registration, hotel booking, abstract and other information. That means you can submit your abstract early, but make changes right until the submission

deadline. There are pages where you can tell us your opinion to help us with conference planning. Tell us which sessions should be scheduled so they do not conflict. Tell us your wish for field trips, which will be planned in all of the Nordic countries, to fit demand. You can look at the participant list to see if your colleagues have already expressed their interest in the meeting. You can download the poster (shown on this *Geochemical News* cover) and print it in whatever size you wish, either in colour or black and white. Please hang it on bulletin boards, or attach a copy to email for colleagues and students, or print it in newsletters.

The conference and hotels are all downtown, close to train stations, castles, parks, Tivoli, the harbour and the walking streets of the old town. There is hostel accommodation for students and all those on a tight budget. The meeting will be held in part of the University of Copenhagen, in the Geocenter, the Geological Museum, and the H.C. Ørsted Institute [see map page 11]. A shuttle bus will move people from one site to the other during coffee and lunch breaks. We have space for as many parallel sessions as we need, to fit the number of participants. Posters and exhibitions will be held in the Geocenter Rotunda, where there are 5 floors of open mezzanine [rotunda]. The two main conference sites are surrounded by parks, where you can wander to eat your lunch in the sunshine. In the King’s Garden, near the Geocenter, is Rosenborg Castle, the building on our poster.

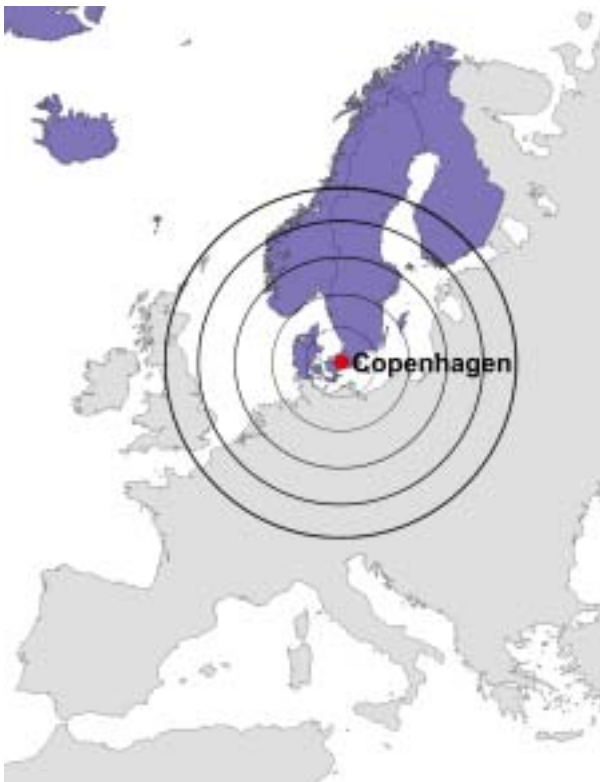
### Important Dates

|                           |   |
|---------------------------|---|
| <b>26 January, Monday</b> | <b>Abstracts due - electronic submission only</b>   |
| <b>20 March, Friday</b>   | <b>Abstract acceptance posted on web</b>  |
| <b>2 April, Friday</b>    | <b>Early registration (lower fee) deadline</b>  |
| <b>16 April, Friday</b>   | <b>Limit of registration for those presenting. Lack of registration paid means abstract is removed from program and not published by GCA.</b> |

Copenhagen is in the far south of the Nordic countries and many people think of it as their gateway to the rest of Europe.

That makes sense, because it IS the centre of Europe [see map below], so it makes a very good place to begin or end a vacation. Most airlines have direct or one-change flights from major centers to Copenhagen (Kastrup, CPH) and it takes only 12 minutes by train from the airport to downtown. If you are short on money, or don't want to stay over Saturday night, try flying with one of the economy airlines to Copenhagen or to Malm (Sturup, MMX), just across the bridge in Sweden. From Malm it takes 50 minutes by bus to the centre of downtown. If you are coming from North America, think of flying through Reykjavik (Keflavik, KEF). It may be no more expensive and provides a peek at the fascinating Icelandic landscape.

Hans Christian Andersen, the famous Danish story teller and uncle of "The Ugly Duckling", "The Little Mermaid" and many more, wrote, "Denmark is delightful in the summer". Copenhagen in June can be a very nice place to be. Although we will do our best to organise good weather, we can absolutely guarantee that if it isn't raining, the sky will be very blue.



We look forward to seeing you next June.

Susan Stipp

On behalf of the Nordic Goldschmidt Organising Committees

**The Nordic Goldschmidt Geochemistry Conference, Copenhagen, 5 to 11 June 2004**

## Goldschmidt Symposia

### Theme 1 - The Dynamic Solid

- 1.1 Hydrogen and its influence on mineral structure, properties and behaviour
- 1.2 Light elements in igneous and metamorphic processes
- 1.3 In-situ investigation of properties and processes
- 1.4 Solid solutions
- 1.5 Phase transitions in minerals
- 1.6 Nano-scale properties of materials
- 1.7 Glasses and amorphous solids
- 1.8 Minerals and glasses as wasteforms
- 1.0 Open session

### Theme 2 - The Dynamic Interface

- 2.1 Mineral surface reactivity
- 2.2 Growth and dissolution of minerals - linear and non-linear processes
- 2.3 In-situ investigation of interface processes
- 2.4 Confined fluids
- 2.5 Processes near geochemical fronts: making space and filling space
- 2.6 Geochemical fluxes and biofilms
- 2.7 Biomineralisation
- 2.8 Aqueous clusters, gel formation and amorphous materials
- 2.0 Open session

### Theme 3 - The Volatiles of the Earth

- 3.1 Petroleum geochemistry and migration
- 3.2 Organic macromolecules
- 3.3 Fluids from sedimentary basins through the metamorphic cycle
- 3.4 Hydrothermal solutions and their input to the biosphere
- 3.5 Volatile components in the deep Earth
- 3.6 Solubility, transport and hydrothermal ore deposition
- 3.0 Open session

### Theme 4 - The Earth's Surface

- 4.1 The marine environment: water, sediment, crust, and their interactions
- 4.2 Trace element geochemistry and biogeochemistry
- 4.3 Geomicrobial processes: pathways, rates and controls
- 4.4 The deep biosphere
- 4.5 Weathering and geochemical fluxes
- 4.6 Pollution, climate and anthropogenic effects
  - 4.61 Aftermaths of catastrophic contaminant releases
  - 4.62 Contaminant transport and the water cycle
  - 4.63 Climate and global geochemical fluxes - now and in the past
  - 4.64 Radionuclides in the environment
  - 4.65 Fate of arsenic, antimony and similar elements in the environment
  - 4.66 Micropollutants and health
- 4.7 Geochemical maps (poster session)
- 4.0 Open session

### Theme 5 - The Deeper Earth

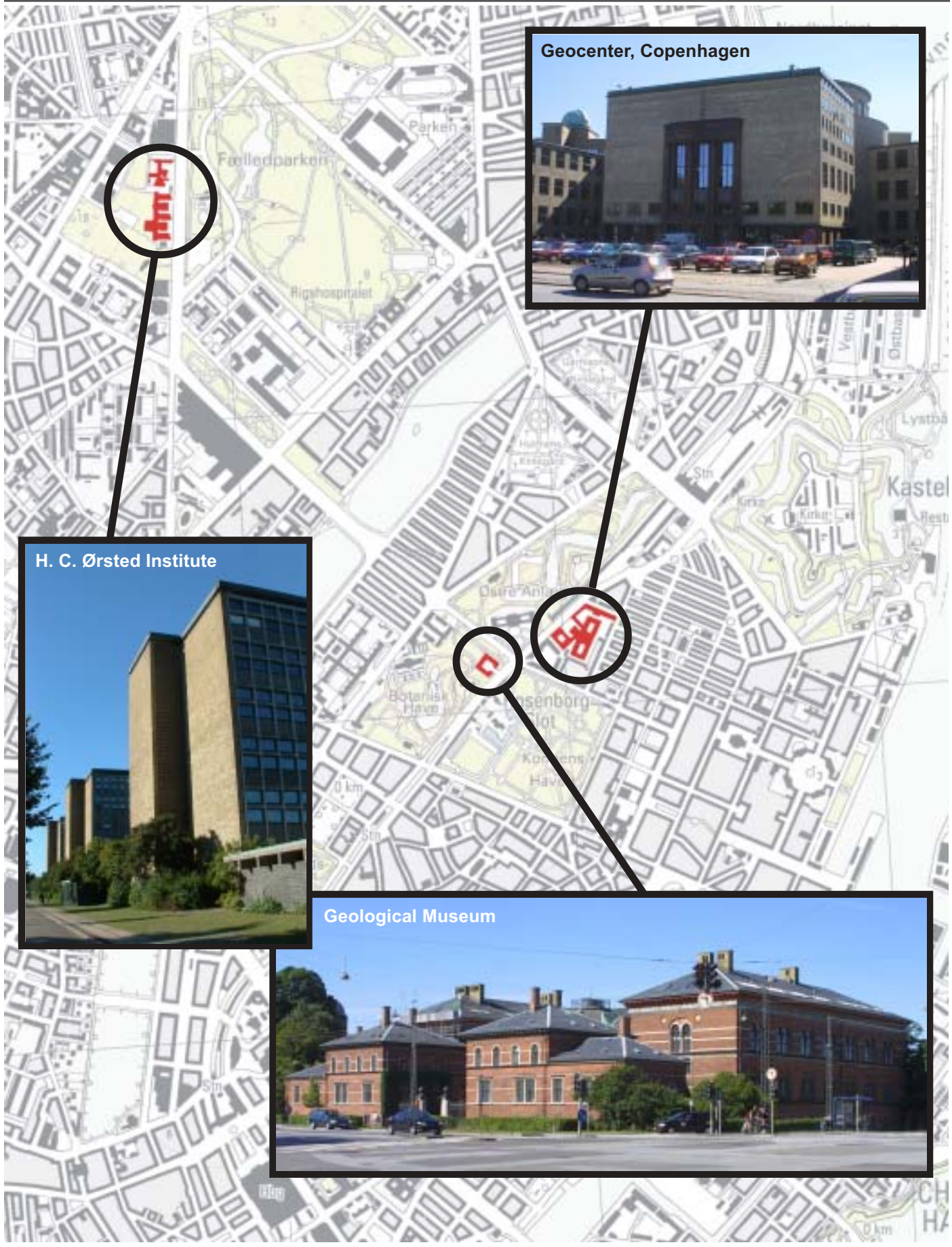
- 5.1 Mantle reservoirs and geodynamics
- 5.2 Large igneous provinces
- 5.3 Subduction processes and the subcontinental lithosphere
- 5.4 Processes in magma chambers
- 5.5 Crustal anatexis and granites
- 5.6 Dynamics of slow and ultra-slow spreading ridges
- 5.0 Open session

### Theme 6 - The Early Earth and the Planets

- 6.1 From accretion to core formation
- 6.2 Composition and evolution of the early Earth
- 6.3 Moon, Mars and the other planets
- 6.4 Early giant ore bodies
- 6.5 Early atmosphere
- 6.6 Origin of life
- 6.7 Astrobiology
- 6.0 Open session

The open sessions in each of the themes provide an opportunity for submission of abstracts that do not appear to fit elsewhere. Depending on the topics of the contributions, the organisers may generate additional symposia or merge some of those listed, where the program would benefit. Likewise, to optimise topic groupings, the organisers may transfer some contributions from one session to another.

No sessions are planned exclusively on modelling or analytical techniques. Abstracts on techniques should be submitted to the session where they best can be applied. If a group of participants wishes to organise a workshop on a particular technique before or after the conference, arrangements can be made. Contact [goldschmidt@geol.ku.dk](mailto:goldschmidt@geol.ku.dk) to include it in the program and [svh@vanhauen.dk](mailto:svh@vanhauen.dk) to arrange practical details.



Geocenter, Copenhagen

H. C. Ørsted Institute

Geological Museum



**Goldschmidt 2003**  
September 7-12, 2003  
Kurashiki Sakuyo University, Kurashiki, Japan

# Frontiers in Geochemistry

## A Kurashiki Retrospective

By Yukihiro Matsuhisa

**The 13<sup>th</sup> Annual V. M. Goldschmidt Conference** (Goldschmidt 2003) was held in Kurashiki, Japan from September 7-12, 2003. Goldschmidt 2003 has a special significance, as it is the first time that the meeting was held in the western Pacific region. Judging from the many comments, it was a successful meeting, remembered for the hot, humid weather. We initiated preparation of the meeting with an assumption of 800 participants. There was a concern that Japan was too far for Europeans to come and that school had already started for US university people. As a matter of fact, the total number of participants turned out to be 1,170 from 35 countries, which was more than we expected. Many young researchers and students came from the western Pacific region including Japan. We prepared partial financial support for them. This conference would have provided them with access to the frontiers of ongoing scientific research in geochemistry and cosmochemistry.

Geochemistry is growing rapidly with the aid of newly developed analytical tools and techniques. New tools open new horizons of science, which we have never thought of its possibilities before. At the same time, we are coming into an exciting new era to explore the interfaces between disciplines, which have been previously seldom considered. Goldschmidt 2003, as was designed for the preceding meetings, was intended to be a place to facilitate communication by worldwide experts of recent developments in geochemistry and cosmochemistry. Such a comprehensive meeting would also provide good opportunities to promote interaction between disciplines and allow scientists to familiarize themselves with what is going on in other areas of geochemistry. In addition, I like to mention that geochemistry is becoming an important tool to help understand and solve problems of social interests.



*The internet rooms were popular during the conference.*



*Discussion in a poster session.*

*Facing top: Participants are satisfied with traditional Japanese music in the welcome concert.*

When we accepted to hold a Goldschmidt Conference in Japan, we had several candidates for the venue of the conference including Tokyo and Tsukuba. Before long, however, we realized that people are sick and tired with a conference in a big city, but they prefer a local city with a traditional Japanese atmosphere. Fortunately according to these conditions, we received a generous offer from Kurashiki Sakuyo University to use their facilities for the conference. The city of Kurashiki was also supportive of the conference. Kurashiki is a medium size city in Japan, located approximately 200 km west of Osaka. Due to its proximity to the coast and well-developed canal systems, Kurashiki was a regional trading center in the Seto Inland Sea region in Western Japan, during the Edo period of 17<sup>th</sup> to 19<sup>th</sup> centuries. The history is well preserved in the old town area, where visitors will find the atmosphere of the good old days in narrow streets lined with traditional two-story wooden buildings and plastered walls. We thought that the participants to the conference would enjoy their stay in this historical town.

For preparing the conference, the Geochemical Society of Japan established the Organizing Committee with the aid of other societies across Japan. The supporting societies range from chemistry, through oceanography, hydrology, volcanology, seismology, mineralogy, and meteorology, to geology. Besides, we received the sponsorship of the Mineralogical Society of America for the conference. Due to the wide range of supporting societies, the Organizing Committee was able to prepare a well-balanced, comprehensive meeting for geochemistry and cosmochemistry. Many members of the Geochemical Society of Japan devoted themselves in various aspects of preparing and managing the conference. Their efforts were indispensable for realizing the conference.

We assumed responsibility for both the idea and organization of the International Program Committee (IPC), which Alex Halliday established for the Davos meeting last year. The main purpose of IPC is to help the



*The conference venue, Kurashiki Sakuyo University.*



Accompanying persons enjoy tea seremony in a "tatami" room.

cial symposia, JPC organized nine general symposia to cover broader topics of geochemistry and cosmochemistry. The International Program Committee was very helpful for accumulating current worldwide research activities and integrating them into special symposia. The system of IPC should be continued for future conferences.

A wide range of special symposia covered subjects as diverse as paleoceanography in the Western Pacific, biogeochemical cycles of elements and isotopes, marine geochemistry, atmospheric transport of terrestrial materials, aerosols and reactive gases, global methane cycle, subsurface microbiology, biogeochemistry of trace metals, bacterial surfaces in chemical processes, weathering and biosphere, humus or DOM in soils and sediments, origin and distribution of life in the universe,

Organizing Committee plan special symposia. To keep the continuation of experience and topics of symposia, we tried to have at least one of the chair-persons of each Task Group remain in the position, then elected Japanese members for the balance. The IPC, chaired by Jun-ichi Matsuda of Osaka University, asked the IPC members to call for symposia topics or propose topics and make symposia proposals to IPC with candidates of keynote and invited speakers. We received as many as 65 proposals of special symposia covering all the current topics in geochemistry and cosmochemistry. After necessary rearrangements such as combining symposia with similar or related topics, the Japan Local Program Committee (JPC), also chaired by Jun-ichi Matsuda, eventually reduced the number of special symposia to 53. In addition to the 53 spe-



Mayor of Kurashiki (second from left) greets GS President Judith McKenzie (second from right).

GS Presidential address given by Judith McKenzie.



biological radiation and extinction, diagenetic processes, metals in marine sediments, natural gas hydrates, isotope biosignatures, non-traditional stable isotopes, molecular isotopes, advances in high precision trace element and isotope analysis, laser ablation ICP-MS, noble gas isotopes, lithium isotope geochemistry, lanthanide tetrad effect, crustal fluids, ore genesis in relation to magma, natural hazards, nano materials/minerals, mineral-fluid interfaces, geochemistry of waste, metamorphic processes, subduction zone processes, mantle heterogeneity and mantle plumes, hot spots and global mantle circulation, structure of silicate melts, geochemistry of diamond, mantle-core differentiation, first billion years, co-evolution in the early earth, multiple sulfur isotope system, early solar system processes, Martian meteorites, cosmogenic nuclides, thermochronometry, Quaternary geochronology, archaeological geochemistry, and geochemical mapping.

The abstracts were published in a supplement issue of *Geochimica*

et *Cosmochimica Acta* by Elsevier with the guidelines given by Frank Podosek and distributed to the participants as was done at the Davos meeting. Cambridge Publications led by Paul Beattie handled abstracts and prepared them for printing. They also assisted the Organizing Committee in making the science program with their professional experience. We linked the conference website to their website for receiving abstracts. We have received as many as 1,152 abstracts. Without their effort and experience, it would not have been possible to handle such a large number of abstracts in a short period. Thanks are also given to ICS Inc., Japan, who provided technical assistance in preparing and managing the conference.

The conference ran with ten parallel oral sessions (756 presentations) and poster sessions (392 presentations). The posters were divided into two groups, with two days devoted to each group for display. Three rooms plus space of the entrance hall were available for exhibitions of commercial companies and other organizations. A half-day was devoted

of the conference. The Internet Room with 50 circuits and 20 computers was also a popular place during the conference.

A welcome concert with Japanese music and dance was given by Kurashiki Sakuyo University on Monday evening, followed by a light meal and drinks. The conference hosted a banquet with 350 people at Ivy Square Hotel in Kurashiki on Thursday evening. Mr. Takeshi Nakada, Mayor of the city of Kurashiki, gave a welcoming speech. During the conference, family programs including a guided tour to the old town area of Kurashiki, tea ceremony, flower arrangements with Japanese taste, and "yukata" dressing were organized for accompanying persons.

Since the conference venue was about 10 km away from downtown Kurashiki, where most of the participants stayed, transportation was one of our concerns. Initially we thought about using shuttle bus services from the hotels, but they seemed unreliable due to a possible traffic jam in the morning. Finally, we decided to use Japan Railways (JR) commuter trains by giving free tickets to the participants. JR kindly arranged one extra train for the conference in addition to the trains in the regular timetable. We received generous help from local volunteers to assist the participants at the train stations.

Childcare was available with excellent facilities and staff at Kurashiki Sakuyo University. Its location within the conference buildings was convenient to the participants who came with their children.

Two half-day tours (Seto Inland Sea cruise to Okayama and Himeji Castle) during the conference and tour of Kyushu after the conference were organized. As luck would have had it, a typhoon turned away from Japan before the participants started on their tour to Kyushu. They enjoyed their first visit to active volcanoes and pottery shopping.

A two-day Short Course on ICP-mass spectrometry was organized and convened by Takafumi Hirata for students and young researchers prior to Goldschmidt 2003 (September 6th and 7th). A group of excellent lecturers including Gunther Detlef, Alex Halliday, Toshiyuki Fujii, Simon Jackson, and Keith O'Nions gave high-quality lectures to 50 participants covering the entire range of ICP-MS techniques and their applications to earth and planetary sciences.



to the plenary session for award ceremonies of the sponsoring societies, induction of new EAG/GS fellows, and four plenary lectures. These included the GS presidential address by Judith McKenzie, Clarke Medalist - Paul Asimow, GS Outstanding Service Award - Hubert Barnes, Patterson Medalist - William Fitzgerald, Houterman Medalist - Jess Adkins, announcement of Urey Medalist - Sir Nicholas Shackleton, Goldschmidt Medalist (lecture) - Bernard Wood, and Guest Lecturer (lecture) - Hiroshi Ohmoto. For the first time awardees of the Geochemical Society of Japan were introduced at the Goldschmidt Conference including Geochemical Journal Award - Nicolas Dauphas, Laurie Reisberg, and Bernard Marty, Award for Young Researchers - Tomo Shibata, Kiyoshi Matsumoto, and Tsuyoshi Watanabe, and Geochemical Society of Japan Award (lecture) - Ichiro Kaneoka.

This was the first time we limited oral presentations to PowerPoint or overhead transparencies at the Goldschmidt Conference. Old-fashioned slide projectors disappeared from lecture halls. This system functioned smoothly by receiving compact disks and loading texts into computers one day before their presentations. The Projection Center for assembling presentations was equipped with 28 computers and was the heart

Goldschmidt 2003 has proven that the Goldschmidt Conference had been established as a truly international meeting. It is a good idea to keep the conference moving around the world to attract local people and promote their understanding of geochemistry and cosmochemistry. It is my pleasure to announce that the Geochemical Society of Japan will take part in future Goldschmidt Conferences as one of the sponsoring societies.

On behalf of the Organizing Committee for Goldschmidt 2003, November 24, 2003



# Book Review

## Environmental Aspects of Mine Wastes

Short Course Series, Volume 31.

J.L. Jambor, D.W. Blowes,  
A.I.M. Ritchie, eds.

Review by Scott Wood

Mineralogical Association of Canada, 2003. 430 pp.  
Price: US\$50 outside Canada; CAN\$50 in Canada  
Member price, US\$40/CAN\$40.

The importance of understanding and controlling the environmental impact of mine wastes is indicated by the number of special volumes dedicated to the subject in the past decade. These volumes include: 1) Jambor, J.L. and Blowes, D.W. (1994) Short Course Handbook on Environmental Geochemistry of Sulfide Mine-Wastes, Mineralogical Society of Canada Short Course Handbook. v. 22; 2) Alpers, C.N. and Blowes, D.W. (1994) Environmental Geochemistry of Sulfide Oxidation, American Chemical Society Symposium Series; 3) Plumlee, G.S. and Logsdon, M.J. (1999) The Environmental Geochemistry of Mineral Deposits, Reviews in Economic Geology, v. 6a and 6b; and 4) the volume being reviewed here. Moreover, some of the more exciting developments in geomicrobiology, spectroscopic investigation of water-mineral interfaces, and reactive-transport modeling, have been applied to environmental aspects of mine wastes.

As indicated above and discussed in the Preface to the volume under review, the Mineralogical Association of Canada (MAC) published their first volume dealing with sulfide mine wastes in 1994. The 1994 publication has been out of print for several years, and MAC considered reprinting it. However, owing to rapid advances in the environmental aspects of mine wastes, it was decided to publish a new volume focusing on the progress made in the ten years since the first publication. The result was MAC Short Course Volume 31, containing 20 chapters by 27 authors in a massive 430 pages.

In the first chapter, W.A. Price outlines the challenges presented by acid rock drainage and metal leaching. He discusses difficulties resulting from the nature of the beast, as well as those stemming from governmental regulation. Price's chapter serves as an excellent introduction to the volume. This is followed by a description of geoenvironmental models of mineral deposits by R.R. Seal II and J.M. Hammarstrom, with emphasis on massive sulfide and gold deposits. This chapter is a wealth of information on everything from classification of the various types of massive sulfide and gold deposits, through sorption, to mercury methylation.

Hydrologic and geochemical processes in mine waste rock is the subject of the third chapter by L. Smith and R. Beckie. Here the structure of and the infiltration of water into waste piles are discussed. Considerable attention is also paid to instrumentation for monitoring water infiltration. The fourth chapter, by A.I.M. Ritchie, deals with oxidation and gas transport in sulfide waste piles. This chapter was, for me at least, rather dry, but it provides a useful primer on the subject. D.W. Blowes, C.J. Ptacek and J. Jurjovec present a review of the hydrogeology and geochemistry of mill tailings in Chapter 5. This chapter includes discussion of the hydraulics of mill-tailing impoundments, the chemistry of sulfide oxidation and acid neutralization, and the formation of secondary minerals.

The mineralogy of mine waste and a mineralogical approach to acid-base accounting are covered in Chapter 6 by J.L. Jambor. A number of static tests for the prediction of acid-generating potential are presented and evalu-

ated. This is followed by a similar discussion of kinetic (humidity-cell) tests for estimating acid-generation potential by K.A. Lapakko in Chapter 7. Chapter 8 (M. Raudsepp and E. Pani) and Chapter 9 (C.G. Weisener) deal with Rietveld analysis and spectroscopic methods of characterization of mine waste, respectively. These two chapters contain quite general discussions and are of interest above and beyond characterization of mine waste.

It is widely recognized that microbes play an essential role in accelerating the oxidation of sulfide minerals that result in acid generation, in addition to influencing other redox processes in mine wastes. Chapters 8 (W.D. Gould and A. Kapoor) and 9 (D.K. Nordstrom) are devoted to the interplay of microbiology, geochemistry and mineralogy. These chapters were personally among the most interesting and informative in the volume.

In Chapter 12, C.J. Ptacek and D.W. Blowes discuss the Pitzer approach for handling activity coefficients in geochemical models of concentrated mine waters and review the application of this approach to several case studies. This chapter serves as a good lead-in to Chapters 13 (B.A. Kimball, R.L. Runkel, and K. Walton-Day) and 14 (K.U. Mayer, D.W. Blowes, and E.O. Frind), which are concerned with reactive-transport modeling. Chapter 13 illustrates the use of field-scale experiments and reactive-transport modeling in evaluating schemes for remediation of streams impacted by acid mine drainage. In Chapter 14, recent advances in reactive-transport modeling are summarized and applied to several case studies.

R.R. Seal II commences Chapter 15 with a general, fundamental review of stable isotope geochemistry. He follows this with a discussion of applications of stable isotopes to mine waste problems. In Chapter 16, K. Walton-Day outlines methods for passive and active treatment of mine drainage. Next, D.W. Blowes et al. (Chapter 17) provide a detailed discussion of one type of passive treatment, the use of permeable reactive barriers. In this chapter, presentation of basic principles of operation of permeable reactive barriers is followed by several case histories. Continuing the theme of remediation/prevention, G.W. Wilson contributes a short chapter on the design and performance of cover systems for mine waste.

The final two chapters have to do with case studies: Chapter 19, by A.I.M. Ritchie, on the Rum Jungle mine in Australia, and Chapter 20, by C.N. Alpers, D.K. Nordstrom, and J. Spitzley, on the Iron Mountain mine in California. These chapters cover the history of environmental problems at these two sites and document remediation efforts and their results. The Iron Mountain mine is of particular interest; some of the mine waters at this location have among the lowest pH values ever measured, including negative values!

Overall the quality of the editing and production of the volume is excellent. The figures are crisp and clear, and I detected relatively few typographical errors. There are eight pages of color plates, collected together in the middle of the volume. A couple of things about the volume were somewhat annoying. It seems that almost all of the 20 chapters reproduce the basic pyrite oxidation reactions responsible for acid mine drainage, and discuss fundamental aspects of the process. This information could have been compiled in one of the early chapters and simply referred to in subsequent chapters. Moreover, I encountered a significant error in the chapter on mine-waste mineralogy by Jambor. In the text he states: "The solubility of minerals with respect to pH typically follows a sloping line or a U-shaped profile in which the lowest solubility is at pH 7 or higher; thus, solubility increases markedly as pH decreases (Fig. 13)". However, Figure 13 actually shows the *rate* of dissolution of minerals with respect to pH, not their *solubility*. Thus, solubility (a thermodynamic property) has been confounded with dissolution rate (a kinetic property). However, these annoyances aside, the volume is an excellent source of information on environmental impacts of mine wastes, and should find its way onto the bookshelves of many economic geologists and environmental geochemists. Although the focus is on recent developments in the field, the volume contains much basic information and would make a reasonable text for a senior-undergraduate/graduate course. Even at the non-member price outside of Canada (\$50 US), the volume is a great bargain, and should be very affordable for students.



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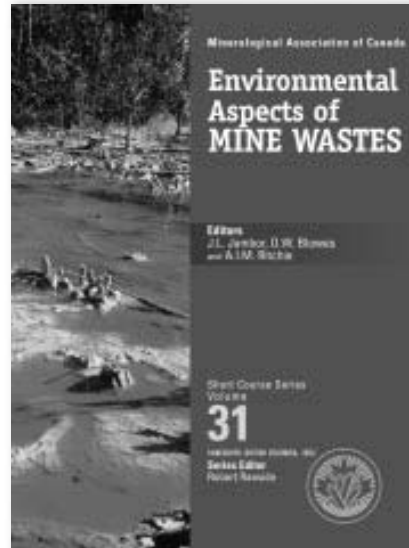
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Lead contributors to the volume are: C.N. Alpers (USGS, Sacramento), D.W. Blowes (U. Waterloo), W.D. Gould (NRCan, Ottawa), J.L. Jambor (LRC, Vancouver), B. Kimball (USGS, Utah), K. Lapakko (Minnesota Natural Resources), U. Mayer (UBC), D.K. Nordstrom (USGS, Boulder), W. Price (B.C. Ministry of Energy and Mines), C.J. Ptacek (U. Waterloo), M. Raudsepp (UBC), A.I.M. Ritchie (formerly ANSTO, Australia), R. Seal (USGS, Reston), L. Smith (UBC), K. Walton-Day (USGS, Denver), C.G. Weisener (U. Waterloo) and W. Wilson (UBC).

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# Initiation of the Goldschmidt Conferences

H. L. Barnes<sup>1</sup> and A. C. Lasaga<sup>2</sup>

<sup>1</sup>Pennsylvania State University

<sup>2</sup>GeoSolutions International, Ltd., Box 1042, Lemont, Pennsylvania

The inception began from a general conversation on the state of geological sciences. In 1983, Brian Skinner (Yale) and Hu were returning homeward after the Indianapolis meeting of the Geological Society of America. We were commiserating over the relatively poor state of funding for geochemical research although the consensus among geochemists, unabashedly, was that many of the recent major discoveries in geological sciences frequently were based on geochemical concepts. Brian observed that appropriate recognition of geochemistry as the source of many crucial insights was unlikely unless the field became better recognized as a discipline, similar to the traditional fields of geology and geophysics. An annual meeting specifically for geochemistry would help with that identification and, if designed to be comprehensive, also could alleviate another problem by providing an opportunity for interaction among geochemists, scientists who are especially disperse internationally.

When Hu became President of the Geochemical Society, Brian's perspective was discussed thoroughly by the Council and was found to be consistent with the views of its members. To consider possible courses of action, Hu proposed at the May, 1985 Council Meeting the forming of an *ad hoc* committee on the "Future of the Geochemical Society" with Bruce Doe (U.S.G.S.) as chairman and Ed Anders (Enrico Fermi Institute), Vice-President Stan Hart (M.I.T.), and Hu as members. The mandate from the Council was to find a means for consolidating and strengthening the realm of geochemistry and coincidentally of our Society. That "FOGS Committee," so-named by Bruce, reasoned that a continuing annual series of meetings among geochemists on frontier research was sorely needed; that led to some fruitful international correspondence. Consequently, the committee recommended action which the Council approved in October, 1985. The resolution stated that the Geochemical Society would sponsor an initial meeting jointly with the European Association of Geochemistry in Strasbourg in 1987, an effort that ultimately failed. Also, the Council made a commitment to organize a second joint meeting to be held in Baltimore in the spring of 1988, just prior to the American Geophysical Union Meeting. By having both our geochemical meeting and the AGU meeting in the same city with only a day or two between them meant that participants, especially those from Europe, could be attracted by the opportunity to attend both meetings for the travel costs of one. Associated with that commitment, and accepted by the Council, was the intent of the FOGS Committee that the annual joint meetings should have sites alternating across the Atlantic. When Stan Hart became President, he concluded that because the Society's commitment to the new meetings had been developed during Hu's tenure as president, the responsibility should be his to chair and recruit an organizing committee for the 1988 meeting.

The naming of the meetings was the result of an opportune circumstance. Earlier, in the May, 1986 Council Meeting, Charlie Sclar (Lehigh University) had been asked to form an exploratory committee to develop a proposal to celebrate the upcoming centennial of V. M. Goldschmidt's birth in 1888. Goldschmidt was already widely appreciated as the father of geochemistry, a belief later documented in 1992 by Brian Mason in the Society's Special Publication No. 4. Discussions of possible commemorative events converged with the developing plans for the international meeting. Spontaneously, Charlie and Hu agreed that the new meetings appropriately should be christened as "Goldschmidt Conferences." It would merge the purposes both of commemorating Goldschmidt's birth and of fulfilling the mandate for an international meeting in geochemistry.

Financing of that meeting generated an immediate crisis because the Geochemical Society was not rich and funds were needed to cover the many bills tendered long before registration fees would be collected. Furthermore, the society, with its limited resources, could not risk any financial loss from the meeting. The problem was solved through the Penn State Continuing Education Office which routinely organizes meetings around the globe and readily provided the crucial initial funding. Furthermore, that office accepted the risk of some loss as it operated under a decree to be a non-profit organization. That this help was the critical catalyst was immediately apparent. In addition to resolving the dilemma of the up-front costs, the staff provided superb administrative support for the meeting and absorbed our small loss from that first, 1988 Goldschmidt Conference. They continued to provide administrative and financial assistance for four of the first five Goldschmidt Conferences.

By 1993 when Tony Lasaga became President, the issue of where to hold the Society's annual meetings had become a prime concern of the Council. Problems with scheduling and room capacities for geochemical sessions at the Geological Society of America Annual Meetings had caused serious dissatisfaction. Alternatively, the American Chemical Society was favorably disposed to strengthening ties to geochemists but the huge size of ACS meetings was daunting to the Geochemical Society Council. The spring meeting of the American Geophysical Meeting was hospitable but lacked the preferred, uncompromising emphasis specifically on geochemistry and not as a secondary component of geophysics. The Goldschmidt Conferences were clearly favored, especially for their proposed broader international flavor but, to be viable over the long term, they probably had to take place annually.

The principle of having the Goldschmidt Conferences alternate between North America and Europe was accepted early by both the Geochemical Society and the European Association of Geochemistry but organizing of the European meetings was a major burden for the comparatively smaller society. Furthermore, the European geochemical community had been participating in the European Union of Geosciences meetings in Strasbourg. Consequently, not until 1994 was a Goldschmidt Conference consummated in Europe, at Edinburgh, Scotland. Under the Chairmanship of Ben Harte (University of Edinburgh), it was a superlative initiation for the European Goldschmidt Conferences. Nevertheless, the Geochemical Society Council continued to have strong doubts that the Goldschmidt Conferences could be successful if scheduled for every year. However, Tony urged the Council to realize that the proposed annual alternation was both necessary and feasible. With a somewhat reluctant agreement in hand, but with a lead time already shorter than normal for such meetings, he recruited Peter Deines and Hu to quickly organize the fifth Conference at Penn State in 1995 to inaugurate the conversion of the meetings from biennial to annual. Meanwhile, Tony carried on discussions on the potential for meetings between Europe and North America with European geochemists, especially with Claude Allegre, Ben Harte, Al Hoffmann, Keith O'Nions, and Jan Veizer. A joint agreement with our European colleagues on the annual alternation soon followed and was implemented in 1996 with the sixth Conference to be in Heidelberg. Since then, as we all recognize, the Goldschmidt Conferences have thrived in attendance and quality to become the dominant annual meetings of geochemistry. Furthermore, they have now become truly global as attested by this year's meeting in Kurashiki, Japan.

### ***The First Fifteen Goldschmidt Conferences:***

| <b>Date</b>      | <b>Chairs</b>                             | <b>Location</b>          | <b>Publisher</b>                        |
|------------------|---|--------------------------|---|
| May 1988         | H. L. Barnes                              | Baltimore, MD, USA       | Geochemical Society                     |
| May 1990         | P. Deines                                 | Baltimore, MD, USA       | Geochemical Society                     |
| May 1992         | B. Doe                                    | Reston, VA, USA          | Geochemical Society                     |
| Aug-Sept 1994    | B. Harte                                  | Edinburgh, Scotland      | Mineralogical Magazine                  |
| May 1995         | H. L. Barnes, P. Deines                   | University Park, PA, USA | Geochemical Society                     |
| March-April 1996 | H. Lippolt                                | Heidelberg, Germany      | J. Conference Abstracts                 |
| June 1997        | M. J. Drake                               | Tucson, AZ, USA          | Lunar & Planetary Institute             |
| Aug-Sept 1998    | J. Schott, S. Callahan                    | Toulouse, France         | Mineralogical Magazine                  |
| Aug 1999         | S. B. Jacobsen                            | Cambridge, MA, USA       | Lunar & Planetary Institute             |
| Sept 2000        | M. Coleman,<br>C. Hawkesworth, K. O'Nions | Oxford, England          | J. Conference Abstracts                 |
| May 2001         | R. J. Bodnar, M. P. Hochella              | Hot Springs, VA, USA     | Virginia Polytechnic & State University |
| Aug 2002         | A. N. Halliday, J. Kramers,<br>R. Wieler  | Davos, Switzerland       | Geochim. Cosmochim. Acta                |
| Sept 2003        | Y. Matsuhisa                              | Kurashiki, Japan         | Geochim. Cosmochim. Acta                |
| June 2004        | S. Stipp, B. Jamtveit,<br>B. Nielsen      | Copenhagen, Denmark      | Geochim. Cosmochim. Acta                |
| May 2005         | S. A. Wood, M. E. Gunter,<br>P. Larson    | Moscow, ID, USA          |   |

# Geochemical Society Board of Directors Meeting Minutes

Sunday, 7 Sept 2003  
9:00 - 17:00  
Kurashiki, Japan

## Present:

*Board of Directors:* Judith McKenzie (President), Tim Drever (Vice President), Mike Hochella (Past President), Frank Podosek (GCA Editor), Scott Wood (Special Publications Editor), Roberta Rudnick (Director)

*Guests:* Marty Goldhaber (GS Program Committee), Seth Davis (GS Business Manager), Doug Rumble (MSA President), Alex Halliday (Org. Committee, 2002 Goldschmidt Conf.), Yukihiro Matsuhisa and Jun-ichi Matsuda (Org. Committee, 2003 Goldschmidt Conf.), Susan Stipp, Berit Hedegaard, and Bjørn Jamtveit (Org. Committee, 2004 Goldschmidt Conf.), Simon Turner (Proponent for 2006 Goldschmidt Conf.), Herbert Palme (Proponent for 2006 Goldschmidt Conf.), Friso Veenstra (Elsevier Product Manager)

## Apologies:

Becky Lange (Treasurer), Jeremy Fein (Secretary), Ken Peters (OGD Chair), Eiichi Takahashi (International Secretary), Trudy Dickneider (OGD Secretary), Harry Elderfield (Director), Mickey E. Gunter (Org. Committee, 2005 Goldschmidt Conf.), Gilbert Hanson (Director), Eric Oelkers (Director), Ed Sholkovitz (Director), Erwin Suess (Director), Johnson Haas and Carla Koretsky (GS Newsletter Editors), Dominique Weis (Proponent for 2007 Goldschmidt Conf.)

Note: Because only 6 Board of Director members could attend, there was not a quorum at the meeting and official votes for proposals were carried out via email in the weeks following the Board of Directors meeting. The following minutes are in shorthand format to provide a brief account of the issues discussed.

## 1) President's Report (McKenzie)

This was the "year of the email". There was an enormous amount of email correspondence, leading Seth Davis to set up a web site for Board members to archive all discussions.

## Outreach discussions:

a) Discussions concerning how to use business office in outreach. Ideas include: Higher profile at GSA meeting (work with Marty Goldhaber – chair of GS program committee), Cocktail party, booth, GS breakfast (for officers/directors/committee members), reinvigorate program committee input to GSA meetings.

AGU not very receptive to have increased GS presence at Fall AGU.

b) Increase exposure through GS funds and organization. The Moscow, ID, meeting is 50<sup>th</sup> anniversary of GS.

**Awards:** Announcement of this year's Goldschmidt, Triebis, Clarke medals. Seven new GS fellows, one of which is female. Discussion followed on the need to increase number of females who are nominated for fellowships. Lynn Walter will serve as chair of Fellows committee for another year. Gast lecture will be given by Hiroshi Ohmoto (Penn State). Ingerson lecture will be given by Emily Klein at GSA 2003 Annual Meeting.

2003 Meeting assistance program (MAP) Awards:

\$2000 awarded for Symposium in honor of John Hedges (Aug 2003) organized by Cindy Lee; \$1,500 awarded for Arsenic Research symposium, ACS meeting in NY (Sept. 2003) organized by Peggy O'Day, (ASU); \$500 awarded for Modeling metamorphism symposium organized by Mike Brown (Univ. MD); and \$2000 awarded to Water-Rock interaction conference (2004) organized by Sue Brantley (Penn State).

2) Goldschmidt 2003 Report (Matsuhisa)

Tried to provide support to young researchers, and those from Pacific-rim countries to attend meeting. 1150 Abstracts received; 1164 Registrants; 877 Full Registrations; 287 Students.

Kurashiki was chosen as venue due to its traditional Japanese atmosphere. Also, Kurashiki-Sakuro Univ. made generous offer of support. Sponsorship from GS Japan, MSA. Made use of international Goldschmidt program committee (IGC). Came up with 53 separate symposia.

Problem for future conferences is how to organize special symposia. Cambridge Publications provided web support for abstract submission. Their participation was critical. Cooperation between Cambridge Publications and Elsevier went very well.

It is hoped that Goldschmidt 2003 will serve as model for successful meeting in Asia. It was noted that it is important to keep the conference moving around the world.

Message from GS Japan: interested in joining GS in promotion of Geochemistry and being involved in future Goldschmidt conferences.

McKenzie congratulated local organizers on their efforts.

## Q&A:

1) What is financial "bottom line" of meeting? A: Expecting balanced budget. Grand total of Budget is 60M JPY. Registration fee covers ~50% of costs. Remainder covered by government grants, City of Kurashiki, other small funds.

2) Almost 300 student registrants is very good. How many student grants awarded? A: 90 grants: 76 to students, 14 to young researchers (younger than 35, coming from less developed countries). Covered registration fee and abstract submission fee (\$100). 50% of money from GS and GSJ. Selected these people on basis of their abstracts. Total applications numbered 150.

3) Was it successful to separate the abstract submission fee from the registration fee? A: Yes.

4) Were others supported? A: We waived abstract submission fee for keynote speakers.

5) Does abstract submission fee include costs for publication of GCA abstract volume?

A: Organizing committee charged \$15/copy of GCA volume. Other costs borne by Elsevier. \$100 fee covers costs of receiving abstracts and making them ready for publication using Cambridge Publications. Registration fee reduced because of institution of abstract fee. Summary: Numbers of abstracts: Kurashiki: 1150; Davos: 1775; VA: 900; Harvard: 600

McKenzie: very important points brought up by Mats: a) non US and Europe venue is important, b) GS accepts offer of GS Japan to contribute towards other meetings, c) Role of IPC very important in making the conference a success, and d) Use of Cambridge Publications proves very successful

Cambridge publications will be used for Moscow ID meeting, but not Copenhagen meeting.

Wood: suggests development of Goldschmidt Conference guide (web-based).

Recommendation drafted (by FAP) at Davos meeting to adopt commercial conference organizers (e.g., Cambridge Publications) for all future Goldschmidt meetings.

Hochella: propose modification of proposal, allow local organizers some lee-way – don't want to micro-manage meetings. However, we need certain guidelines for future meetings.

**Action Items (to be voted on via email by BoD after meeting):** Move to require Goldschmidt Conference organizers to: 1) use the International Program Committee; and 2) use Cambridge Publications, unless other plans approved by BoD

## 2) Vice President's Report (Drever)

Everyone asked to serve on committees accepted. Most useful change was to canvass BoD for suggestions of people to serve on GS committees.

## 3) Nominations Committee Report (McKenzie)

Published in July issue of GN. Rudnick and Sholkovitz to rotate off, Delaney and Dove to replace them. McCulloch has agreed to replace Takahashi as International Secretary; Jeremy Fein has agreed to serve another term. Becky Lange has asked to be replaced. Her term ends at the end of 2004. BoD should make suggestions to nominations committee for Treasurer. Chair of nominations committee: Roland Hellman has taken over as chair from Jan Veizer. Discussion: Should attendance of BoD meetings be re-emphasized to candidates who are selected to serve? Tim Drever will contact BoD to emphasize importance of attending Copenhagen meeting.

## 4) Secretary's Report (Fein)

The following report summarizes the actions that were taken by the GS Board since its last annual meeting. These are listed below:

- 1) Approved a proposal for Elsevier to publish a GS Special Publication in honor of Ian Kaplan.
- 2) Approved the nomination of Roger Summons for the 2003 Treibs Medal.
- 3) Approved the proposal by Wood and Gunter to host the 2005 Goldschmidt conference in Moscow, Idaho, USA.
- 4) Approved the nomination of Bernie Wood for the 2003 Goldschmidt Medal.
- 5) Approved the nomination of Paul Asimow for the 2003 Clarke Medal.
- 6) Approved the nomination of William Fitzgerald for the 2003 Patterson Medal.
- 7) Approved the nomination of Robert Aller, Richard Carlson, Marilyn Fogel, S. Krishnaswami, John W. Morse, Herbert Palme, and David Rickard to be named as Geochemistry Fellows at the 2003 Goldschmidt Conference.
- 8) Approved the nominations of replacements for outgoing Geochemical Society Committee members as put forth by Vice President Drever.
- 9) Approved the nomination of Susan Brantley for the position of Vice-President of the Geochemical Society, the nomination of Malcolm McCulloch for the position of International Secretary of the Geochemical Society, and the nomination of Peggy Delaney and Patricia Dove as non-officer Directors of the Geochemical Society to replace the outgoing Directors.
- 10) Approved 20% discount from Wiley for GS members on the book, 'Getting Science Grants' by Tom Blackburn.

## 5) Treasurer's Report (Lange/McKenzie)

Received refund check from Davos meeting of \$19,900 (includes reimbursement from EAG for GN news to EAG members). GSA GS/MSA reception did occur in Denver

– no contribution from GS for this meeting – costs covered by ticket prices and MSA. Lange discussed audit, which is performed every year by CPA accountant. An official audit (by firm) will be performed at end of Lange's term. Assets: decrease of liquid assets in 2002, and probably 2003 due to stock market performance. General agreement at meeting that endowment needs to be kept solid. New initiatives need to be tempered with this in mind. Endowment: Took loss in stock market. Treasurer communicates with Tom Anderson (at Smith-Barney — investment firm handling endowment) and makes decisions, based on his recommendations about how to invest funds.

## 6) Business Office and Website Reports (Davis)

Membership down from previous years (2002 high due to Davos membership). Davos: gained 589 members, but not enough information collected (e.g., only name and email) for follow-up. Seth contacted those available, but only ~400 responded to initiate membership benefits. Of the 400, 75 renewed. Many Davos members are already EAG members, who already receive GN. Problems:

incomplete information, membership benefits not obvious, short membership year – became members in Sept, but needed to renew by Dec. 31<sup>st</sup>. Possible Solutions: have conferences earlier in year, so members can see the benefits of membership before they need to renew.

**2004 membership drive:** Compile contact information using publicly available data. Contact scientists to inform them of GS membership benefits. GS pens: to be given out at GS booth.

**Membership kit:** to give "tactile" response to membership. Will contain: thank you from President, ball point pens, GS sticker, membership card, brochure for next Goldschmidt conference. Discussion followed on relative merits of such a membership kit, and it was concluded that currently the costs can be covered by Business Office, so a membership kit can be given to all new registered GS members.

**Other issues:** GCA membership subscriptions have been slowly declining (due to on-line access and shelf space). Back issue requests now go to Harcourt, and person in charge has been brilliant in handling requests. Sales of special volumes still fairly low. Inventory numbers were discrepant (esp. for Vol 1 and 2). Numbers in Business Office report reflect accurate accounting. Costs have been recovered for early volumes. Need to contact university libraries and tell them about these volumes. Discussion followed on methods for distributing/selling remaining volumes.

**Discussion of Oelkers' proposal to give away all but 30 copies of special publications older than 10 years to GS members:** Giving out publications for membership was generally considered to be undesired, as it may detract from value of volumes, and may give people the idea that all Spec. Publ. will eventually be free. It was recommended to instead offer discounts at conference booths or give to libraries.

**Action Items:** Contact institutional libraries and offer Special Publications #1-7 at cost of mailing; offer deep discounts (50%) on the same publications at GS booths at Goldschmidt & GSA meetings.

**Website:** Changed credit card companies for on-line renewal. Currently don't have on-line payments available, but its coming in November. Bob Nichols (webmaster) will redesign website. Some feedback provided. Needs: more color, better design, larger font. Change GN news cover to be that of current issue. The BoD thanks Bob for his efforts, which are greatly appreciated.

## Conferences/Exhibits

GS booth at Kurashiki, GSA, Seattle. Special events: GSA: Reception at GSA, Tues morning breakfast for Society officers/directors/committee members. RIMG: shared processing with MSA. Memberships – if Goldschmidt meetings held late in the year, make membership available for following year as well.

## 7) GCA Executive Editor's Report (Podosek)

Three people to be in the GCA office (currently only two – one had to be let go).

## Policy

**Mineral names:** GCA follows guidelines for IMA on mineral names. Earlier this year, AE pointed out that term used in paper (fassite) is discredited. Authors were upset, because term has become entrenched. Vice president of IMA, recommends use of quotes around first usage of name, with reference to 1973 paper, then use it without quotes thereafter.

**Meteorite names:** Concern by Meteoritical Society that private collectors will not follow procedures for naming meteorites. Solution: Geoff Grossman has become AE and will be consulted regarding meteorite nomenclature and his advice will be followed.

## Production problems

Typesetting of Tables, equations and symbols. Conducted survey of GCA authors in 2001/2002: Response was 60% of total. Ten percent of people were seriously unhappy with production issues. Corresponded with Elsevier about problems. Problem seems to lie with Cadmus, who is responsible for type setting.

Recently: Heard that Elsevier is getting rid of Cadmus and going with another printer.

GCA is moving ahead in e-data tabulation and supplements. Will start asking authors to provide basic data tables as e-supplements in specified format, even if the data are printed. Outcome of meeting at GERM meeting. Downside will be more work for authors (e.g., providing meta-data).

## 8) Special Publication Editor's Report (Wood)

### Special Publications

1) Special Publication 7 (Crerar Volume): Water-rock Interaction, Ore Deposits, and Environmental Geochemistry: A tribute to David A. Crerar. Editors - R. Hellmann and S.A. Wood.

- Published in April 2002
- Favorable book reviews appeared in *The Canadian Mineralogist* (2002) v. 40, p. 1522-1523 and *Mineralium Deposita* (2003) v. 38, p. 647-648.
- Book reviews requested in *Chemical Geology*, and *Geochimica et Cosmochimica Acta* but have not yet appeared.

2) Giggenbach Volume: Volcanic, geothermal and ore-forming fluids: Rulers and witnesses of processes within the Earth. Editors - Stuart F. Simmons and Ian Graham.

- Joint publication with Society of Economic Geologists (SEG)
- This volume is identified as SEG Special Publication No. 10. There is no GS Special Publication Number on the volume but it can be considered GS Spec. Pub. No. 8. The GS logo does appear on the volume.
- Was available at Kurashiki

3) Special Publication 9 (Kaplan Volume): Geochemical Investigations in Earth and Space Science: A Tribute to the Career of Isaac R. Kaplan Editor - R. Hill.

- To be produced by Elsevier
- Will consist of 29 papers from authors from US, Japan, Australia, Taiwan, New Zealand, Israel
- As of August 11, 2003, final versions of 20 papers had been received.
- All papers should have been received by the end of August.

It will be interesting to see how sales of the latter two volumes go as they represent deviations from how our Special Publications traditionally have been produced and marketed.

### Reviews in Mineralogy and Geochemistry

Volumes Sponsored to Date by Geochemical Society

- 1) Molecular Modeling Theory and Application in the Geosciences, v. 42 (2001)
- 2) Noble Gases in Geochemistry and Cosmochemistry, v. 47 (2002)
- 3) Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Science, v. 49 (2002)
- 4) U-Series Geochemistry, v. 52 (2003)

No additional GS-sponsored RiMG volumes are in the pipeline. Wood will be calling for proposals for GS-sponsored RiMG volumes in the next GS News.

## 9) Reports on Goldschmidt Conferences

### 2002 meeting, Davos, Switzerland (Halliday)

Meeting appeared to run smoothly because of organization. A lot of goodwill behind meeting. Over 400 North American attendees (record for European Goldschmidt). Things to change: some meeting rooms too small; poster sessions venue could be improved. Discussion of holding another Goldschmidt conference in a similar location. Important to avoid conflict with meeting of European organic geochemistry society. Meeting budgeted to break even if 1000 attendees. The ~1800 attendees yielded net income. Only 300 students, at reduced fee of 100 Euros. In future/retrospect could reduce student fees even lower.

2003 meeting, Kurashiki, Japan (Matsuhisa/Matsuda) (see above)

2004 meeting, Copenhagen, Denmark (Stipp/Jamtveit)

Focus on dynamics of geochemistry; Six themes of conference, 50 symposia, one full day plenary session, towards beginning of conference. Help in organizing

came from: IPC, past organizers, GS officers, etc. Program was organized first, then conveners chosen. Estimate that participants may be ~2000 based on past conferences. Full 6 days. All symposia fit into 6 themes, with emphasis on processes. 10 parallel sessions, ~950 talks. 3 or 4 poster sessions, all at one location. Held at two locations: the Geocenter and Ørsted Institution, 15 minutes by local shuttle from each other (~30 minute walk). Downtown accessed by 15 minute ride from airport. There will be inexpensive student accommodations. Plan to limit number of abstracts by any one person to one. Time Plan: 26 Jan abstracts due; 20 March Info on web about abstract acceptance; 2 April Early registration deadline; 16 April Limit of registration for those presenting (if they haven't registered by this deadline, their abstract will not be accepted); 19 April Camera-ready copy sent to Elsevier (7 weeks printing time)

email: [goldschmidt@geol.ku.dk](mailto:goldschmidt@geol.ku.dk)  
web-page: [www.goldschmidt2004.dk](http://www.goldschmidt2004.dk)

Professional Conference Organizer – Susanne Van Hauern Conferences will handle registration, booking of hotels, etc.; Password-accessed conference website will provide access to those who also have logged in and who has registered. Student registration fee is substantially reduced from regular registration. Registration fees to be announced before abstract deadline.

### 2005 meeting, Idaho, USA (Wood/Gunter)

Publicity: circular is being distributed, GN article, Website is up and running.

"Voyage of Discovery" theme. 50<sup>th</sup> anniversary of GS – time to reflect by inviting early players to give plenary. Contracting with Cambridge Publications to publish abstracts. Local organizers doing registration, housing, etc. Jan 13, 2005 abstract deadline; Mineralogical Association of Canada, International Humic Substance Society, IMA will provide financial support. Accommodations: 700 in hotels in Moscow and Pullman (trans. to be provided), new dorms at very inexpensive rates. Can handle at least 2000 people between dorms and hotels. Venue: University. All meals will be catered (breakfast, lunch & dinner), with wine and beer available. Estimate of ~\$400 for registration (meals included).

### 10) Proposals for Goldschmidt Conferences

2006 meeting, Melbourne, Australia (Simon Turner).

Proposed for 27 Aug-1 Sept., but dates are flexible. Overwhelming support on the ground (as witnessed by the successful ICOG and IAVCEI meetings held in the early 1990's). Melbourne – easy to access, major new convention facility within walking distance to hotels and restaurants. Fieldtrips to Great Barrier Reef, Tertiary volcanics, etc. Way to enhance collaboration between southern hemisphere and NA/Europe. Costs: similar to Davos costs. Costs include abstract submission fee, etc. These cost estimates do not include contributions from societies, industry, etc. Airline-conference deals running discounts on air fares up to 75%. Australian government has funds available to help attendance by participants from former east block and developing countries.

2006 meeting, Köln, Germany (Herbert Palme)

Venue: University of Köln. Inst. of Mineralogy and Geochemistry and Inst. of Geology  
University lecture halls would be used for sessions. Organizing committee: Köln will have 3 new hires by 2004 (yet to be determined). Mezger, von Blankenburg, Putnis, Keppler, Brumsack. Mensa building for dinner (holds up to 1500). Would be major impact for German geochemistry and cosmochemistry. Registration 200-250 Euros, 100-150 Euros for students. Includes abstract submission and printing, lecture hall rentals, dinner and boat trip on Rhein. Hotels available for 50 Euros and up. Proposed date: after Aug 21, 2006. Meteoritical Soc. Meeting in Zürich at end of July. Can handle up to 1500 participants.

**Action Item:** Need vote of GS BoD ASAP regarding conference venue for 2006 meeting.

2007 meeting, Vancouver, B.C. (Dominique Weis/McKenzie)

Proposed date: June 2004. A formal written proposal was submitted and described. Will be considered by BoD.

### 11) Joint GS/SEG proposal (Wood)

PROPOSAL FOR JOINT PUBLICATION SERIES WITH THE SOCIETY OF ECONOMIC GEOLOGISTS

Report from Scott Wood:

I have been communicating with members of the Society of Economic Geologists regarding extending our cooperative efforts in publications which have commenced with the imminent joint publication of the Giggerbach volume. The discussion has centered around the possibility of having a joint publication series in which volumes are published at regular intervals, say every three to five years. One model for such a collaboration would be volumes covering material similar to that covered in the volumes edited by Hu Barnes titled "Geochemistry of Hydrothermal Ore Deposits" or GHOD for short. In case you are not familiar with this series, it consisted of three volumes, all of which covered similar material but updated, and published by Wiley. The first edition appeared in 1967, followed by editions in 1979 and 1997. These publications covered material of common interest to geochemistry and economic geology, they have been widely used as texts in courses on ore deposit geochemistry, and were obviously very successful (or a commercial publisher such as Wiley would never have published three editions). Although centered on ore deposits, these volumes contained a wealth of information on geochemistry including radiogenic isotopes, stable isotopes, thermodynamics, aqueous geochemistry, etc., and so their appeal is not restricted to economic geochemists. It is unlikely that Hu Barnes will edit a fourth edition of this volume, and so a vacuum will soon exist in the field.

The proposal is not to simply take over publishing the current version of GHOD in which all the original subject matter is reviewed and updated with each new edition. Rather, the idea is that each joint volume would deal in depth with some particularly "hot" topic of joint interest to GS and SEG members. For example, volumes might be on topics such as "Microbiological influences on ore geology", "Advances in isotopic studies of ore deposits", or "Ore deposits as witnesses to global change".

At this point, the exact mechanisms and procedures need to be discussed further before a definite agreement can be made. However, I would like to present this idea to the board for discussion, and perhaps a vote on the idea in principle. A positive vote would provide a mandate for further discussions/negotiations with SEG to come up with a more specific, detailed proposal. The board would then vote again on a more specific detailed proposal. I presume that any agreement with SEG would stipulate that any proposed volume in this series would need to be approved by both societies individually, so that we would not be automatically committing to all possible future volumes at once. What we would be agreeing to is a protocol so that each time one of these volumes is approved, we are not re-inventing the wheel.

#### 12) Proposal for GS/MSA Magazine (Hochella)

Joint publication between GS, MSA, MAC, Mineral. Soc., Clay Minerals Soc. 4-6 times/year to start, up to 12 issues per year. Focus on thematic topics, but includes society news, student awards, conference reports, etc. Guest editors would be invited to focus on a given scientific issue, to produce cross-disciplinary review articles. Budget modeled after MRS (Materials Res. Society) Bulletin, which brings in money. If the four societies pool their newsletters, they would be fully funded without additional income from advertising. Projection based on 6 issues per year, ~48 pages, glossy, full color. Press run of 4000 copies. Canadian printing, mailed in U.S. \$52,000/year. Would supplant GN. Discussion followed report, and BoD will vote on proposal via email after the meeting.

#### 13) Lisa Pratt's Proposal to establish a GS Foundation (McKenzie)

Discussed adding a check box for voluntary contributions to this fund on membership forms. No action was taken, but the issue will be considered further.

These minutes were prepared by Roberta Rudnick, Director, and Jeremy B. Fein, Secretary, The Geochemical Society, and were submitted October 29, 2003.

**Post-Script: Official Board voting results, conducted via email after the Goldschmidt Conference:**

- 1) Voted to approve the use of an International Program Committee at all Goldschmidt Conferences.
- 2) Voted to use Cambridge Publications as conference organizers unless a request from the local organizers for a different company is approved by the GS Board.
- 3) Voted to approve the proposal to hold the 2006 Goldschmidt Conference in Melbourne, Australia.

## EMPLOYMENT OPPORTUNITIES

### Postdoctoral Position in Transmission Electron Microscopy and Aqueous Geochemistry

A postdoc position is immediately available in the areas of high-resolution transmission electron microscopy and aqueous geochemistry. We are particularly interested in individuals who are interested in extrapolating TEM results to large-scale geological problems via aqueous and isotope geochemistry and geochemical modeling. Experience is less important than motivation and education of the individual.

The successful applicant will be working on collaborative projects funded by Professors David Veblen at Johns Hopkins University and Chen Zhu at Indiana University. The position is hired through Indiana University. Depending on research emphasis, the appointee may spend her/his time in Baltimore to use TEM and in Bloomington to use the aqueous geochemistry, scanning electron microscopy, stable isotope, and X-ray diffraction facilities. Appointment is initially for one year, with subsequent years possible pending availability of funds and performance. Salary is competitive and includes fringe benefits.

Applicants should send a letter outlining their background in electron microscopy and geochemistry, along with vitae and names of 3 references to Ms. DeAnn Reinhart (Department of Geological Sciences, Indiana University, 1001 East 10<sup>th</sup> Street, Bloomington, IN 47405-1405) or contact Professors Veblen (dveblen@jhu.edu) or Chen Zhu (hzu\_09@yahoo.com).

Indiana University is an Equal Opportunity/Affirmative Action employer. Women and minorities are especially encouraged to apply

### Postdoctoral Position at the University of California, Berkeley. Application Deadline: March 1, 2004

A postdoctoral position is open in the Department of Earth & Planetary Science for collaboration in research concerned with:

- 1) calculation of activity coefficients as a function of temperature, pressure, and composition for aromatic compounds and other hydrocarbon and NSO species that exhibit nonideal behavior in petroleum,
- 2) investigation using these activity coefficients of the effect of differences in reactant and product kerogen compositions in the system CHNSO on the composition and speciation of different crude oils generated at the same temperature by incongruent melting of the reactant kerogen,
- 3) determination of the effect of nitrogen and sulfur in the reactant and product kerogen on oil generation and the thermodynamic consequences of reaction among sulfur-bearing species in the oil and sulfide minerals in hydrocarbon source rocks, and
- 4) chemical and thermodynamic description of the chemical interaction of expelled oil with its aqueous and mineralogic environment.

Highly qualified individuals at the time of or shortly after completion of their doctoral studies are invited to apply for this position. A background in thermodynamics and organic geochemistry is desired. Salary commensurate with experience and publication record. The term of appointment is two years with the possibility of a one-year extension.

Send a letter of interest, resume, and names and addresses (including email) of three references to:

Liz Garrity, MSO  
Department of Earth & Planetary Science, Mail Code 4767  
University of California  
Berkeley, CA 94720-4767

The University of California is an equal opportunity employer.

# *The Integrated Ocean Drilling Program (IODP) needs your opinions!*

The Chemistry Working Group of the Scientific Measurement Panel (SciMP) of the Integrated Ocean Drilling Program (IODP) is requesting input from the community regarding the types of geochemical analyses to be conducted "on-site" during IODP expeditions. The term "on-site" reflects analyses performed during the drilling phase of any IODP expedition (analogous to the shipboard analyses of the Ocean Drilling Program) and is inclusive of riser and non-riser platforms as well as Mission Specific Platforms (MSPs). We recognize that analyses performed during drilling with a MSP may not be as extensive as with shipboard drilling. Therefore, we ask that you complete a short (11 question) questionnaire, the purpose of which is to ensure that the correct analyses are performed on all IODP platforms, data quality is high, and safety is not compromised.

We value your opinion very much and urge you to reply to these questions and to provide any other comments you wish. *Please, please, answer* - this is your chance to help influence the new program as it gets off the ground. Please note that your individual responses will be held in confidence to the Chemistry Working Group - the feedback we are soliciting is for our committee's purposes only.

Please respond to Clive Neal: neal.1@nd.edu or by snail-mail at Dept. Civil Eng. & Geological Sciences, 156 Fitzpatrick Hall, University of Notre Dame, Notre Dame, Indiana 46556, USA, on behalf of the Chemistry Working Group of SciMP, fax (574) 631-9236.

Many thanks for your time.

*Clive Neal  
Mosanobu Yamamoto  
Rick Murray*

For ocean drilling, what material(s) and analyses do you feel are important? (check all that apply)

| Materials                            | Analyses                              |
|--------------------------------------|---------------------------------------|
| <input type="checkbox"/> Hard rock   | <input type="checkbox"/> Organic      |
| <input type="checkbox"/> Soft Rock   | <input type="checkbox"/> Inorganic    |
| <input type="checkbox"/> Metamorphic | <input type="checkbox"/> Major        |
| <input type="checkbox"/> Water       | <input type="checkbox"/> Trace        |
| <input type="checkbox"/> Gas         | <input type="checkbox"/> Isotopic     |
| <input type="checkbox"/> Extracts    | <input type="checkbox"/> Petrographic |

Please specify the types of analyses not included above that you would like to see performed on-site in order to fully characterize materials that are important to your research.

What types of analyses do you consider are necessary to influence drilling strategy?

In your opinion, what types of analyses are required to ensure safe drilling and core handling?

What other "on-site" analyses would be critical during the drilling phase?

How could "on-site" geochemical analyses be improved upon what was carried out during ODP?

Would you consider using data gathered "on-site" in scientific publications?

If you answered "no" to the question above, what would it take for the "on-site" data to be considered usable by you in scientific publications?

For porewater chemistry, it has been suggested that in addition to the squeezing apparatus there be centrifuging capabilities on-board as well. Some microbiologists have suggested that this may be a preferred porewater extraction technique for soupy unlithified sediments. Do you have any thoughts on this?

There is a possibility of adding quadrupole ICP-MS, with or without a laser-ablation capabilities to the riser and non-riser drill ships. Do you have any strong feelings on this new capability?

Do you have any other thoughts/comments/suggestions?



## MEETINGS ANNOUNCEMENTS

## Calls for Abstracts

### 2004 V. M. Goldschmidt Conference

### *Symposium on Mineral Surface Reactivity*

Contributions are requested for the topical symposium "Mineral Surface Reactivity" to be held at the 2004 V.M. Goldschmidt Conference in Copenhagen, Denmark, June 5-11. **The abstract deadline is January 26.** See the Goldschmidt Conference website for submission and registration (<http://www.goldschmidt2004.dk>).

Confirmed invited speakers include:

Dr. Nora de Leeuw (Birkbeck) - Mineral surface structure  
 Prof. Claudine Noguera (Groupe de Physique des Solides, CNRS) - Oxide surfaces  
 Prof. Wolfgang Schmickler (Universität Ulm) - Scanning tunneling microscopy  
 Prof. Kenneth Eisenthal (Columbia University) – Non-linear spectroscopy at interfaces

The focus of this symposium is on the elucidation of relationships between the structure at surfaces and interfaces of natural materials, including the atomic, electronic, and topological structure, with their reactivity and physical properties. The session will include experimental and theoretical research integrating any of the various theoretical concepts and microscopic or spectroscopic tools of mineral surface science, physical chemistry of surfaces, solid state physics, electrochemistry, or crystal chemistry. Possibilities include but are not limited to studies based on scanning probe, X-ray, electron or optical microscopies and spectroscopies, and molecular or mesoscale modeling studies of various kinds. Scientific themes include thermodynamics and kinetics, electron transfer, mechanisms of dissolution and growth, nanoparticle reactivity, transport phenomena, and sorption reactions of inorganic, organic, and microbial interfacial systems.

#### Symposium Organizers

Kevin Rosso  
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 and the Environmental Molecular Sciences Laboratory  
 Pacific Northwest National Laboratory  
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 Sandia National Laboratory  
 PO Box 5800  
 Albuquerque, NM, 87185 USA  
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## 2004 V. M. Goldschmidt Conference

### *In-situ Investigations of Interface Processes*

We would like to announce and invite contributions to the topical symposium "In-situ investigation of interface processes" to be held at the 2004 V.M. Goldschmidt Conference in Copenhagen, Denmark, June 5-11. The abstract deadline is January 26.

Confirmed invited speakers include: Mike Machesky, Terry Seward, Gordon Brown, Andrew Neal, John Bargar

Interfacial processes play an important role in regulating and facilitating biogeochemical reactions. Solid/liquid, liquid/liquid, and gas/solid/liquid interfaces influence reactive transport and biogeochemical transformations over a wide range of spatial and temporal scales. In recent years, significant insights have emerged about biotic and abiotic reactions at interfaces and many of the major breakthroughs have resulted from advances in in-situ analytical, spectroscopic, and imaging methods. Such techniques allow for measurements under increasingly detailed and accurate time and size scales while maintaining environmentally-relevant conditions. Using such approaches, it is now possible to unravel previously intractable interface facilitated reaction mechanisms, involving sorption/desorption, mineral dissolution/transformations, oxidation/reduction, microbe/mineral interactions, etc.. These interactions control biogeochemical reactivity and transport in complex multiphase systems and have been studied by coupling more conventional methods and novel reaction cell design with these advanced in-situ techniques.

This symposium intends to bring together scientists who employ advanced in-situ analytical, spectroscopic, and imaging techniques to examine biogeochemically relevant interfacial processes occurring over a variety of temporal and spatial scales, including research aimed at modeling over a range of scales.

Again, please submit your abstract via the above given website, where all the conference information regarding registration, abstract submission and deadlines may be found. Note that the abstract deadline is January 26.

#### Symposium Organizers

Liane G. Benning (University of Leeds, UK)  
 Paul Bertsch (The University of Georgia, USA)  
 Willem van Riemsdijk (Wageningen University, The Netherlands)

## MEETINGS ANNOUNCEMENTS

## Call for Abstracts

### 2004 V. M. Goldschmidt Conference

### *Volatiles in the Deep Earth*

We would like to draw your attention to symposium 3.5 "Volatiles in the Deep Earth" during the 2004 Goldschmidt Conference in Copenhagen, June 5-11, 2004. This symposium is organized by David Kohlstedt (U. Minnesota) Michael Carroll (U. Camerino) and Bjorn Mysen (Geophysical Laboratory, Carnegie Institution of Washington)

This symposium aims to trace the behavior of volatiles during their transfer from the surface to the deep Earth and back to its surface. The symposium aims to address PVT properties of volatiles in the C-O-H system as well as silicate solubility in C-O-H fluids at high pressure. It will also examine devolatilization equilibria in the pressure/temperature regime of subduction, and the fate of volatiles bound in hydrous minerals, DHMS, hydrous wadsleyite, spinel, garnet, and perovskite in the upper and lower mantle. The carbon cycle in the Earth's interior will be addressed via carbonate stability relations and the CO<sub>2</sub>-graphite-diamond relations in the deep upper mantle and below. The rheological behavior of dry versus wet peridotite mantle minerals at high pressures will be addressed. We will also focus on transport of volatiles as a free phase ("wetting angle" restrictions) as a function of pressure, temperature, and silicate compositions, discuss the fluxing effects of C-O-H volatiles on melting behavior in the interior of the Earth, solubility and solubility mechanisms of COH volatiles in silicate melts, relationships between volatile contents of silicate melt and physical and chemical properties of silicate melts in the Earth's interior as a function of their volatile content.

If you would like to submit an abstract to this symposium, please go to:

[www.goldschmidt2004.dk](http://www.goldschmidt2004.dk)

and follow the instructions for abstract submission. The deadline for abstract submission is January 26, 2004.

Symposium Organizers:  
Bjorn Mysen, Michael Carroll and David Kohlstedt.

## Call for Abstracts

### 11th International Symposium on Water-Rock Interactions

### *Session in Honor of Professor Henry Lutz Ehrlich*

This special symposium will honor Professor Henry Lutz Ehrlich for his essential role in the development of the field of Geomicrobiology, i.e., studies of microbial processes of geological importance. The symposium is scheduled as part of the Eleventh International Symposium on Water-Rock Interaction to be held in Saratoga Springs, NY from June 27-July 2, 2004 (<http://app.outreach.psu.edu/wri/>).

The Henry Ehrlich Symposium will focus on the recent progress and remaining challenges in our quest to understand the effect of microbial communities on geological processes at various spatial and temporal scales. Prof. Ehrlich's contributions to Geomicrobiology span a wide range of subjects that include large-scale oxidation and reduction of inorganic substances catalyzed by bacteria, solubilization of minerals as a result of microbial metabolism, bacterial oxidation and solubilization of mineral sulfides such as those of iron, copper, arsenic, lead and silver (ore bioleaching), Mn oxidation and reduction by bacteria in hydrothermal vents, and interaction of resident bacterial flora with bauxites. Three inter-related themes of Prof. Ehrlich's research will form the organizing framework for this symposium:

- redox transformations and metal cycling
- interactions between metals and microbial surfaces
- microbially-mediated precipitation and dissolution reactions

Several keynote speakers will address these major themes including Terry Beveridge (University of Guelph), Gordon Brown (Stanford), Jeremy Fein (University of Notre Dame), Dianne Newman (Caltech), and Ron Oremland (USGS, Menlo Park). We encourage the submission of contributed oral and poster presentations in any of the above areas of Geomicrobiology. Admirers, former students, students of former students, associates and colleagues of Professor Ehrlich are invited to submit an abstract (see <http://app.outreach.psu.edu/wri/> for submission instructions) by October 15, 2003. Any questions about the symposium should be addressed to the session organizers:

T. A. Abrajano  
Department of Earth and Environmental Sciences  
Rensselaer Polytechnic Institute  
110 8th Street, Troy, NY 12180  
Tel (518) 276-6036, Fax (518) 276-6680  
email: [abrajt@rpi.edu](mailto:abrajt@rpi.edu)

## MEETINGS ANNOUNCEMENTS

# Mineralogical Society of America Short Course Geochemistry of Non-Traditional Stable Isotopes

May 15-16, 2004

Preceding the AGU/CGU Meeting, Montreal, Canada

Studies of the stable isotope variations of elements such as H, C, N, O, and S have been pursued for several decades, and have provided important constraints on the sources of these elements in natural rocks, minerals, and fluids. The range of problems that these studies have focused on include planetary geology, the origin and evolution of life, crust and mantle evolution, and the genesis of natural resources. Much less attention, however, has been paid to stable isotope variations of other elements that are also geochemically important such as the metals and halogens. In part this has been due to analytical challenges, although the first-order variations for several systems have been constrained using long-standing analytical methods such as gas- and solid-source mass spectrometry. With the advent of breakthrough analytical instrumentation such as multi-collector ICP-MS, large portions of the Periodic Table are now accessible to stable isotope studies, and this Short Course, and its associated Reviews in Mineralogy and Geochemistry volume, provide insight into these new or "non-traditional" stable isotope systems, as reviewed by the current leaders in the field.

We begin with several broad topics, including an overview of stable isotope variations in the cosmos, which forms the baseline with which to view terrestrial systems. Calculation of stable isotope fractionation factors for these new isotope systems is critical for providing a framework for interpreting measurements of natural materials, particularly where experimental studies are few, and the second topic reviews different theoretical approaches for predicting isotopic fractionations. Next we discuss the variety of analytical approaches that may be taken in measuring stable isotope variations of "non-traditional" elements in natural materials, highlighting issues that are important in producing the highest quality data.

The later part of the Course summarizes what is known about stable isotope variations for specific "non-traditional" elements that have received the most intensive study, working up the mass range from Li to Mo. These elements cover a wide range of chemical behavior, and include alkali (Group I) and alkaline-earth (Group II) metals, the Group VI elements, the halogens (Group VII), and several examples from the first and second transition elements. In addition to participation in a variety of bonding environments, many of the elements discussed are involved in redox reactions, and are therefore involved in a wide variety of geochemical and biological processes that are sensitive to redox conditions.

#### Overview, theory, and analytical methods

- An overview of isotopic variations and their nucleosynthetic heritage - *Jean Louis Birk (Institut de Physique du Globe de Paris)*
- Applying stable isotope fractionation theory to new systems - *Edwin Schauble (University of California, Los Angeles)*
- Analytical methods for measurement of non-traditional stable isotope systems - *Francis Albar de (Ecole Normale Supérieure de Lyon) and Brian Beard (University of Wisconsin, Madison)*
- Calcium isotopic variations produced by biological, kinetic, radiogenic and nucleosynthetic processes - *Donald DePaolo (University of California, Berkeley)*
- Selenium and Chromium isotopes - *Thomas Johnson (University of Illinois, Urbana-Champaign) and Thomas Bullen (United States Geological Survey, Menlo Park)*

#### Specific isotope systems

- Developments in the understanding and application of Lithium isotopes in the Earth and Planetary Sciences - *Paul Tomascak (University of Maryland, College Park)*
- The isotope geochemistry and cosmochemistry of Magnesium - *Edward Young (University of California, Los Angeles) and Albert Galy (University of Cambridge)*
- The stable-Chlorine isotope composition of natural and anthropogenic materials - *Michael Stewart (University of Illinois, Urbana-Champaign) and Arthur Spivack (University of Rhode Island, Narragansett)*
- Iron isotope variations in the modern and ancient Earth and other planetary bodies - *Brian Beard (University of Wisconsin, Madison) and Clark Johnson (University of Wisconsin, Madison)*
- Isotopic constraints on biogeochemical cycling of Iron - *Clark Johnson (University of Wisconsin, Madison), Brian Beard (University of Wisconsin, Madison), Eric Roden (University of Alabama, Tuscaloosa), Dianne Newman (California Institute of Technology), and Ken Nealson (University of Southern California)*
- The stable isotope geochemistry of Copper and Zinc - *Francis Albar de (Ecole Normale Supérieure de Lyon)*
- Molybdenum stable isotopes: observations, interpretations and directions - *Ariel Anbar (University of Rochester)*

**Conveners:** *Clark Johnson*, University of Wisconsin - Madison, USA; *Brian Beard*, University of Wisconsin - Madison, USA; *Francis Albarède*, Ecole Normale Supérieure de Lyon, France.

**Fees & Registration:** Registration fee covers short course sessions (including lunches) and *Reviews in Mineralogy and Geochemistry* volume. Professional Registration on or before March 1, 2004: MSA or GS Members \$160; Non-member \$200; Student Registration: MSA or GS Member \$40; Non-member \$60. You can register online at the MSA Home Page (<http://www.minsocam.org>). Forms are available from the MSA Business Office, 1015 Eighteenth Street NW Suite 601, Washington, DC, 20036-5212, USA. Tel: 202-775-4344, Fax: 202-775-0018, e-mail: [business@minsocam.org](mailto:business@minsocam.org).

The course is partially supported by the U.S. Department of Energy.

ELEVENTH INTERNATIONAL SYMPOSIUM ON



# waterROCK

**INTERACTION**

JUNE 27–JULY 2, 2004

SARATOGA SPRINGS, NEW YORK, U.S.A.

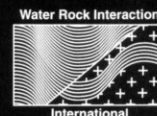
For additional information regarding this symposium and the call for abstracts, visit our Web site at [www.outreach.psu.edu/C&I/WRI/](http://www.outreach.psu.edu/C&I/WRI/)

The *Eleventh International Symposium on Water-Rock Interaction* is geared for individuals engaged in research and education in water-rock interaction, including geology and hydrogeology, mineral surface chemistry, nanobiogeochemistry, geochemistry, petroleum geology, mining geology, environmental sciences, and hazard geology.

**THE TOPICS INCLUDE:**

- thermodynamics and kinetics of weathering reactions
- ore deposit geochemistry
- high-temperature water-rock interaction
- volcanic degassing
- water-rock interaction in groundwater and watersheds
- environmental geochemistry
- organic geochemistry
- isotope and radionuclide geochemistry
- biogeochemistry
- geomicrobiology
- advances in geochemical analysis
- geochemical modeling
- geochemical sequestration
- aqueous geochemistry

The 2004 symposium is being organized by the Working Group on Water-Rock Interaction of the International Association of Geochemistry and Cosmochemistry (IAGC) in cooperation with Penn State. The IAGC is one of twenty-four organizations affiliated with the International Union of Geological Sciences (IUGS).

**WRI-11 CONTACTS:**

Dr. Susan Brantley, WRI-11 Secretary General  
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239 Deike Building  
University Park PA 16802-2711

Dr. Ann Maest, Fund-Raising Chair  
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**VISIT OUR WEB SITE AT**  
[www.outreach.psu.edu/C&I/WRI/](http://www.outreach.psu.edu/C&I/WRI/)

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## MEETINGS CALENDAR

- Jan 5-7, 2004: Volcanic and Magmatic Studies Group - Annual Meeting** (with the Mineralogical Society), Assembly Rooms, Bath, U.K. Main theme: geothermal processes. Abstract deadline 31 October 2003. Contact: Kathryn Goodenough; E-mail: kmgo@bgs.ac.uk; Web site: <http://www.mineroc.org>
- Jan 2-4, 2004: short courses** on, for instance, on laser ablation ICP-MS for isotopic dating of U- and Th-bearing accessory minerals, Fort Lauderdale, Florida. Web site: <http://www-unix.oit.umass.edu/~wc2004/shortcourse.htm>
- Jan 5-10, 2004: Winter Conference on Plasma Spectrochemistry**, Fort Lauderdale, Florida. Web site: <http://www-unix.oit.umass.edu/~wc2004/WinterConf2004.htm>
- Jan 12-16, 2004: Penrose Conference, Neogene Continental Margin Volcanism**, Mexico. Contact: Gerardo J. Aguirre-Diaz, Centro de Geociencias, Campus UNAM-Juriquilla, Queretaro, Queretaro, 76230 Mexico; E-mail: ger@geociencias.unam.mx; Fax: +52 623 4105; Phone: +52 623 4116, ext 107; Jose Luis Macias, Instituto de Geofísica, UNAM, Coyoacan 04510, Mexico D.F.E-mail: macias@tonatiuh.igeofcu.unam.mx; Fax: +52 55502486; Phone: +52 56224124 ext. 19; Claus Siebe, Instituto de Geofísica, UNAM, Coyoacan 04510, Mexico D.F.E-mail: csiebe@tonatiuh.igeofcu.unam.mx; Fax: +52 55502486; Phone: +52 56224124 ext. 17; Web site: <http://tepetl.igeofcu.unam.mx/penrose/index.html>
- Jan 18-22, 2004: Workshop, Neogene Continental Margin Volcanism**, Mexico. Contacts: Gerardo J. Aguirre-Diaz, Centro de Geociencias, Campus UNAM-Juriquilla, Queretaro, Queretaro, 76230 Mexico; E-mail: ger@geociencias.unam.mx; Fax: +52 623 4105; Phone: +52 623 4116, ext 107; Jose Luis Macias, Instituto de Geofísica, UNAM, Coyoacan 04510, Mexico D.F.; E-mail: macias@tonatiuh.igeofcu.unam.mx; Fax: +52 55502486; Phone: +52 56224124 ext. 19; Claus Siebe, Instituto de Geofísica, UNAM, Coyoacan 04510, Mexico D.F.; E-mail: csiebe@tonatiuh.igeofcu.unam.mx; Fax: +52 55502486; Phone: +52 56224124 ext. 17; Web site: <http://tepetl.igeofcu.unam.mx/penrose/index.html>
- Jan 21, 2004: Depleted Uranium: Facts Behind the Science**, East Midlands Regional Group, British Geological Survey, Keyworth, U.K. Contact: Martin Culshaw; E-mail: mgc@bgs.ac.uk
- Jan 25, 2004: winter meeting DEEP Submergence Science Committee (DESSC) of UNOLS**, Portland, Oregon. Website: <http://www.unols.org/>
- Jan 26-30, 2004: AGU Ocean Sciences Meeting**, Portland, Oregon. Web site: <http://www.agu.org/meetings/meetings.html>
- Feb 8-13, 2004: 17th Australian Geological Convention - Past, Present and Future**, Hobart, Tasmania. Contact: Conference Design, PO Box 342, Sandy Bay Tasmania 7005; Web site: <http://www.17thage.gsa.org.au>
- Feb 10-12, 2004: Second International Symposium "Dynamics of Fluids in Fractured Rock"**, Lawrence Berkeley National Laboratory, Berkeley, California, U.S.A. Web site: <http://esd.lbl.gov/fluidsinoack/>
- Feb 15-20, 2004: ASLO-TOS Ocean Research Conference**, Honolulu, Hawaii, U.S.A. Co-sponsored by the American Society of Limnology and Oceanography and The Oceanography Society. Web site: <http://www.aslo.org/honolulu2004/index.html>
- Feb 16-19, 2004: Australian Organic Geochemistry Conference (AOGC) and national conference for the International Humic Substances Society (IHSS)**, Leura, New South Wales, Australia. Web site: <http://www.ahort.uq.edu.au/staff/kspark/aogc-ihss/>
- Feb 26-28, 2004: Seismic heterogeneity in the Earth's Mantle: Thermo-Petrologic and Tectonic Implications**, Copenhagen, Denmark. Contact: H.Thybo, Geological Institute, Oester Voldgade 10, Copenhagen K DK-1350, Denmark; Phone: +45 3532 2452; Fax: +45 3314 8322; E-mail: thybo@geol.ku.dk
- Feb 29-March 2, 2004: Mid-Atlantic Ridge Workshop on the slow-spreading Northern Mid-Atlantic Ridge**, Westin Providence Hotel, Providence, RI, USA. Convenors: Deborah Kelley, University of Washington, Deborah Smith, WHOI and Chuck Fisher, Penn State. Web site: <http://ridge2000.bio.psu.edu/>
- March 28-April 1, 2004: 227th ACS National Meeting**, Anaheim, CA. Will include: Arsenic Geochemistry, Fate and Transport of Colloids, Environmental Chemistry of Bacterial Mn(II) oxidation, Scaling issues: Application of molecular geochemistry to field scale transport, and Chemistry of metals in terrestrial and aquatic systems. Web site: <http://membership.acs.org/g/geo/upcoming.html>
- March 29-31, 2004: Euradwaste '04, Sixth European Commission Conference on the Management and Disposal of Radioactive Waste**, European Commission, Jean Monnet building, Luxembourg - Kirchberg. Web site: <http://www.cordis.lu/fp6- Euradwaste/04/events.htm>
- Mar 29-Apr 01, 2004: Modelling Permeable Rocks IV**, Southampton University, Southampton, UK. Contact: Lucy Nye, Catherine Richards House, 16 Nelson Street, Southend-on-Sea, Essex, UK; Phone: +44 (0) 1702 354020; Fax: +44 (0) 1702 354111; E-mail: lucy.nye@ima.org.uk; Web site: <http://www.ima.org.uk/mathematics/confmodelling.htm>
- April 5-6, 2004: Seventh Nederlands Aardwetenschappelijk Congres (NAC VII)**, No further information yet.
- April 5-7, 2004: 22nd European Conference of Society for Environmental Geochemistry and Health (SEGH 2004)**, University of Sussex, UK. Web site: more at website <http://www.sussex.ac.uk/conferences/seg/h>
- April 6-7, 2004: The 8th international conference of Jordanian Geologist Association**, Faculty of Engineering, University of Jordan, Amman, Amman, Jordan. Contact: Dr. Ahmad Al-Malabeh, Jordanian Geologist Association; Phone: +962 6 5652310; Fax: +962 6 5652312; E-mail: jga@joimnet.com.jo; Web site: <http://www.jo-geologists.com>
- April 12-16, 2004: MRS 2004 Scientific Basis for Radioactive Waste Management XXVIII**, San Francisco, CA, U.S.A. Web site: <http://www.mrs.org/meetings/spring2004/>
- April 14-19, 2004: 5th International Symposium on Eastern Mediterranean Geology**, Thessaloniki, Greece. A conference covering all earth science topics related to the broader eastern Mediterranean region. Contact: Alexandros Chatzipetros; Phone: +30 (231) 0998512; Web site: <http://www.geo.auth.gr/5thISEMG>
- April 22-23, 2004: Symposium on Silica: Sampling and Analysis**, Salt Lake City, Utah, U.S.A. Contact: Dorothy A Fitzpatrick, Symposia Operations, ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428 2959, U.S.A.; E-mail: mharpner@cdc.gov
- April 25 - 30, 2004: European Geosciences Union - 1st General Assembly**, Nice, France. Web site: <http://www.copernicus.org/EGU/ga/egu04/>
- April 26-30, 2004: European Geophysical Society XXXIX General Assembly**, Nice, France. Contact: EGS Office, Max-Planck-Str. 13, 37191 Katlenburg-Lindau, Germany; Phone: +49 5556 1440, Fax: +49 5556 4709; E-mail: EGS@COPERNICUS.ORG; Web site: <http://www.copernicus.org/EGS/EGS.html>
- May 15-16, 2004: Short course Stable Isotopes of Intermediate to Heavy Mass Elements**, Montr. al, Canada. Organizers: Clark Johnson (Univ. of Wisconsin - Madison) ([clarkj@geology.wisc.edu](mailto:clarkj@geology.wisc.edu)), Francis Albarde (Univof Lyon), Brian Beard (Univ. of Wisconsin - Madison). Sponsor: Mineralogical Society of America
- May 17-21, 2004: joint meeting - 2004 AGU Spring meeting and the Canadian Geophysical Union annual meeting**, Montr. al, Canada. Contact: [meetinginfo@agu.org](mailto:meetinginfo@agu.org); Web site: <http://www.agu.org/meetings/>
- May 23-27, 2004: 104th General Meeting American Society for Microbiology**, Ernest N. Morial Convention Center, New Orleans, LA. Web site: <http://www.asm.org/Meetings/index.asp?bid=697>
- May 24-26, 2004: Arctic Geology, Energy resources and Environmental Challenges**, Polar Environmental Centre, Tromsø, Norway. Contact: Marianne Blikkas, Norwegian Geological Society, c/o NGU, N-7491 Trondheim, Norway; Phone: +47 73 90 44 68; Fax: +47 73 92 16 20; E-mail: Marianne@geologi.no; Web site: <http://www.geologi.no/cgi-bin/geologi/maker?id=1658>
- May 26-June 6, 2004: Polymorphism: Solvates and Phase Relationships**, Erice, Italy. Contact: E-mail: Yoel@bgumail.bgu.ac.il; Web site: <http://www.geomin.unibo.it/org/erice/olderice/bemstei.htm>
- Summer 2004: The 2nd International Symposium on Volcanic Ash and Aviation Safety**, Washington, DC. Contact: Mary Cairns or Donald Carver, Office of the Federal Coordinator for Meteorology, 8455 Colesville Road Silver Spring, MD 20910, U.S.A.; Phone: +1 301-427-2002; Fax: +1 301-427-2007; Web site: [http://www.ofcm.gov/homepage/text/spec\\_proj/volcanic\\_ash/volash2.html](http://www.ofcm.gov/homepage/text/spec_proj/volcanic_ash/volash2.html)
- June 2-7, 2004: 20th Colloquium of African Geology - Geoscientific Infrastructure in Africa for Sustainable Development**, Orleans, France. Bureau de recherches géologiques et minières (BRGM). Contact: Secrétariat of CAG 20, BRGM 3, Avenue Claude Guillemin, B.P. 6009 - 45060 Orlans cedex 2, France; Phone: +33 2 38 64 38 11; Fax: +33 2 38 64 38 61 - +33 2 38 64 37 29; E-mail: cag20@brgm.fr; Web site: <http://cag20.brgm.fr>
- June 6-12, 2004: 14th V.M. Goldschmidt Conference**, Copenhagen, Denmark. Web site: <http://www.goldschmidt2004.dk/>
- June, 2004: Short Course Epidote Group Minerals**, At XIVth Goldschmidt Conference in Copenhagen (Denmark). Sponsor: Mineralogical Society of America. Organizer: Axel Liebscher; E-mail: alieb@pop-server.gfz-potsdam.de
- June 5-9, 2005: 105th General Meeting American Society for Microbiology**, Atlanta, GA, U.S.A. Web site: <http://www.asm.org/Meetings/index.asp?bid=470>
- June 13-18, 2004: ASLO Summer Meeting**, Savannah Convention Center, Savannah, Georgia, U.S.A. Contact: Arny Parker, University of Georgia; E-mail: aparker@smokey.forestry.uga.edu; Alan Decho, University of South Carolina; E-mail: Awdecho@gwm.sc.edu
- June 19-24, 2004: 41st Clay Minerals Society annual meeting**, Richland, WA, U.S.A., by the Clay Minerals Society and Pacific Northwest National Laboratory. Contact: Jim Amonette; Phone: +1 509-376-5565; Fax: +1 509-376-7972; E-mail: jim.amonette@pnl.gov; Web site: <http://www.pnl.gov/cms/>
- June 20-24, 2004: The East African Rift System: Development, Evolution and Resources**, Addis Ababa, Ethiopia. Web site: [http://www.gl.rhul.ac.uk/ear\\_conference/EAR1\\_circular.pdf](http://www.gl.rhul.ac.uk/ear_conference/EAR1_circular.pdf)
- June 27-July 2, 2004: XIth International Conference on the Coordination and Organometallic Chemistry of Germanium, Tin and Lead**, Santa Fe, New Mexico. Contact: Prof. Keith Pannell, Department of Chemistry, University of Texas at El Paso, El Paso, TX 79968-0513, U.S.A.; Phone: +1 915-747-5796; Fax: +1 915-747-5748; E-mail: kpannell@utep.edu
- June 27-July 1, 2004: International Basement Tectonics Association (IBTA) Conference on the Four-D Evolution of Continental Crust**, Oakridge, TN, U.S.A. Sponsors: IBTA, AGU, Geological Society of America, others. Contact: R.D. Hatcher, Jr., Department of Geological Sciences, University of Tennessee, 305 Geological Sciences Building, Knoxville, TN 37996-1410 U.S.A.; E-mail: bobmap@utk.edu
- June 27-July 2, 2004: 11th International Symposium on Water-Rock Interaction**, Saratoga Springs, New York, U.S.A. Contact: Cheryl Corman, Phone: +1 814-863-1738; Susan Brantley, Secretary General, Dept. of Geosciences, The Pennsylvania State University, 239 Deike Building, University Park, PA 16802, U.S.A.; Phone: +1 814-863-1739; Fax: +1 814-863-8724; Web site: <http://www.outreach.psu.edu/C&I/WRI/> and [http://www.wr.cmln.wr.usgs.gov/wri/future\\_meetings.htm](http://www.wr.cmln.wr.usgs.gov/wri/future_meetings.htm)
- June 28-30, 2004: 4th BGA Geoenvironmental Engineering Conference**, Stratford-upon-Avon, U.K. The main conference theme is "Integrated Management of Groundwater and Contaminated Land". Organized by the Geoenvironmental Research Centre (Cardiff School of Engineering, Cardiff University) and the National Groundwater & Contaminated Land Centre (Environment Agency) on behalf of the British Geotechnical Association. Web site: <http://www.grc.cf.ac.uk/4bga/>
- July 4-9, 2004: 16th International Conference on Phosphorus Chemistry (ICPC 16)**, Birmingham, England. Contact: Prof. Pascal Metivier, Rhodia, R&D for Phosphorus and Performance Derivatives Oak House, reeds Crescent Watford, WD24 4QP, U.K.; Phone: +44 1923 485609; E-mail: pascal.mativier@eu.rhodia.com; Web site: <http://www.icpc2004.com>
- July 12-16, 2004: GEOSCIENCE AFRICA, International Conference**, University of the Witwatersrand, Johannesburg, South Africa. Web site: <http://www.wits.ac.za/geoscienceafrica>
- July 25-29, 2004: 11th International Symposium on Solubility Phenomena, Including Related Equilibrium Processes (11th ISSP)**, Aveiro, Portugal. Contact: Prof. Clara Magalhães, Department of Chemistry, University of Aveiro, P-3810-193 Aveiro, Portugal; Phone: +351 234 401518; Fax: +351 234 370084; E-mail: mclara@dq.ua.pt; Web site: [http://www.dq.ua.pt/11th\\_issp](http://www.dq.ua.pt/11th_issp)
- July 25-30, 2004: 7th INTECOL International Wetlands Conference**, Utrecht University, Utrecht, The Netherlands. Web site: <http://www.bio.uu.nl/INTECOL>
- Aug 1-6, 2004: Gordon Research Conference "Water & Aqueous Solutions"**, Holderness School. Web site: <http://www.grc.uri.edu/04sched.htm>
- Aug 2-7, 2004: 9th International Chemistry Conference in Africa (ICCA)**, Arusha, Tanzania. Web site: [http://www.udsm.ac.tz/News\\_events/9icca.html](http://www.udsm.ac.tz/News_events/9icca.html)
- Aug 8-13, 2004: Gordon Research Conference "The Role of Water in Rock Deformation"**, Mount Holyoke College, South Hadley, MA, U.S.A. This conference will emphasize the chemical and physical roles of aqueous fluids in deformation, the sources and transport of fluids in deforming rock bodies and faults of the crust and mantle, and the importance of fluid-rock interactions to tectonics. Contact: Andreas Kronenberg, Chair, or Mark Jessell, Vice-chair; E-mail: a-kronenberg@tamu.edu or mjessell@lmtg.ups-tse.fr; Web site: <http://www.tectonice.net/grc/>
- Aug 8-13, 2004: Gordon Research Conference Organic Geochemistry**, Holderness School. Web site: <http://www.grc.uri.edu/04sched.htm>
- Aug 16-20, 2004: Western Pacific Geophysics Meeting**, Honolulu, Hawaii, U.S.A. Sponsor: AGU. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7333; Fax: +1-202-328-0566; E-mail: [meetingsinfo@agu.org](mailto:meetingsinfo@agu.org); Web site: <http://www.agu.org/meetings>
- Aug 20-28, 2004: 32nd International Geological Congress (IGC)**, Florence, Italy. Geochemical Society/IUGS. Also: 6-day post-congress field trip to the blueschists, eclogites and tectonics of northwest Turkey (modified version of the successful 1998 Metamorphic Studies Group field trip). See second circular. In addition: post-congress field workshop n; PWO 01: "Low-angle normal faulting - twenty years after". This workshop will be a 6-day excursion from Corsica (France) to Elba Island, Tuscany and western Umbria (Italy). Conveners PWO01-1: Giusy Lavecchia, Dipartimento di Scienze della Terra - Chieti University, Italy ([glavecchia@unich.it](mailto:glavecchia@unich.it)), Gordon S. Lister, Department of Earth Science - Monash University, Australia ([gordon@mail.earth.monash.edu.au](mailto:gordon@mail.earth.monash.edu.au)), and Laurent Jolivet, Lab. de Tectonique - P & M. Curie University - Paris, France ([laurent.jolivet@lgs.jussieu.fr](mailto:laurent.jolivet@lgs.jussieu.fr)). Web site: <http://www.32igc.org/>
- Aug 20-28, 2004: symposium G-04.04 Kinetics and geochemical reactions, part of the 32nd International Geological Congress (IGC)**, Florence, Italy (see above). Web site: <http://www.32igc.org/default1.htm>
- Aug 22-26, 2004: 228th ACS National Meeting**, Philadelphia, PA, U.S.A. Web site: <http://membership.acs.org/g/geo/upcoming.html>
- Aug 30-Sept 3, 2004: 2nd International Conference on Recrystallization and Grain Growth**, Annecy, France. Primarily for and by metallurgists. The themes of the conference include: fundamentals of recrystallization and grain growth, dynamic recrystallization and elevated temperature deformation, computer simulation

## MEETINGS CALENDAR

- and modeling, microstructure and texture, structure, thermodynamics and kinetics of interfaces, and new experimental methods and techniques. Chairpersons of the Organizing Committee: Julian Driver and Brigitte Bacroix; Web site: <http://www.rex-gg-2004.org/>
- Aug, 2004: 67th annual meeting of the Meteoritical Society**, Rio de Janeiro, Brazil. Contact: E-mail: [congrex@congrex.com.br](mailto:congrex@congrex.com.br)
- Sept 3-5, 2004: 4th International Symposium on Chemistry and Biological Chemistry of Vanadium**, Szeged, Hungary. Contact: Prof. Tamas Kiss, University of Szeged, Department of Inorganic and Analytical Chemistry, PO Box 440, H-6701 Szeged, Hungary; Phone: +36 62 544337; Fax: +36 62 420505; E-mail: [tkiss@chem.u-szeged.hu](mailto:tkiss@chem.u-szeged.hu); Web site: <http://www.staff.u-szeged.hu/~vanadium/>
- Sept 4-9, 2004: 8th International Global Atmospheric Chemistry Conference**, Christchurch, New Zealand. Contact: Kim Gerard, PO Box 13 494, Christchurch, New Zealand; E-mail: [kim@conference.co.nz](mailto:kim@conference.co.nz); Web site: <http://www.IGACConference2004.co.nz>
- Sept 6-10, 2004: ECORAD 2004**, Aix en Provence, France. Web site: <http://www.irsnd-pre.com/ecorad/>
- Sept 6-12, 2004: EUROSOL 2004**, Freiburg, Germany. Web site: <http://www.forst.uni-freiburg.de/eurosoil/>
- Sept 19-22, 2004: 8th International Congress on Applied Mineralogy (ICAM 2004)**, Aguas de Lindoia, Aguas de Lindoia, Sao Paulo, Brazil. Contact: Dogan Paktunc, Phone: +1 613 947 7061; Fax: +1 613 996 9673; E-mail: [dpaktunc@nrcan.gc.ca](mailto:dpaktunc@nrcan.gc.ca); Web site: <http://www.icam2004.org>
- Sept 20-24, 2004: 2nd Mid-European Clay Conference**, Miskolc, Hungary. Contact: Dr I. Viczian; E-mail: [viczian@ludens.elte.hu](mailto:viczian@ludens.elte.hu) or Dr T.G. Weisburg; E-mail: [weisburg@ludens.elte.hu](mailto:weisburg@ludens.elte.hu)
- Oct 13-16, 2004: SOLAS Science 2004**, Halifax, Nova Scotia, Canada. Web site: <http://www.uea.ac.uk/env/solas/ss04.html>
- Nov 7-10, 2004: GSA 2004 Annual Meeting & Exposition**, Denver, Colorado. Web site: <http://www.geosociety.org/>
- Nov 14-19, 2004: IAVCEI 2004 General Assembly Volcanism and its Impact on Society**, Puc-n, Chile. Contact: Jos A. Naranjo or Jorge Clavero, General Secretariat IAVCEI 2004 GA, Av. Santa Maria 0104, Providencia, Santiago, Chile; Phone: +56-2-737 50 50; Fax: +56-2-777 19 06; E-mail: [iavcei@sermageomin.cl](mailto:iavcei@sermageomin.cl); Web site: [www.sermageomin.cl/iavcei](http://www.sermageomin.cl/iavcei)
- Nov 22-23, 2004: GeoSur 2004 - International Symposium on the Geology and the Geophysics of the Southernmost Andes, the Scotia Arc and the Antarctic Peninsula**, Hilton Buenos Aires Hotel, Buenos Aires, Argentina. Contact: Angela Marchetto, OGS, Borgo Grotta Gigante 42c - 34010 SGONICO TS Italy; Phone: +39 040 2140339; Fax: +39 040 327040; E-mail: [amarchetto@ogs.trieste.it](mailto:amarchetto@ogs.trieste.it); Web site: <http://www.ogs.trieste.it/GeoSur2004/index.html>
- Dec, 2004: ACE 2004 - 5th European meeting on environmental chemistry**, Bari, Italy. Contact: Dr. Michele Aresta, META Research Center, University of Bari, via Celso Ulpiani 27, 70126 Bari, Italy; E-mail: [resta@meta.uniba.it](mailto:resta@meta.uniba.it); Web site: <http://www.science.plym.ac.uk/ace/Meetings.html>
- Dec 5-8, 2004: Salt-Sediment Interactions and Hydrocarbon Prospectivity: Concepts, Applications, and Case Studies for the 21st Century**, Adam's Mark Hotel, Houston, TX U.S.A. GCSSEPM Foundation. Contact: Paul J. Post; Phone: +1 504-736-2954; Fax: +1 504-736-2905; E-mail: [paul.post@mms.gov](mailto:paul.post@mms.gov); Web site: <http://www.geosoc.org.uk/template.cfm?name=GCSSEPM1>
- Dec 6-7, 2004: Channel Flow, Ductile Extrusion and Exhumation of lower-mid crust in Continental Collision Zones**, The Geological Society of London, Burlington House, London, U.K. Contact: Helen Wilson, Geological Society of London, Burlington House, Piccadilly, London W1J 0BG; Phone: +44 (0)20 7434 9944; Fax: +44 (0)20 7494 0579; E-mail: [helen.wilson@geosoc.org.uk](mailto:helen.wilson@geosoc.org.uk); Web site: [http://www.geosoc.org.uk/template.cfm?name=channel\\_flow](http://www.geosoc.org.uk/template.cfm?name=channel_flow)
- Dec 13-17, 2004: AGU Fall Meeting**, San Francisco, California, U.S.A. Contact: E. Terry, AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7335; Fax: +1-202-328-0566; E-mail: [eterry@agu.org](mailto:eterry@agu.org); [meetinginfo@agu.org](mailto:meetinginfo@agu.org); Web site: [www.agu.org/meetings](http://www.agu.org/meetings)
- Feb 10-11, 2005: seismic geomorphology**, Westchase Hilton Hotel, Houston, Texas, US. Contact: Jessica Canfor, Geological Society of London, Burlington House, Piccadilly, London W1J 0BG, UK; Phone: +44 (0)20 7434 9944; Fax: +44 (0)20 7494 0579; E-mail: [jessica.canfor@geosoc.org.uk](mailto:jessica.canfor@geosoc.org.uk); Web site: <http://www.geosoc.org.uk/seismicgeomorphology>
- Apr 25-29, 2005: European Geosciences Union (EGU) XXX General Assembly**, Nice, France. Sponsors: EGU, AGU. Contact: EGU Office, Max-Planck-Str. 13, 37191 Katlenburg-Lindau, Germany; Phone: +49-5556-1440; Fax: +49-5556-4709; E-mail: [egu@copernicus.org](mailto:egu@copernicus.org); Web site: [www.copernicus.org/EGU/EGU.html](http://www.copernicus.org/EGU/EGU.html)
- May 23-27, 2005: AGU Joint Assembly**, New Orleans, Louisiana, U.S.A. Contact: AGU Meetings Department, 2000 Florida Avenue, NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7333; Fax: +1-202-328-0566; E-mail: [meetinginfo@agu.org](mailto:meetinginfo@agu.org); Web site: [www.agu.org](http://www.agu.org)
- May 20-24, 2005: Fifteenth Annual V.M. Goldschmidt Conference**, Moscow, Idaho, USA; Web site: <http://www.uidaho.edu/gold2005>
- Aug, 2005: IU-Cr-20 - XX Meeting and General Assembly of the International Union of Crystallography**, Florence, Italy.
- Sept 07-11, 2005: 6th International Conference on Geomorphology**, Congress Hall-Auditorium of Zaragoza, Zaragoza, Spain. (Organizing Secretariat Geomorfologia, Facultad de Ciencias, Universidad de Zaragoza, C/ Pedro Cerbuna 12, Zaragoza 50009, Spain; Fax: +34 976 761106; E-mail: [iag2005@posta.unizar.es](mailto:iag2005@posta.unizar.es); Web site: <http://wzar.unizar.es/actos/SEG/index.html>
- Sept 26-29, 2005: MRS 2005 Scientific Basis for Radioactive Waste Management XXIX**, Gent, Belgium.
- Oct 16-19, 2005: GSA 2005 Annual Meeting & Exposition**, Salt Lake City, Utah. Web site: <http://www.geosociety.org/>
- Nov 06-11, 2005: International Gondwana 12 Conference**, Mendoza, Argentina; Web site: <http://cig.museo.unlp.edu.ar/gondwana>
- Dec, 2005: 6th European Meeting on Environmental Chemistry**, Belgrade, Yugoslavia. Contact: Dr. Branimir Jovancic, Department of Chemistry, University of Belgrade, Akademski trg 12-16, POB 158, 11001 Beograd, Yugoslavia; E-mail: [bjovanci@chem.bg.ac.yu](mailto:bjovanci@chem.bg.ac.yu); Web site: <http://www.science.plym.ac.uk/ace/Meetings.html>
- Dec 5-9, 2005: AGU Fall Meeting**, San Francisco, California, U.S.A. Contact: E. Terry, AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7335; Fax: +1-202-328-0566; E-mail: [eterry@agu.org](mailto:eterry@agu.org); [meetinginfo@agu.org](mailto:meetinginfo@agu.org); Web site: [www.agu.org/meetings](http://www.agu.org/meetings)
- Feb 20-24, 2006: AGU Ocean Sciences Meeting**, Honolulu, Hawaii.
- July, 2006: IMA-2006 - XIX General Meeting of the International Mineralogical Association**, Kobe, Japan.
- Oct 22-25, 2006: GSA 2006 Annual Meeting & Exposition**, Philadelphia, Pennsylvania. Web site: <http://www.geosociety.org/>
- Dec, 2006 - 7th European Meeting on Environmental Chemistry**, Brno, Czech Republic. Contact: Dr. Josef

Caslavsky, Institute of Analytical Chemistry, Czech Academy of Science, Veveří 97, 61142 Brno, Czech Republic; E-mail: [caslav@iach.cz](mailto:caslav@iach.cz); Web site: <http://www.science.plym.ac.uk/ace/Meetings.html>

- Dec 11-15, 2006: AGU Fall Meeting**, San Francisco, California, U.S.A. Contact: E. Terry, AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009 U.S.A.; Phone: +1-202-777-7335; Fax: +1-202-328-0566; E-mail: [eterry@agu.org](mailto:eterry@agu.org); [meetinginfo@agu.org](mailto:meetinginfo@agu.org); Web site: [www.agu.org/meetings](http://www.agu.org/meetings)
- Oct 28-31, 2007: GSA 2007 Annual Meeting & Exposition**, Denver, Colorado. Web site: <http://www.geosociety.org/>



## Information for Contributors

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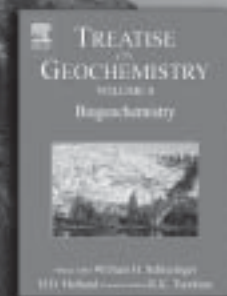
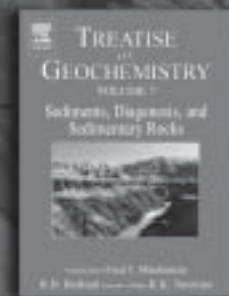
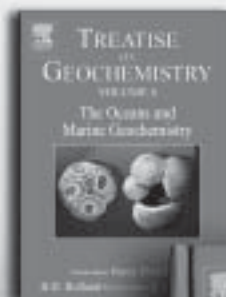
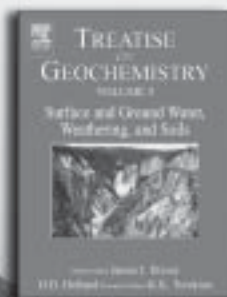
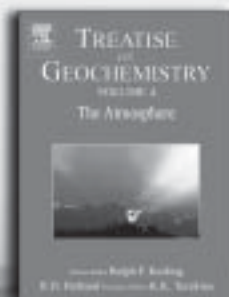
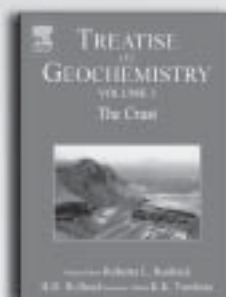
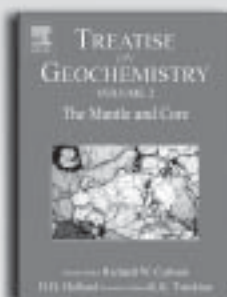
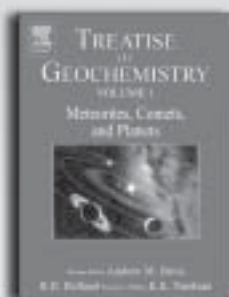
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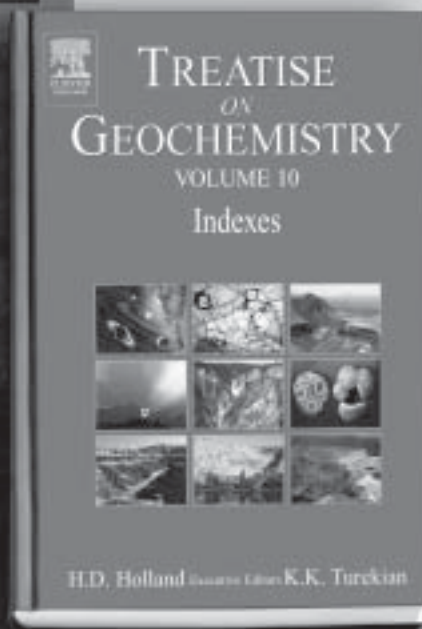
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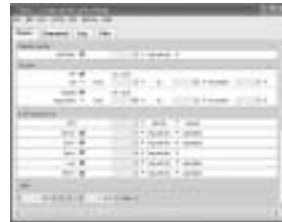
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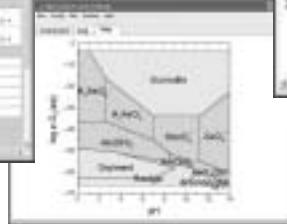
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