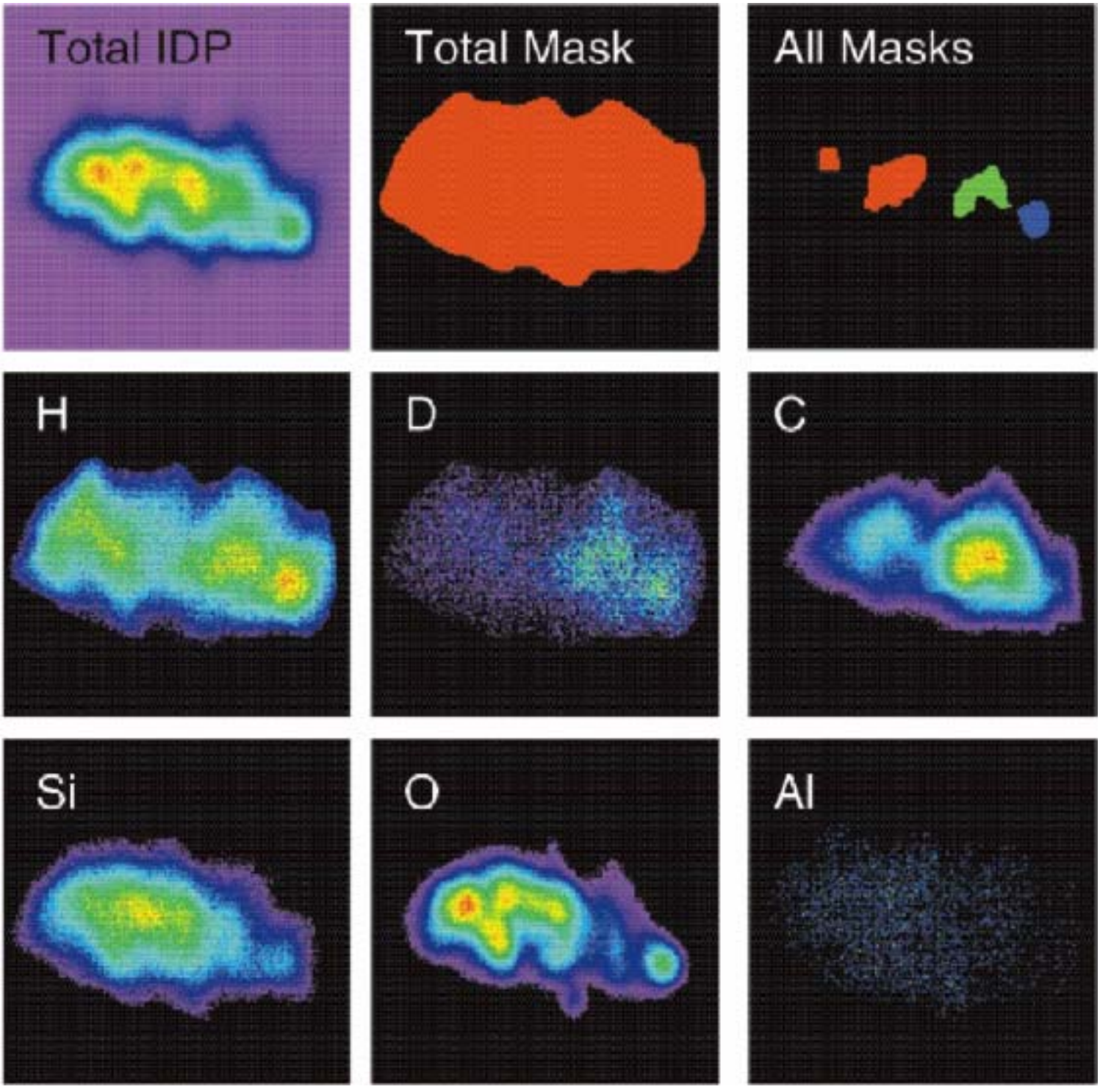
The Geochemical News

Newsletter of The Geochemical Society

in cooperation with The European Association of Geochemistry

NUMBER 109 ISSN 0016-7010 OCTOBER 2001



In this issue: • European Research Facilities • Most-Cited *GCA* Refs • Letters, Meetings, more...

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 ***G³*** (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.

OFFICERS - 2001

PRESIDENT	*Michael F. Hochella, Jr., Virginia Polytechnic Institute*
VICE PRESIDENT	*Judith McKenzie, ETH, Zurich*
PAST PRESIDENT	*Michael J. Drake, University of Arizona*
SECRETARY	*Jeremy B. Fein, Notre Dame University*
INTERNATIONAL SECRETARY	*Eiichi Takahashi, Tokyo Institute of Technology*
TREASURER	*Rebecca Lange, University of Michigan*
CHAIR, OGD	*Mike Engel, University of Oklahoma*
SECRETARY, OGD	*Peggy Ostrom, Michigan State University*

DIRECTORS

Everett L. Shock, Washington University
K. Vala Ragnarsdottir, University of Bristol
Thure Cerling, University of Utah
Albrecht W. Hoffman, Max Planck Institut fur Chemie
Roberta L. Rudnick, Harvard University
Ed Sholkovitz, Woods Hole Oceanographic Institution

EDITORS

GEOCHIMICA ET COSMOCHIMICA ACTA	*Frank Podosek, Washington University*
GEOCHEMICAL NEWS	*Johnson R. Haas, Western Michigan University*
	Carla M. Koretsky, Western Michigan University
INTERNET COORDINATOR	*Bob Nichols, Washington University*
SPECIAL PUBLICATIONS AND REVIEWS IN MINERALOGY AND GEOCHEMISTRY (CO-EDITOR)	*Scott Wood, University of Idaho*

THE GEOCHEMICAL NEWS
OCTOBER 2001

Editors
Johnson R. Haas (Dept of Chemistry)
Carla M. Koretsky (Dept of Geosciences)
Western Michigan University
Kalamazoo, MI 49008
phone: 616-387-2878
fax: 616-387-2909
email: geochemical-news@wmich.edu

Associate Editors
Janne Blichert-Toft (Laboratoire de Sciences de la Terre, Lyon, France)
Yoko Furukawa (Naval Research Laboratory, USA)
Mitch Schulte (NASA Ames Research Center, USA)
Angelina W. M. G. Souren (Armadillo Research, Amsterdam, Netherlands)
Nathan Yee (University of Leeds, Great Britain)

CONTENTS

Letter from the President 3
by Mike Hochella
Letters to the Editors 4
Editor's Corner 5
GS Business Office News 6
Calls for Nominations 7
Book Reviews 8
Laser Ablation ICPMS in the Earth Sciences: Principles and Applications
Edited by Paul Sylvester
European Research Facilities 9
The Centre de Recherche Pétrographiques et Géochmiques CNRS
In Memoriam: *Glen Cass* 15
Feature: 16
The Most-Cited *GCA* Articles of the Past Fifty Years
Positions Announcements 18
Meetings Announcements 20
Meetings Calendar 24

POSTMASTER: Send address changes to The Geochemical Society, Dept of Earth and Planetary Sciences, Washington University, One Brookings Drive, St.Louis, MO 63130-4899, USA.

LETTER FROM THE PRESIDENT

This is the last President's letter that I will have the opportunity to write. My two-year term is up at the end of December, and as I move over to fill the role of Past President, Judith McKenzie of ETH (Switzerland) will become President, and Tim Drever of the University of Wyoming (USA) will become Vice-President. So now seems like a good time to reflect on the overall state of the Society from 2000 through 2001. Where have we gone, where are we going, and what can we do better?

Several things have happened in the last two years that have added significant and fundamental strength to our Society and the community that we represent. I think it most appropriate to start with GCA, the flagship of our Society. I cannot remember when the journal was in such a healthy state, when our relationship with Elsevier was as strong and constructive, and when the future looked so promising. Frank Podosek and his staff are taking a journal with a lofty (in fact enviable!) impact factor and an enormous reputation and somehow making it even better. Concerning another aspect of our publishing enterprise, co-producing Reviews in Mineralogy and Geochemistry is a dream come true for us. This series was formerly the highly successful Reviews in Mineralogy that the Mineralogical Society of America built to huge prominence. Now it is an integral part and vastly important mission of our Society as well. Next, the electronic journal G-cubed (or Geochemistry, Geophysics, Geosystems) is jointly sponsored by AGU and the GS. It is the first successful electronic journal in the field of geochemistry. You can check it out at www.g-cubed.org/. Finally, the Geochemical News has added a very important partner, the European Association of Geochemistry. This is just another step in the process that I hope one day will allow our Societies to completely join forces. And in a leap to become truly international, we have arranged for the first Goldschmidt meeting to be held outside of Europe and North America, that being the Japan Goldschmidt in 2003 hosted by the large and outstanding Geochemical Society of Japan.

On the financial front, we now have for the first time a highly successful professional money manager handling our investments, and our endowment is in an excellent position for long-term growth. Our investments are allowing us to do more as a Society. For example, we are able to distribute the Geochemical News to EAG members at no cost to them (although they will become a full financial partner in GN next year). We have recently started the Meetings Assistance Program, where conveners can apply for $2,000 grants to help fund their geochemically-related meetings. We give $10,000 each year to the Goldschmidt meeting to support student travel, and we support a business office and a manager, Seth Davis, who provides first-class service to our members.

We have also seen recent changes to our awards structure. Along with our major medals and awards (Goldschmidt, Patterson, and Clarke Medals, and GS/EAG Fellowships), we have recently created a Distinguished Service Award which will be given for the first time in 2002. This award will recognize greatness in terms of service to the Society and it members, or to society at large. Finally, because it is typically more of a challenge to select a winner among an increasingly talented and growing young scientist pool, we have changed the bylaws allowing more than one Clarke Award per year in exceptional cases.

The only disappointment for me over the last two years is the number of members. Of the 925 geochemists/mineralogists/petrologists that attended the Goldschmidt meeting in Virginia last spring, only about 300 were GS members. As hard as it is to believe, the majority of our own Fellows and medal winners are not members. Although we are back over 1,500 members for the first time in a few years, this Society should have twice that membership, or even more. More members, as we clearly could have, would give the Society extra financial strength that we could put to very good use for the common good. For example, I am referring to financial strength that would allow us to start giving graduate student scholarships, to begin a distinguished lecturer program, to increase the frequency of our newsletter, and so on. We must, and we will, find strength in numbers in the future. We have plans now in place to grow the membership significantly in the near future, and we will be successful.

And finally, over the last two years, I have had the pleasure of working with an active and engaged Board of Directors, as well as an Executive Committee, a business manager, and a GCA Executive Editor, all of whom deal with Society business on a daily basis. Here I'd like to single out one Executive Committee member who retires at the end of this year as a GS Officer. He is Dave Wesolowski of Oak Ridge National Labs. Dave has served as Society Secretary for the past six years under three Presidents. Six years is a long time, and the work that he has done for us is absolutely enormous. Because of his example, we now pay attention to details, and we run a much tighter ship. He has set a new standard for Society function, and the Society is far better for it. Dave will be missed.

As we approach our 50th anniversary, let us join together in appreciating the enriching contributions of geochemistry to the understanding and protection of this planet for the good of all. We as scientists have much to be proud of, and much more still to look forward to.

Kind regards to all,
Mike Hochella
GS President

COVER: Ion probe images of the chemical (C, O, Si and Al) and isotopic (D and H) compositions of interplanetary dust particles (IDP) (imaged by a 1270 ims Cameca ion-probe at the CRPG-CNRS - PhD thesis Jérome Aléon). The different masks (top right) are used to identify in the IDP different regions (red Si-rich,green C-rich, blue D-rich). John Ludden.

LETTERS TO THE EDITORS:

Dear Editors,

I read with considerable interest in the Geochemical News #108 Keith Kvenvolden's proposal to rename the Organic Geochemistry Division of the Geochemical Society as the Organic Geoscience Division, which to me is a completely ambiguous designation. Nevertheless, according to Keith, this name change would facilitate recognition that Organic Geochemistry includes subject matter in fields such as Biogeochemistry and Organic Cosmochemistry. While this is certainly true to a limited extent, I do not agree with the implication that Biogeochemistry should be considered to be a subdiscipline of Organic Geochemistry, any more than Molecular and Cell Biology, Genomics, Protein Science, or Biochemistry should be regarded at universities as subdisciplines of Organic Chemistry. In any event, a cosmetic name change will not alter the fact that Biogeochemistry is an exploding discipline that goes far beyond what is encompassed in Organic Geochemistry today. If anyone doubts this, a cursory examination of the tables of contents in a few issues of the journal of Organic Geochemistry and/or the Proceedings of the International Meetings on Organic Geochemistry will clear up such doubts.

Much of what is called Organic Geochemistry today is driven by pyrolysis (and other phenomenological experiments) and/or gas chromatography (and other laboratory techniques) for analyzing organic compounds such as hydrocarbons, lipids, and various biomarkers in organic matter in soils, sediments, and riverine, lacustrine, estuarine, and marine environments, as well as in kerogen and crude oil in hydrocarbon source rocks and reservoirs. Contrary to Kvenvolden's assertion, this is not simply perception, but reality. In contrast, Biogeochemistry is concerned with the influence of biology on geochemistry and vice versa in a multitude of diverse processes. These include those involved in the origins of life, the subsurface biosphere, enviromental contamination and remediation, metabolic reactions and life in hydrothermal systems and other "extreme" environments, and the interaction of microbes with mineral surfaces. Biogeochemistry is also concerned with enzymatic catalysis, bioinformatics, and the relative stabilities of biomacromolecules such as proteins and nucleic acids in biogeochemical processes at both high and low temperatures and pressures, as well as with many other interdisciplinary areas between biology, chemistry, and earth and planetary science, including organic, molecular, and inorganic Biogeochemistry. Hence, it covers a broad spectrum of interdisciplinary experimental, observational, theoretical, and computational research that goes far beyond what is normally associated with either Biochemistry or Geochemistry.

I think it's high time to recognize explicitly as a society the incredible scope, depth, breadth and potential of present and future research in Biogeochemistry by forming a Biogeochemical Division of the Geochemical Society. Such a Division would compliment the Organic Geochemistry Division. At the same time it would provide a forum for direct interaction with biochemists, molecular and cell biologists, biophysical chemists, enzymologists, microbiologists, and other members of the life sciences community. Hopefully, many of them would join the Geochemical Society and the Biogeochemical Division and in the process contribute substantially to research progress and diversity in this emerging interdisciplinary field.

In my opinion, the potential impact of Biogeochemistry today is just as great or even greater than that of Geochemistry itself at the birth of the Geochemical Society in 1955. Much of the promise of that society and its goals had its beginnings in the Seminar Series in Geochemistry organized in the academic year 1957/58 by Philip Abelson and held at the Geophysical Laboratory and The Johns Hopkins University, which led to publication of Researches in Geochemistry in 1959, and later its sequel, Researches in Geochemistry, Volume 2, in 1967. Perhaps we need such a seminar now in Biogeochemistry and ensuing Researches in Biogeochemistry volumes to recognize and document the major advances being made and those that are likely to develop as this interdisciplinary field unfolds and grows exponentially in the coming years.

I firmly believe in the future of Biogeochemistry and its potential benefit to society, especially (but not only) through its influence on developments in medicinal chemistry, drug design, and biotechnology. The time is ripe, and I believe failure to form a Biogeochemical Division of the Geochemical Society will result in a rival Biogeochemical Society. In that connection, I think a Journal of Biogeochemistry is long overdue, as is membership in the Geochemical Society by biochemists who are interested in the inorganic-biogeochemical interface. At present, Biogeochemistry is not even listed as an Interest Area on the Application Form for membership in The Geochemical Society. Yet biogeochemical topics have been prominent in the programs of the last two Goldschmidt Conferences and (as noted by Kvenvolden) the Geological Society of America has already formed a Division of Geobiology and Geomicrobiology, and the American Geophysical Union has recently established a Biogeosciences Division that incorporates Biogeochemistry, Biogeophysics, and Planetary Ecosystems. Until the Geochemical Society officially wakes up to the Biogeochemical reality of today and tomorrow, NSF is unlikely to do so. We need both a Biogeochemical Division of the Geochemical Society to promote biogeochemical research and a Biogeochemistry Program at NSF to fund it!

Professor Harold Helgeson
Geology and Geophysics
University of California, Berkeley
Berkeley, CA 94720-4767
brogie@garnet.berkeley.edu

EDITOR'S CORNER…

We had originally intended to announce here some of the evident format changes in this issue of *GN*; full-color cover, consolidated meetings and positions announcements, etc. But after the terrorist attacks of September 11, 2001, it felt to us that crowing optimistically about style issues would be inappropriate. Instead we'd like to express our sympathy and our solidarity with those members of our scientific community, their families, and all others affected by the terrorist attacks in New York City and Washington, DC. Although the attacks took place on United States soil, those harmed directly and indirectly hail from nearly every nation on Earth. They are ourselves, our colleagues, our fellow citizens, and our fellow human beings.

The global fabric of our scientific community was asserted personally to us mere hours after the attacks of September 11th. Colleagues, friends, even those requesting reprints emailed to us from overseas to express their concern and their support. We thank those who contacted to offer their condolences, and we'd like to extend thanks to all of those outside the USA who have continued to offer aid and encouragement at this fateful moment in history.

As reaction to the terrorist attacks reverberates all of us are sure to be affected, either directly as victims of terrorism or indirectly as victims of the resulting societal disturbance. For some of us travel to foreign conferences, to field work, or to collaborate with colleagues across the planet may become difficult or impossible. Already some meetings have been cancelled, others postponed. We would like to offer our support and our assistance to the GS membership where possible. *GN* will publish updated conference schedules, reports detailing field travel advisories, and other pertinent news affecting our profession, as this information is made available to us.

We hope our members, their families and their colleagues were unharmed in last months' attacks. We offer our condolences to those in our community who fell in harm's way. And again we thank our international society and its constituents for their continuing friendship. Until next issue…

Regards,

Johnson R. Haas, Ph.D.
Carla Koretsky, Ph.D.
Editors

WHO WANTS TO HOST A GOLDSCHMIDT CONFERENCE?

Proposals are now being accepted for the 2005 conference to be held at a USA location. Contact the GS office with your ideas (office@gs.wustl.edu). The proposed venue must allow for modern technical presentations and accomodations for 1000+ attendees, ideally in a scenic location.

CORRECTIONS!

• Please note that dates for the 2002 V. M. Goldschmidt Conference, listed on the cover and page 20 of the July 2001 Geochemical News, are incorrect. The correct dates are:

2002 V. M. Goldschmidt Conference
Davos, Switzerland
August 18 - 23, 2002

• Also note that that nominations for the 2002 Goldschmidt Award should be sent to:

Professor Robert Berner
Dept. Geology and Geophysics
Yale University
210 Whitney Avenue
New Haven, CT 06520-8109, USA
Tel: 1-203-432-3183 / Fax: 1-203-432-3134
Email: berner@hess.geology.yale.edu

VISIT THE ONLINE GOLDSCHMIDT CONFERENCE SURVEY!

Have you attended a Goldschmidt meeting in recent years? Do you plan to attend one in future? Visit our online meeting survey and register your opinions at:

http://unix.cc.wmich.edu/~jhaas/survey.html

Help the volunteers who organize these meetings take your needs into account. Results will be compiled and published in an upcoming issue of *GN*.

Geochemical Society Business

Please address all inquiries and correspondence to:

Seth Davis
Earth & Planetary Sciences
Washington University
One Brookings Drive, Box 1169
St. Louis, MO 63130, USA
Tel: 314-935-4131 Fax: 314-935-4121
Email: office@gs.wustl.edu

GEOCHEMICAL SOCIETY BUSINESS OFFICE NEWS

Membership

The 2002 Membership Drive will begin soon with various e-mails and postal mailings. As this issue of GN goes to press, the Board of Directors is still addressing some final concerns before the drive can officially begin.

Please check your contact information listed on the mailing address of this issue for accuracy (especially the e-mail address listed below your address). If an e-mail address is not listed or is incorrect, please send your updated information to the Business Office (gsoffice@gs.wustl.edu). The accuracy of this information is vital for the renewal season, and for maintaining member services. This information is also available on the website (http://gs.wustl.edu/members/). Your last name must be entered identically to how it appears on the mailing label for your information to be retrieved.

Subscription

The GCA back issue log is continuing to dwindle as Elsevier improves this service. If you have not received your back issues within 10 weeks of the request date, please contact the Business Office and I will follow-up on it.

Publication

Please note that all RiM&G orders MUST be payable to the MSA and go to their business office in Washington, D.C. Geochemical Society Special Publication Volume 7: Tribute to David A. Crerar is due for release at the end of December 2001! The Business Office should be able to start processing orders for the volume beginning with the January 2002 issue of Geochemical News. And, because of the release of the next special publications volume, the reduced set rate (Vol. 1-6 for $120.00) will not be available after December 31, 2001.

Website

The announcements page (http://gs.wustl.edu/announce/) is currently running calls for nominations for 2002 Geochemistry Fellows, and the 2002 Goldschmidt, Clarke, and Patterson Awards. The deadline for both calls is November 15, 2001.

Conferences

For complete listings of conferences refer to the listings in this issue or on the website at http://gs.wustl.edu/conferences/

And, as always if you have any questions or concerns about your membership or GCA subscription, please contact me at the business office.

Cheers,

Seth Davis
GS Business Manager
Washington University
Earth and Planetary Sciences
One Brookings Drive, CB 1169
St. Louis, MO 63130-4899, USA
Ph. 314-935-4131
Fx. 314-935-4121
Email: gsoffice@gs.wustl.edu
Website: http://gs.wustl.edu

A Message from the GS Secretary to all Geochemical Society and European Association of Geochemistry Members:

Please note that a mistake was made in the contact listing for nominations packages for the V.M. Goldschmidt Award that appeared in the July 2001 issue of The Geochemical News. DrRobert A. Berner of Yale University is the new Chairperson of the award committee. Listed below is the advertisement in its entirety, including Dr. Berner's correct contact information. Please take the time to consider nominating your worthy colleagues for the Geochemical Society's 2002 awards (Goldschmidt, Clarke and Patterson Medals). The call for nominations for the Treibs Medal of our Organic Geochemistry Division is separately listed in the newsletter.

The Geochemical Society 2002 Awards Nominations

V. M. GOLDSCHMIDT AWARD

The V.M. Goldschmidt Award shall be made for major achievements in geochemistry or cosmochemistry, consisting of either a single outstanding contribution, or a series of publications that have had great influence on the field. The award will normally be given annually at the V.M. Goldschmidt Conference. Current members of the Geochemical Society Board of Directors and past recipients of the award are ineligible for nomination. Nominations should specify the name, address, and chief fields of specialization of the nominee, and be accompanied by a curriculum vitae and bibliography of the nominee, limited to two pages each, and up to three supporting letters. Nominations should also be accompanied by a letter from the nominator giving name, address, phone number, signature, and a brief summary of why the candidate is suitable for the award. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: P.W. Gast (1972), R.M. Garrels (1973), H.E. Suess (1974), H.C. Urey (1975), H.P. Eugster (1976), S. Epstein (1977), G.J. Wasserburg (1978), H. Craig (1979), C.C. Patterson (1980), R.N. Clayton (1981), K.B. Krauskopf (1982), S.S. Goldich (1983), A.O. Nier (1984), J.B. Thompson (1985), C.J. Allégre (1986), W.S. Broecker (1987), H.C. Helgeson (1988), K.K. Turekian (1989), E. Anders (1990), A.E. Ringwood (1991), S.R. Hart (1992), S.R. Taylor (1993), H.D. Holland (1994), R.A. Berner (1995), A.W. Hofmann (1996), D. Lal (1997), W. Stumm (1998), J.L. Bischoff (1999), G. Eglinton (2000), I. Kushiro (2001)

Nominations for the 2002 V.M. Goldschmidt Award should be submitted before November 15, 2001, to:

Dr. Robert A. Berner
Dept. Geology and Geophysics
Yale University
210 Whitney Avenue
New Haven, CT 06520-8109, USA

Telephone: 1-203-432-3183
Fax: 1-203-432-3134
Email: berner@hess.geology.yale.edu

F. W. CLARKE AWARD

The F.W. Clarke Award shall normally be made annually at the V.M. Goldschmidt Conference to an early-career scientist for a single outstanding contribution to geochemistry or cosmo-chemistry, published either as a single paper or a series of papers on a single topic. Eligibility for this award is met if either of the following criteria is satisfied on the first day of the year in which the award is given: (a) the candidate must have received a recognized doctorate or its equivalent within the last six (6) years; or (b) must not have celebrated their thirty fifth (35th) birthday. Current members of the Board of Directors and past recipients of the award are ineligible for nomination. The Clarke and Patterson medals cannot be awarded for the same accomplishment. Nominations should specify the name, address, and chief fields of specialization of the nominee, and be accompanied by a copy of the paper(s) for which the nominee is being considered for the award, and up to three supporting letters. Nominations should also be accompanied by a letter from the nominator giving name, address, phone number, and signature, together with a brief statement explaining the significance of the nominee's work. This letter should also specify the nominee's date of birth and final degree received, the degree advisor's name, the year granted, and the name of the granting institution. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: D.A. Papanastassiou (1972), H. Ohmoto (1973), L. Grossman (1974), D. Walker (1975), J.R. Wood (1976), B. Mysen (1977), D.J. DePaolo (1978), A.C. Lasaga (1979), R.W. Potter (1980), J.F. Minster (1981), P.J. Patchett (1982), E.B. Watson (1983), A. Mackenzie (1984), E.M. Stolper (1985), M.D. Kurz (1986), E. Takahashi (1987), F.M. Phillips (1988), R.J. Walker (1990), D. Sherman (1991), E. Klein (1992), Y Zhang (1993), C. Agee (1994), R. Lange (1995), P.M. Dove (1996), J. Blundy (1997), M. Humayun (1998), A.M. Scheidegger (1999), J. Farquhar (2000), C.C. Lundstrom (2001)

Nominations for the 2002 F.W. Clarke Award should be submitted before November 15, 2001, to:

Dr. Margaret L. Delaney
Ocean Sciences, 1156 High Street
University of California
Santa Cruz, CA 95064 USA

Telephone: 1-831-459-4763
Fax: 1-831-459-4882
Email: Delaney@cats.ucsc.edu

CLAIR C. PATTERSON AWARD

The Clair C. Patterson Award, for a recent innovative breakthrough in environmental geochemistry of fundamental significance, published in a peer-reviewed journal, will normally be made annually at the V.M. Goldschmidt Conference. The award has no age or career stage restrictions, but the Clarke and Patterson medals cannot be awarded for the same accomplishment. Current members of the Geochemical Society Board of Directors and past recipients of the award are ineligible for nomination. Nominations should include the name, address, and chief fields of specialization of the nominee, and be accompanied by a curriculum vita of not more than two pages, a list of no more than 10 peer-reviewed publications relevant to the accomplish-ment being recognized, and up to three support letters. Nominators should include a letter of not more than two pages, giving name, address, phone number, signature, and a brief description of the nominee,s contribution to environmental geochemistry. Awards are based solely on scientific merit, without regard to citizenship or membership in the Society.

Past Recipients: M.L. Bender (1998), R.L. Edwards (1999), E.A. Boyle (2000), F. M.M. Morel (2001)

Nominations for the 2002 Clair C. Patterson Award should be submitted before November 15, 2001, to:

Dr. Lynn M. Walter
University of Michigan
2534 C.C. Little Bldg.
Ann Arbor, MI 48109, USA

Telephone: 1-734-763-4590
Fax: 1-734-763-4690
Email: lmwalter@umich.edu

STUDENT ARTICLES WANTED!

Contributions are invited from undergraduate and graduate student authors. Meeting reports, review articles, interviews, or other good feature ideas are always welcome. If published in *GN*, principal authors receive a one-year membership in the Geochemical Society, including a subscription to *GCA*!

European Association of Geochemistry 2002 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 geochemistry. The award is based solely on scientific merit without regard to nationality and will normally be presented at The V.M. Goldchmidt Conference. Nominations for the H.C. Urey Award should be accompanied by a brief statement from the nominator outling the reason for the nomination and should also include an abbrieviated curriculum vitae and bibliography of the proposed candidate as well as several letters of support.

Past recipients: W.S. Broecker (1990), 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).

Nominations for the 2002 H.C. Urey Award should be submitted before 20 December 2001 to:

Prof. T.M. Seward
Institut für Mineralogie und Petrographie
ETH Zentrum
CH 8092 Zurich, Switzerland

Tel: +41 1 632 2227
Fax: +41 1 632 1088
E-mail: tseward@erdw.ethz.ch

Book Reviews

"LASER ABLATION ICPMS IN THE EARTH SCIENCES: PRINCIPLES AND APPLICATIONS" Edited by Paul Sylvester, Mineralogical Association of Canada Short Course Series Vol. 29.

Review by Philip E. Janney

Although modern geochemistry is based on a large number of analytical techniques, these comprise only a few main types and the development of a whole new class of analytical techniques is relatively infrequent. The advent of inductively-coupled plasma mass spectrometry (ICPMS) has revolutionized the measurement of elemental abundances and isotope ratios in geological and environmental materials. The coupling of ICPMS with in-situ sampling by laser ablation has yielded a new class of technique, arguably capable of combining the spatial resolution of the electron microprobe with the precision and sensitivity of the thermal ionization mass spectrometer. Laser-ablation ICPMS (LA-ICPMS) has been in development since the 1980s but it has only recently made the transition from an experimental technique confined to a few labs to a mature analytical technique that can be employed by non-specialists. The large number of quadrupole and magnetic sector ICPMS instruments sold with laser ablation systems to Earth Science departments over the past few years have vastly increased the number of potential users of this powerful method. However, LA-ICPMS is hardly foolproof and a good understanding of the strengths and weaknesses of the technique is needed to produce high-quality data

To meet this need, the Mineralogical Association of Canada (MAC) has published "Laser Ablation-ICPMS in the Earth Sciences: Principles and Applications" edited by Paul J. Sylvester, the latest volume (#29) in the MAC Short Course Series. This book covers the theory and application of LA-ICPMS to the measurement of trace element abundances and isotope ratios in geological materials. Three introductory chapters cover clearly and concisely the principles of quadrupole, single and double-focussing mass spectrometry, plasma ion sources, data acquisition/calibration and laser systems. The following four chapters explore the analytical nuances of LA-ICPMS: the use of collision/reaction cells to mitigate isobaric interferences, elemental fractionation during laser ablation, depth analysis and isotope ratio measurement. These seven chapters, several written by pioneers of the LA-ICPMS technique, provide a well-rounded description of the method and constitute a valuable reference for both experienced users and those new to the technique. The remaining seven chapters cover a wide range of LA-ICPMS applications to topics and materials as diverse as trace element analysis of fluid inclusions, mantle xenoliths, basaltic glasses, sulfides, whole-rock samples and biological materials, as well as U-Pb and Lu-Hf isotope geochemistry/ geochronology of igneous and metamorphic minerals. All of these chapters provide abundant details on instrumentation and analytical strategy and rigorously address issues of standardization and data quality, crucial for shaking the "semi-quantitative" label often attached to the LA-ICPMS technique in the past. Several chapters also include useful comparisons with data collected by competing techniques.

As an interested bystander to the world of laser ablation-ICPMS, I was very impressed by the depth and scope of the book. The discussions of how sampling variables (e.g., laser wavelength and power, geometry of ablation cell, type and flow-rate of carrier gas) affect ablation efficiency and inter-elemental fractionation, issues vitally important to the accuracy of LA-ICPMS data but often poorly understood, are particularly well explained. All of the articles in the book have abundant schematic drawings, photographs, time-series plots and tables that add greatly to the impact and clarity of the text. Some cutting-edge applications, such as the measurement of mass-dependent stable isotope variations, are only briefly mentioned, but there is only so much that can be fit into a moderate-length volume encompassing the entire LA-ICPMS technique. This book is an extraordinary value for its modest price and it will prove to be a boon for all current and potential LA-ICPMS users. Moreover, it should be read by anyone wanting to understand the basic theory or the practical complexities of how chemical and isotopic data are collected via this powerful and increasingly widely used technique.

EUROPEAN RESEARCH FACILITIES: The Centre de Recherches Pétrographiques et Géochmiques (CNRS)

CRPG-CNRS, 15 rue Notre Dame des Pauvres, B.P. 20, F-54501 Vandœuvre les Nancy France

http://www.crpg.cnrs-nancy.fr/

John Ludden, Jean Carignan, Marc Chaussidon, Etienne Deloule, Christian France-Lanord, Guy Libourel, Béatrice Luais, Bernard Marty, Laurie Reisberg, Raphaël Pik, and Michael Toplis

INTRODUCTION

The CRPG is located in Nancy in eastern France, a region that in the nineteenth and first half of the twentieth centuries was providing France with almost all its coal and iron resources. This industrial activity led to the opening of the French engineering school of geology (Ecole Nationale Supérieure de Géologie-ENSG), to train the required leaders in industry. An outgrowth of the ENSG, the Centre de Recherches Pétrographiques et Géochimiques (CRPG), was created in 1953 as a laboratory of the Centre National de Recherche Scientifique (CNRS) with a mandate to develop research in geochemistry and petrology, and to provide analytical and research expertise for French geologists in ore exploration around the world. The CRPG is now the central research focus of a strong environment of teaching and research in geology that includes five different research laboratories associated with the Institut National Polytechnique de Lorraine (INPL) and also the Université Henri Pointcarré of Nancy, involving more than 250 CNRS researchers, university scientists, engineers and technicians. Early pioneering work in spectrochemistry by Kuppusami Govindaraju set the scene for a research specialisation in analytical geochemistry. In the 70's and 80's Francis Albarède and Simon Sheppard assured the place of the CRPG as a leader in mass spectrometry. This expertise resulted in the CNRS establishing two French national facilities as part of the CRPG-CNRS: the Service d'Analyse des Roches et des Minéraux (SARM) in 1972 and the CRPG Ion-Probe facility in 1998. Over the past 10 years the research areas of the CRPG have evolved away from the more traditional solid earth themes to those of cosmochemistry, kinetics of magmatic processes, crustal-geodynamics and the development of geochemical tracers in modern environments and paleoenvironments. The development of these research themes has been made possible by start-of-the-art analytical laboratories such as the ion probe laboratory, established by Marc Chaussidon and Etienne Deloule, which runs 3f and 1270 ims ion microprobes, the noble gas laboratory established and run by Bernard Marty and, recently, Raphael Pik (two static ms including a VG5400 machine), the stable isotope laboratory run by Christian France-Lanord, the clean laboratories and TIMS instrument run by Laurie Reisberg, more recently, a Micromass ICP-MS-MC with magnetic sector set up by Jean Carignan and Béatrice Luais. The CRPG also hosts the high temperature experimental laboratories of Guy Libourel and Mike Toplis. All of the geochemists have strong interactions with field petrologists and structural geologists of the associated universities.

COSMOCHEMISTRY AND EARLY EARTH PROCESSES

The installation of the high-resolution and multi-collection ion-probe, the development of a noble gas facility, and the recent acquisition of a Micromass multicollector ICP-MS have been the analytical force behind developments in cosmochemistry. In addition, high-temperature furnaces have been developed where the gas pressure of alkali elements (e.g. K or Na) can be controlled, so that the transfer of these elements from the Solar nebula gas to the solids can be experimentally reproduced. An experimental system nicknamed the "Nebulotron" (Fig. 1) has been developed to simulate reactions for high temperature processes such as condensation, evaporation and gas-solid reactions. In this apparatus the high temperature condensates are collected on metal plates and the thin films deposited can be analysed with the high-resolution 1270 ims ion microprobe for their chemical and isotopic compositions. Other original aspects of the "Nebulotron" experimental approach headed by Guy Libourel concern the study of the composition of the magnetite rims which develop on micrometeorites when they enter the Earth's atmosphere and the calibration of the relationship between composition and parameters such as the entry velocity, the entry angle and the fO_2 for meteorites (Toppani et al., 2000)

The CRPG specialises in using the ims 3f and 1270 ims ion microprobes to perform isotopic analysis of light elements (H, Li-Be-B, C, N and ^{17}O in addition to ^{18}O and ^{16}O). Major developments with the ion probe include the measurement of D/H ratios in nearly anhydrous phases, the measurement of $^{7}Li/^{6}Li$ and $^{11}B/^{10}B$ ratios at the ppb-ppm level for Li and B and the analysis by depth profiling of the H, Li, C and N isotopic compositions of the thin films present on the surface of grains from lunar soils which have been exposed to the Solar wind, galactic cosmic rays and meteoritic bombardment. These developments are the basis of long term ongoing projects concerning the distribution and origin of H and water in the Solar system (Etienne Deloule & Francois Robert) and the cosmochemistry of Li-Be-B. Notable are the finding of traces of an irradiation event in the early Solar system from the observation of B isotopic variations and the discovery of the presence of short lived ^{10}Be (Chaussidon and Robert, 1999), and the study of the isotopic composition of the Solar wind

resulting in finding in the Solar wind of traces of ^{6}Li and of very light, most probably protosolar, N (Fig. 2, Wieler et al., 1999; Hashizume et al, 2000).

The major recent development in gas analysis concerns the measurement of the isotopic composition of N and noble gases in single micrometer size grains by using laser extraction. This permits an unprecedented scale of investigation of N and rare gas distribution and isotopic composition in extraterrestrial material and has been used to study such materials as single grains from Lunar soils, individual minerals from chondrites and Martian meteorites. All these studies are aimed at better understanding the planetary evolution of volatiles and are combined with studies of terrestrial rocks such as carbonatites, plumes and oceanic lavas (Dauphas and Marty, 1999).

Developments are currently in progress with the MC-ICPMS (Isoprobe, Micromass) to undertake high precision

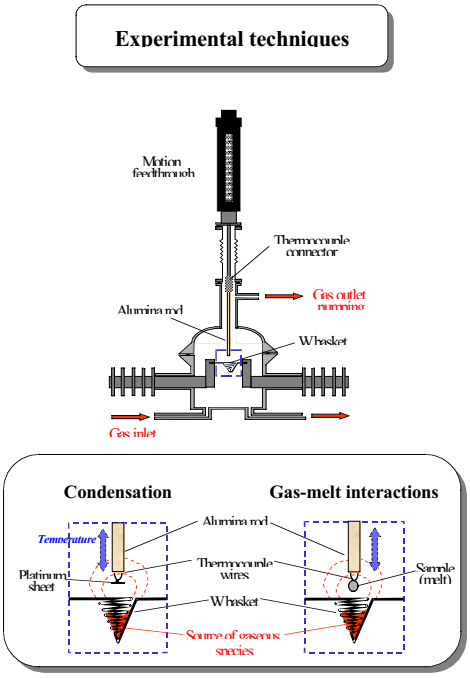


Fig.1 The reaction cell in the Nebulotron which is used to simulate the condensation processes in the early solar nebula (Tissandier et al., 2000).

analyses of the isotopic composition of elements such as Mo (Dauphas et al., 2001) or Ge (Béatrice Luais) in iron meteorites and chondrites. These siderophile elements are clues in the understanding of the physiochemical conditions of core-mantle differentiation and the possible isotopic heterogeneity of the solar nebula.

KINETICS OF MAGMATIC SYSTEMS

Study in the field of magmatic processes is centred on the identification and quantification of heat and mass transfer in magmas, with particular emphasis on the kinetics of these exchanges. Our approach combines field studies, petrographic and geochemical study of natural samples, and experimental petrology. Exchanges over a wide range of length scales are

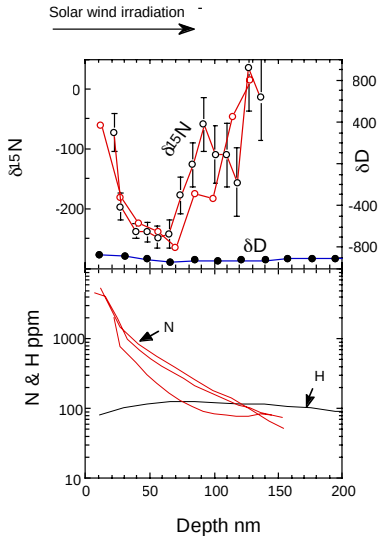


Figure 2 - Depth profile for H and N concentrations and isotopic compositions in grains from Lunar soil samples. These profiles allow deciphering of the N isotopic composition of solar wind (after Hashizume et al., 2000).

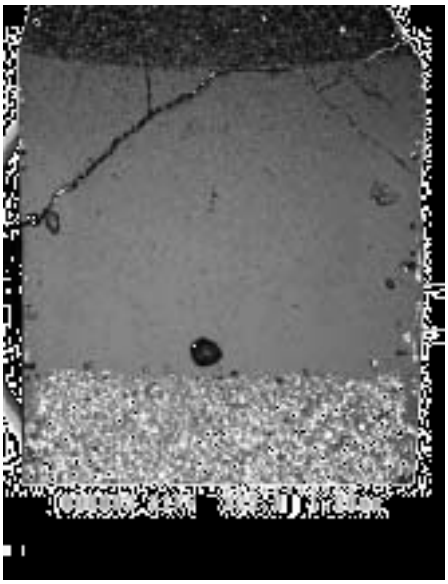


Fig. 3. Electron microscope image of an experiment involving the centrifuge furnace at 1250°C showing plagioclase flotation over a basaltic liquid (glass). Note the accumulation of Fe-Ti minerals at the base of the experimental charge. These experiments, coupled with ion-probe analyses will be used to simulate magma chamber evolution and also planetary differentiation.

considered, from those between Earth-scale reservoirs (i.e., mantle melting, genesis of the lower crust and exchanges associated with subduction - the Subduction Factory), to determination of chemical and isotopic gradients at the scale of individual mineral grains, including the formation of magmatic ore deposits (Maryse Ohnenstetter). Understanding the physical and chemical evolution of crustal magma chambers is one of our primary focuses of attention (Mike Toplis, Pierre Barbey, Bill Brown & Daniel Ohnenstetter), including study of the structures associated with the emplacement of plutons and the evolution of liquid/mineral compositions and textures during cooling. Basaltic systems are of particular interest at the present time, not only to understand terrestrial rocks such as those from layered intrusions (e.g. Skaergaard or Bushveld; Toplis and Carroll, 1996) but also to comprehend the fractionation processes which give rise to the chemical diversity of achondritic meteorites and to constrain the consequences of differentiation in a primitive magma ocean.

The experimental laboratory plays a pivotal role in these studies, primarily through determination of phase equilibria and elemental partition and diffusion coefficients. Recent experimental studies have centred on developing techniques to study and quantify the kinetics and mechanisms of crystal nucleation, growth, dissolution and the resulting (micro)textures. In addition, a novel centrifuge furnace capable of heating to 1250°C under accelerations 2000 times that of the Earth's gravitational field has recently been developed. This furnace will be used to study processes of mineral-liquid and mineral-mineral segregation and will provide an unprecedented opportunity to simulate the physical and chemical consequences of basaltic differentiation: Figure 3 demonstrates how the centrifuge furnace may be used to simulate crystal-liquid segregation in magmas which will be applicable to magma chambers and planetary differentiation.

GEOCHRONOLOGY AND THERMO-CHRONOLOGY OF THE LITHOSPHERE

One of the developments with the Cameca 1270 ims, which is now available as a service to French (and other) scientists, is routine in-situ U-Pb dating on zircons. The CRPG had anticipated the arrival of the 1270 ims ion probe in developing a zircon standard G91500 now used world-wide for in-situ analysis (Wiedenbeck et al., 1995). Within the CRPG U-Pb geochronolgy has been applied to ongoing projects in the Pyrenees and Massif Central (Alain Cheilletz, Dominique Gasquet) and in a French-Chinese cooperative project in Dabie Shan (Etienne Deloule).

The establishment of these different dating tools in the CRPG has the goal of studying the thermal and mechanic deformation of the lithosphere in recent orogens and links to processes of erosion and sedimentation at the surface. A recent innovation in the noble gas laboratory concerns the chronological potential of rare gas geochemistry. Efforts are focussed on the development of cosmogenic helium (^{3}He) dating and (U+Th)/He thermochronology. Associated with this activity is the study of the thermochronological aspects of helium diffusion parameters in U- and Th-bearing minerals, as well as calibration of natural mineral standards. The scientific applications of these new powerful dating techniques in the noble gas group by Raphael Pik provide an essential part of ongoing studies in erosion-tectonics. Current projects involve the study of the uplift and erosion processes of the Himalaya, the quantification of rift motion and activity in East Africa and their relationship to the Afar mantle plume. A new project has been initiated using radiogenic chronometers (Rb/Sr, Sm/Nd, U/Pb and (U+Th)/He thermochronology) during exhumation and cooling in the orogenic cycle of the Aegean islands (Stèphanie Duschène).

FLUIDS, GEMS AND THE HIDDEN BIOSPHERE

One of the traditional areas of research at the CRPG has been the study of fluids and metallogenetic processes. In the seventies a sub-group of the CRPG headed by Bernard Poty established a separate research centre located in Nancy with a specific orientation to Uranium mineralisation and fluids (CREGU). In the past years the CRPG has developed a series of fascinating research areas in the realms of gem deposits, in particular emeralds and rubies (Alain Cheilletz and Gaston Guilani). The ion-probe has been used to analyse ancient emeralds from collections and permitted tracing ancient trading routes for these gems and other products (Guilfiani et al., 2000).

One of the interesting applications of the new ICP-MS multi-collector instrument is the possibility of analysing the isotope composition of metals and metalloids in the low mass range. In particular Se, Mo, Sb, in addition to Fe, Cu and Zn isotopes may provide important means of differentiating biotic and abiotic processes in mineral-fluid interaction (Rouxel et al, 2001). Important in this project in progress, in association with the Subduction Factory (John Ludden) and the IFREMER, is the documentation of bio- geo-chemical reactions in basaltic alteration systems which may provide a reference against which extra-terrestrial samples can be compared.

NEW ISOTOPIC TRACERS FOR ENVIRONMENTAL GEOCHEMISTRY

Environmental geochemisty is a relatively new field of research at the CRPG. This is a result of the general trend in France and internationally towards the study of environmental problems in earth sciences and also the arrival of new technology, notably an ICP-MC-MS (Micromass-Isoprobe), the high-resolution Ion-probe and recently a continuous-flow Gas MS for D/H analysis in organic material at the CRPG. In particular, CRPG scientists have focussed on understanding of geochemical cycles of elements, including their source, their pathways and related processes affecting elemental speciation and elemental/isotopic fractionation. Projects are in progress on both natural systems, such as the erosion and weathering of continental and oceanic crust, and anthropic systems, such as the dispersion of heavy metals in the atmosphere and in hydro-

graphic basins. One of the common approaches between the projects is the development of new chemical and isotopic tracers and the testing of these tracers through experimentation in the laboratory and in natural systems in the field. One of the most exciting applications of the ion-probe to environmental problems is the ability to measure in-situ $\delta^{18}O$ and $\delta^{13}C$ and $\delta^{11}B$ at a spatial resolution of 10 μm in carbonate fossils such as coral. These data can be used to document high-resolution climate change, in addition to linkages in "vital" effects, pH, etc. during coral growth. These studies are illustrated here by a plot of $\delta^{18}O$ in corals in Fig. 4.

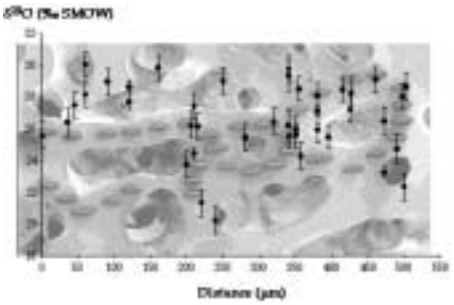


Fig.4. δ18O (SMOW) versus distance (μm) in a coral skeleton (PhD thesis Claire Rollion-Bard). The black circles correspond to the measurements in the ion probe spots of the SEM photograph . While conventional analyses of this sample give δ18O between 26 and 27 ‰, microanalyses vary over a range of 10 ‰ implying that the vital effect integrates a variety of processes. The error bars are ± 1 ‰ and represent the internal error of the measurement and the reproducibility determined on standards.

Atmosphere : Different sample types have been used to document the chemical and isotopic composition of the atmosphere, in order to examine variable integration times of sampling from minutes/hours (precipitation), months (snow packs), to years (epiphytic lichens). This approach, headed by Jean Carignan, allows us to document short-time scale heterogeneity of atmospheric composition at a given point, as well as to measure long-term average composition for atmospheric "mapping" and general process modelling. By comparing the metal concentration and the Pb isotopic composition measured in these different samples from a given area (northeastern North America), it is possible to observe seasonal variations and large changes in compositions related to major climatic conditions, such as El Niño and its effect on the position of the polar front in NE North America [Simonetti et al. 2000]. Furthermore, using the composition of lichens, it is possible to draw the first isotopic map of Pb dispersion in the atmosphere at the continent scale, and also to document small-scale isotopic gradients, related either to an important point source of anthropogenic emission or to the altitude of sampling, for which the gradient is produced by convection winds in the valleys (Fig. 5). The field areas where lichens are being studied for their metal composition are the coast of California, northwestern US and Canada, the Kola Peninsula in Russia and different areas of France. Currently research is in progress on the isotopic fractionation of base metals (Cd, Cu, Zn) during evaporation and condensation of these elements in order to trace such anthropogenic fractionation in the environment. Various other elements are studied to document sources and atmospheric transfer between large reservoirs like oceans and continents. For example, boron and halogens were measured in precipitation and lichens sampled along different sections from coasts inland (Rose et al. 2000).

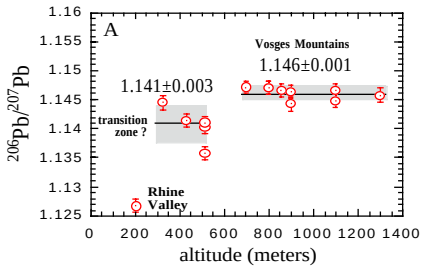


Fig.5. The $^{206}Pb/^{207}Pb$ ratios measured in lichens against the altitude of the sampling sites along a cross section in the Vosges Mountains (Doucet and Carignan 2001).

Groundwater resources and circulation: Understanding the movement of groundwater in basins is essential in economically important fields such as oil exploration, groundwater exploitation and nuclear waste disposal projects (Pinti et al., 1997). Studies of noble gases dissolved in groundwater (B. Marty) coupled with ^{14}C and stable isotope studies (C. France-Lanord) provide information on the ages of groundwater recharge, paleo-temperatures, residence time, flow paths and potential cross formational flows of groundwaters in basins. Current applications include the eastern part of the Paris sedimentary basin where the French Nuclear Waste Agency is developing an underground laboratory.

Erosion and weathering: The role of erosion on the carbon cycle throughout silicate weathering and organic carbon burial is at the centre of several projects developed by Christian France-Lanord at CRPG. In this theme of climate-tectonic interaction, our objectives are both to understand the processes which control the action of erosion and to study the cycle of possible global proxies of erosion such as isotopic compositions of oceanic B, C, Sr and Os (e.g., Rose et al., 2000; France-Lanord and Derry, 1997). In particular the radiogenic-isotope facility directed by Laurie Reisberg has provided critical information on the diversity of dissolved Sr sources in the Himalayan system and its decoupling with silicate weathering (Galy et al., 1999) and the recycling of Re-Os during erosion (Pierson-Wickmann et al., 2000). Most projects are developed on the Himalayan system by working at the same time on the modern river system and on sedimentary records in the Bengal fan and the Siwaliks. This approach allows us to understand

the processes of transfer of sediment from mountains to the ocean and to interpret records of erosion at different time scales from Quaternary to Neogene. The geochemical approaches use isotopic tracers for the provenance of detrital sediments, the geochemical budget of weathering and the extent of dissolved and particulate loads in rivers (Galy and France-Lanord, 2001). In terms of the carbon cycle, the main implications of our research are that Himalayan erosion acts as a major sink for carbon by organic carbon burial and that the budget through silicate weathering remains modest despite major physical erosion (Fig. 6).

The Moselle River, a French Natural Laboratory: A project close to our back door is part of a French natural laboratory, the Moselle River in northeastern France. One of the great advantages of studying this river is the relatively simple lithology of the catchment, which comprises silicate rocks (granitoïds, gneisses and sandstones) in the Vosges mountains source area and chemical sediments (limestones, dolomites, marnes) of the Lorrain plateau downstream. This situation is ideal to test new tracers which may mark differences between a silicate and a carbonate source of the dissolved load of the river water. In particular work is in progress by MC-ICP-MS to use the isotope systematics of major dissolved cations (Ca, Mg) coupled with Pb- and Sr-isotopic compositions to discriminate alteration processes and sources. Similar approaches will be applied to the Indian river systems and also the Aral Sea catchment in the near future. A novel approach along similar lines headed by Alain Ploquin involves the use of well mapped and historically dated Pb-Ag-mine scoria in southern France to study heavy-metal pollutants released in this hydrographic system over a 1000 year period.

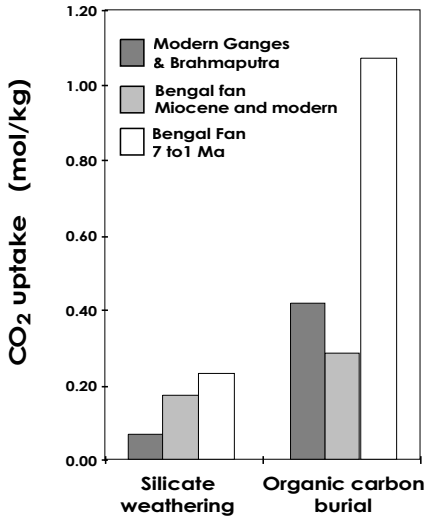


Fig. 6: Budget of carbon uptake per kg of eroded rocks during Himalayan erosion based on Bengal sediments and modern river particles (after France-Lanord and Derry, 1997 and Galy and France-Lanord, 1999).

REFERENCES

Chaussidon M. and Robert F. (1999) Lithium nucleosynthesis in the Sun inferred from the solar-wind $^{7}Li/^{6}Li$ ratio. Nature 402, 270 - 273.

Dauphas N., Reisberg L., and Marty B. (2001). Solvent extraction, ion chromatography, and mass spectrometry of molybdenum isotopes. Analytical Chemistry 73, 2613-2616.

Dauphas N. and Marty B. (1999). Heavy nitrogen in carbonatites of the Kola peninsula: a possible signature of the deep mantle. Science 286, 2488-2490.

Doucet, F. and Carignan, J. (2001) Atmospheric Pb isotopic composition and trace metal concentration as revealed by epiphytic lichens: an investigation related to two altitudinal sections in eastern France. Atmospheric Environment 35, 3681-3690.

France-Lanord C. and Derry L. A. (1997) Organic carbon burial forcing of the carbon cycle from Himalayan erosion. Nature 390, 65-67.

Galy A. and France-Lanord C. (1999) Processes of the weathering in the Ganges-Brahmaputra basin and the riverine alkalinity budget. Chemical Geology 159, 31-60.

Galy A. and France-Lanord C. (2001) Higher erosion rates in the Himalaya: geochemical constraints on riverine fluxes. Geology 29, 23-26.

Giuliani G., Chaussidon M., Schubnel H.J., Piat D.H., Rollion-Bard C., France-Lanord C., Giard D., Narvaez D., Rondeau B. (2000) Oxygen isotopes and emerald trade routes since the antiquity. Science, 287, 631-633.

Hashizume K, Chaussidon M., Marty B. and Robert F. (2000) Solar wind record on the moon: deciphering presolar from planetary nitrogen. Science, 290, 1142-1145.

Pierson-Wickmann A.-C., Reisberg L., and France-Lanord C. (2000) The Os isotopic composition of Himalayan river bedloads and bedrocks: Importance of black shales. Earth and Planetary Science Letters 176, 203-218.

Pinti D.L., Marty B. and Andrews J.N. (1997) Atmosphere-derived noble gas evidence for the preservation of ancient waters in sedimentary basins. Geology 25, 111-114

Rouxel O., Ludden L. and Fouquet Y. (2001) Selenium and Antimony isotope variations in natural systems determined by MC-ICP-MS: experimental and field studies. 4th International Symposium on Applied Isotope Geochemistry, June 25-29 2001, Pacific Grove, California, USA

Rose, E.F., Carignan, J. and Chaussidon, M. (2000) Transfer of atmospheric Boron from oceans to continents : an investigation using precipitation waters and epiphytic lichens. G-Cubed 1, AGU and Geochemical Society publication. 15 pages.

Simonetti, A., Gariépy, C. and Carignan, J. (2000) Pb and Sr isotopic evidence for sources of atmospheric heavy metals and their deposition budgets in northeastern North America. Geochimica et Cosmochimica Acta 64(20), 3439-3452.

Tissandier L., Libourel G., Robert F. and Chaussidon M. (2000) SiO_2 Condensation experiments and implications for protosolar materials. Lunar and Planetary Science Conference XXXI, #1553.

Toplis, M.J. and Carroll, M.R. (1996) Differentiation of ferro-basaltic magmas under conditions open and closed to oxygen: Implications for the Skaergaard Intrusion and other natural systems. J. Petrology 37, 837-858.

Toppani A., Libourel G., Engrand C. and Maurette M. (2000) Experimental simulation and modeling of atmospheric entry of micrometeorites. Meteoritics Planet. Sci. 35 suppl, A158.

Wiedenbeck M., Allé P., Corfu F., Griffin W. L., Meier M., Oberli F., von Quadt A., Roddick J. C., Spiegel W. (1995) Three natural zircon standards for U-Th-Pb-Lu-Hf, Trace Elements and REE analyses. Geostandards Newsletter 19, 1-23

Wieler R., Humbert F. and Marty B. (1999) Evidence for a non-solar origin of nitrogen in the lunar regolith revealed by single grain analyses. Earth Planet. Sci. Lett., 167, 47-60.

THE DAVID A. CRERAR TRIBUTE:

Volume 7 of the GS Special Publications Series is due for release in December 2001. Order information will be made available as the release date nears. Table of contents online at:

http://gs.wustl.edu/publications/sps7toc.pdf

Service National d'Analyse des Roches et des Minéraux (SARM) CNRS
http://www.crpg.cnrs-nancy.fr/SARM.

The Service d'Analyse des Roches et des Minéraux (SARM) is a CNRS Research Service which is part of the Centre de Recherches Pétrographiques et Géochimiques. The Service was founded in 1972, to harness the analytical potential of the CRPG and the needs of the geological community in France. The SARM is equipped with an ICP-AES and two ICP-MS instruments in addition to a series of "wet-chemistry" laboratories including AAS, CS analyser and spectrophotometer. The SARM is oriented towards multi-elemental packages of routine research quality geochemical data, in addition to analytical development and the preparation and characterisation of reference material for geochemical analysis. Routine element packages for the major elements, common trace elements, REE, Th, U, Sc and the noble metals in geological materials are provided to about 150 research laboratories and private companies annually. New elemental packages are in development for environmental earth sciences, notably in soils, waste residues, contaminated materials and natural waters. Please note that the SARM offers services to the finternational Earth Science community (see information and prices on the web site).

Geochemical Reference materials

Under the responsability of K. Govindaraju between 1963 and 1994, the SARM, in association with other international groups, prepared, characterised and distributed international geochemical reference materials. New materials, notably Komatiite KAL-1 and Limestone CAL-S are in preparation at the SARM. Please contact Jean Carignan, carignan@crpg.cnrs-nancy.fr, for information concerning their distribution.

Geostandards Newsletter
"*THE JOURNAL OF GEOSTANDARDS AND GEOANALYSIS*"
http://www.crpg.cnrs-nancy.fr/Geostandards/

Geostandards Newsletters was initiated at the CRPG by K. Govindaraju in 1977 as a means of exchange of information on geochemical reference materials. It has evolved into a full journal which over the past years has had an impact factor of 2 to 3. The Journal is now issued in 3 volumes a year. The upcoming issue includes papers from the Geoanalysis 2000 international conference. In addition to new analytical developments, recent issues include synthesis papers on "the state of the art" in analytical development including MC-ICP-MS, in Hf-isotope analyses etc, and are fundamental sources of information in particular for graduate students starting out in these fields of research.

Editors in chief : Philip Potts (Open University, UK), Mireille Polvé (University of Toulouse, France)
Business and publication manager: Edward Williams

SESSION ANNOUNCEMENT

FALL AGU 2001

BIOGEOSCIENCES SPECIAL SESSION: BIOLOGICAL MINERALIZATION

Joint with Ocean Sciences, Mineral and Rock Physics

CONVENERS

Patricia M. Dove
Department of Geosciences, 4044 Derring Hall
Virginia Polytechnic Institute and State University,
Blacksburg, VA 24061
Email: dove@vt.edu
Phone: (540) 231-2444; Fax: (540) 231-3386

James J. DeYoreo
Department of Chemistry and Materials Sciences
Lawrence Livermore National Laboratory
Livermore, CA 94550
Email: deyoreo1@llnl.gov
Phone: (925) 423-4240

SESSION DESCRIPTION

The abundance of biominerals throughout the ancient rock record, sediments, and the water columns of modern oceans chronicle the intertwined roles of biota and Earth history. These single crystals and mineral-organic composites possess remarkable morphological properties and chemical compositions that hold clues to their chemical and physical environments of formation.

Recent advances in the biogeochemistry, materials, and ocean science communities are deciphering the complexity of biomineralization processes and their environmental signatures. This new knowledge is driving a renewed interest in understanding the physical basis of biomineralization phenomena, signatures of chemical biomineral proxies, impacts of biomineral formation on biogeochemical cycles, and clues for unamiguously identifying minerals with biogenic origins. We invite papers to present new findings related to this rapidly developing research arena.

In Memoriam: GLEN CASS

Noted air-pollution expert Glen R. Cass, chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology, died of cancer July 30 in Durham, N.C. He was 54. Cass became chair of the School of Earth and Atmospheric Sciences at Georgia Tech in January 2000. He also was a professor of civil and environmental engineering at Georgia Tech and maintained a joint appointment at the California Institute of Technology, where he taught for 24 years. Among Cass' many research interests was the characterization of ambient air quality and air-pollutant source emissions.

A prolific scientist with more than 200 published articles, conference proceedings, book chapters, and technical reports to his credit, Cass' research focused on air pollution, with a particular emphasis on the control of airborne particles, photochemical oxidants, and improved visibility. He was instrumental in identifying the complex mix of airborne chemicals that pollute urban areas, especially in Los Angeles and the Northeastern United States.

Of special concern to Cass were very fine particles that can be inhaled and that contribute to haze and poor visibility. He once described haze as a "problem of worldwide note and local disgust." Cass earned widespread regard for both his professional achievements and personal integrity. He made a name for himself beginning in the 1980s by painstakingly seeking the myriad sources of air pollution in Los Angeles. "An urban environment like L.A. is one of the hardest places to take that on," said Christine Sloan, director of technical strategic development at General Motors, who collaborated with Cass on the project. Cass and his group ultimately generated a comprehensive database of source-emitted and ambient aerosol particles "that is without peer," said John Seinfeld, who holds the Louis E. Nohl Professor chair at Caltech's chemical engineering department. Sloan remembers Cass making measurements everywhere possible during their research collaboration, even inside fast-food restaurants. "He knew the difference between whether [the food was] fried or grilled, and even what kind of oil they used,"she said.

The long series of papers that resulted from this ongoing study "constitutes the definitive body of work on the chemical composition of organic aerosols," Seinfeld said. "His analytical chemistry was so meticulous that Glen was able to find traces of nicotine and cholesterol in atmospheric particles, markers for cigarette smoking and meat cooking in the ambient atmosphere. This body of work is of inestimable importance to air-pollution research."

In 1999, Cass initiated a global ozone study at 500 sites throughout the world that continues today. The effort includes seven monitoring stations in China and four in India and the Maldives. Seven sites in mainland China were monitored for Operation Blue Sky, which identified pollution sources in Beijing and other cities and whose results factored into China's 2008 Olympic bid.

Cass' research also turned to the protection of museum collections and archaeological sites from damage due to air pollution. He and colleagues modeled air quality both within and just outside several museums throughout Southern California, which was useful in evaluating the effectiveness of various measures to protect works of art. He led similar research efforts throughout the world. In China, for example, Cass helped design computer-based models that simulated the air flow into the Yungang Grottoes, a collection of man-made cave temples dating from the 5th century that hold more than 50,000 stone carvings. The grottoes are in the middle of one of China's largest coal-mining regions. Cass' work contributed to the design of particle-filtration systems and appropriate ventilation rates for reducing air pollution within the grottoes.

Cass was a member of the National Research Council's Board on Environmental Studies and Toxicology and the council's Committee on Research Priorities for Airborne Particulate Matter. He also was a member of the Health Effects Institute's Committee on Research Projects in Cambridge, Ma. Cass was a past member of the U.S. Environmental Protection Agency's advisory committee on Ozone, Particulate Matter and Regional Haze Implementation Programs and formerly served on the EPA's Clean Air Scientific Advisory Committee. He was on the editorial boards of the journals Aerosol Science and Technology and Environmental Science & Technology. His sponsored research included work for the Environmental Protection Agency, the California Air Resources Board, NASA, the Department of Defense, Exxon, and the Ford Foundation. Cass also obtained a patent for systems that reduce the deposition of fluid-borne particles.

Cass graduated summa cum laude in 1969 with a bachelor's degree in mechanical engineering from the University of Southern California. He earned his master's degree in mechanical engineering a year later from Stanford University. Cass' thesis, Sulfate Air Quality Management, earned him his doctorate in environmental engineering science and economics from California Institute of Technology in 1978.

Contributions can be made to the Georgia Tech Foundation for the Glen R. Cass Scholarship Fund. For more information contact Rita Bryan, (404) 894-3955 or by email. William L. Chameides, Regent's Professor and the Smithgall Chair in Atmospheric Sciences at Georgia Tech, will become acting chair of the School of Earth and Atmospheric Sciences. A search committee will be formed soon to find a new chair.

Source: Georgia Institute of Technology Communications and Public Affairs Office

THE MOST FREQUENTLY CITED ARTICLES IN *GEOCHIMICA ET COSMOCHIMICA ACTA*

by Yoko Furukawa, Stennis Space Center, Mississippi, USA

GCA has been one of the most influential journals in Geochemistry. Its weight can be seen by the number of citations it receives. Tracking its citation trend over the past years yields an insight into the recent history of our discipline. A bibliographic database, Science Citation Index Expanded (SCIE), published by Institute of Scientific Information, is used here to follow GCA's citations. Articles listed below, including the ones from 1950's, are still being widely studied and cited today. SCIE gives, for each of its journal article entries, the number of times the article is cited by other subsequent articles that appear in SCIE-indexed journals. More than 8,600 journals are indexed in SCIE, including GCA and other leading earth sciences journals.

GCA started in 1950. During the first decade (1950 - 1959), the most cited GCA articles as determined by the "times cited" numbers on SCIE database include (in alphabetical order):

Ahrens, L. H. (1952) The use of ionization potentials. I. Ionic radii of the elements. v.2, p.155.
Coombs, D. S., Ellis, A. J., Fyfe, W. S. and Taylor, A. M. (1959) The zeolite facies, with comments on the interpretation of hydrothermal syntheses. v.17, p.53.
Craig, H. (1953) The geochemistry of the stable carbon isotopes, v.3, p.53.
Craig, H. (1957) Isotopic standards for carbon and oxygen and correlation factors for mass-spectrometric analysis of carbon dioxide. v.12, p.133.
Epstein, S. and Mayeda, T. (1953) Variation of 18O content of waters from natural sources. v.4, p.213.
Friedman, I. (1953) Deuterium content of natural waters and other substances. v.4, p.89.
Goldberg, E. D. and Arrhenius, G. O. S. (1958) Chemistry of Pacific pelagic sediments. v.13, p.153.
Krauskopf, K. B. (1956) Factors controlling the concentrations of 13 rare metals in sea water. v.9, p.1.
Urey, H. C. and Craig, H. (1953) The composition of the stone meteorites and the origin of the meteorites. v.4, p.36.
Wiik, H. B. (1956) The chemical composition of some stony meteorites. v.9, p.279.

Many of these articles dealt with the stable isotopes, which had become one of the useful tools for geochemists. During 1960 - 1964, a variety of subjects, including marine sedimentary geochemistry, meteorites, organic geochemistry, geochemical thermodynamics, elemental compositions and stable isotope geochemistry, were discussed and became influential as seen in the following list of most cited articles:

Bray, E. E. and Evans, E. D. (1961) Distribution of normal paraffins as a clue to recognition of source beds. v.22, p.2.
Clayton, R. N. and Mayeda, T. K. (1963) The use of bromine pentafluoride in the extraction of oxygen from oxides and silicates for isotopic analysis. v.27, p.43.
DuFresne, E. R. and Anders, E. (1962) On the chemical evolution of the carbonaceous condrites. v.26, p.1085.
Goldberg, E. D. and Koide, M. (1962) Geochronological studies of deep sea sediments by the ionium-thorium method. v.26, p.417.
Kaplan, I. R., Emery, K. O. and Rittenberg, S. C. (1963) The distribution and isotopic abundance of sulphur in recent marine sediments off Southern California. v.27, p.297.
McIntire, W. L. (1963) Trace element partition coefficients - A review of theory and applications to geology. v.27, p.1209.
Park, R. and Epstein, S. (1960) Carbon isotope fractionation during photosynthesis. v.21, p.110.
Taylor, S. R. (1964) Abundance of chemical elements in the continental crust - A new table. v.28, p.1273.
Thods, H. G., Monster, J. and Dunford, H. B. (1961) Sulphur isotope geochemistry. v.25, p.159.
Toulmin, P. and Barton, P. B. (1964) A thermodynamic study of pyrite and pyrrhotite. v.28, p.641.

Geochemists continued to study stable isotope geochemistry and elemental compositions of geological materials during the following five years. Some of the favorite materials to become the subjects of investigations were igneous rocks and meteorites.

Bottinga, Y. (1969) Calculated fractionation factors for carbon and hydrogen isotope exchange in system calcite-carbon dioxide-graphite-methane-hydrogen-water vapor. v.33, p.49.
Flanagan, F. J. (1969) US Geological Survey Standards. 2. First compilation of data for new USGS Rocks. v.33, p.81.
Gast, P. W. (1968) Trace element fractionation and origin of tholeiitic and alkaline magma types. v.32, p.1057.
Gordon, G. E., Randle, K., Goles, G. G., Corliss, J. B., Beeson, M. H. and Oxley, S. S. (1968) Instrumental activation analysis of standard rocks with high-resolution gamma-ray detectors. v.32, p.369.
Green, D. H. and Ringwood, A. E. (1967) An experimental investigation of gabbro to eclogite transformation and its petrological applications. v.31, p.767.
Larimer, J. W. and Anders, E. (1967) Chemical fractionations in meteorites. 2. Abundance patterns and their interpretation. v.31, p.1239.
Murozumi, M., Chow, T. J. and Patterson, C. C. (1969) Chemical concentrations of pollutant lead aerosols, terrestrial dusts and sea salts in Greenland and Antarctic snow strata. v.33, p.1247.
Norrish, K. and Hutton, J. T. (1969) An accurate X-ray spectrographic method for analysis of a wide range of geological samples. v.33, p.431.
Sharma, T. and Clayton, R. N. (1965) Measurement of 18O/16O ratios of total oxygen of carbonates. v.29, p.1347.
Van Schmu, W. R. and Wood, J. A. (1967) A chemical-petrologic classification for chondritic meteorites. v.31, p.747.

Investigations of igneous and metamorphic rocks during the first half of 1970's have been extensively cited since then as the list below shows. Studies of meteorites also continued.

Flanagan, F. J. (1973) 1972 Values for International Geochemical Reference Samples. v.37, p.1189.
Frey, F. A. and Green, D. H. (1974) Mineralogy, geochemistry and origin of ilherzolite inclusions in Victorian basanites. v.38, p.1023.
Grossman, L. (1972) Condensation in primitive solar nebula. v.36, p.597.
Krogh, T. E. (1973) Low-contamination method for hydrothermal decomposition of zircon and extraction of U and Pb for isotopic age determinations. v.37, p.485.
Li, Y. H. and Gregory, S. (1974) Diffusion of ions in sea-water and in deep-sea sediments. v.38, p.703.

Masuda, A., Nakamura, N. and Tanaka, T. (1973) Fine structures of mutually normalized rare-earth patterns of chondrites. v.37, p.239.
Nakamura, N. (1974) Determination of REE, Ba, Fe, Mg, Na, and K in carbonaceous and ordinary chondrites. v.38, p.757.
Philpotts, J. A. and Schnetzler, C. C. (1970) Phenocryst-matrix partition coefficients for K, Rb, Sr and Ba, with applications to anorthosite and basalt genesis. v.34, p.307.
Schnetzler, C. C. and Philpotts, J. A. (1970) Partition coefficients of rare-earth elements between igneous matrix material and rock-forming mineral phenocrysts. 2. v.34, p.331.
Shaw, D. M. (1970) Trace element fractionation during anatexis. v.34, p.237.

The following GCA papers published during 1975 - 1979 have received more citations than others according to the SCIE database:

Arth, J. G. and Hanson, G. N. (1975) Geochemistry and origin of early Precambrian crust of northeastern Minnesota. v.39, p.325.
Deniro, M. J. and Epstein, S. (1978) Influence of diet on distribution of carbon isotopes in animals. v.42, p.495.
Evensen, N. M., Hamilton, P. J. and Onions, R. K. (1978) Rare-earth abundances in chondritic meteorites. v.42, p.1199.
Froelich, P. N., Klinkhammer, G. P., Bender, M. L., Luedtke, N. A., Heath, G. R., Cullen, D., Dauphine, P., Hammond, D., Hartman, B. and Maynard, V. (1979) Early oxidation of organic-matter in pelagic sediments of the eastern equatorial atlantic - suboxic diagenesis. v.43, p.1075.
LaFlamme, R. E. and Hites, R. A. (1978) Global distribution of polycyclic aromatic hydrocarbons in recent sediments. v.42, p.289.
Langmuir, D. (1978) Uranium solution-mineral equilibria at low temperatures with applications to sedimentary ore deposits. v.42, p.547.
Matsuhisa, Y., Goldsmith, J. R. and Clayton, R. N. (1979) Oxygen isotopic fractionation in the system quartz-albite-anorthite-water. v.43, p.1131.
Robbins, J. A. and Edgington, D. N. (1975) Determination of percent sedimentation rates in Lake Michigan using 210Pb and 137Cs. v.39, p.285.
Seifert, W. K. and Moldowan, J. M. (1978) Applications of steranes, tempanes and mono-aromatics to maturation, migration and source of crude oils. v.42, p.77.
Sholkovitz, E. R. (1976) Flocculation of dissolved organic and inorganic matter during mixing of river water and seawater. v.40, p.831.

In addition to the topics that had been discussed previously, organic geochemistry and sedimentary/marine geochemistry became well-cited topics. During 1980 - 1984, thermodynamics and kinetics of common geologic systems became prominent.

Berner, R. A. (1984) Sedimentary pyrite formation - an update. v.48, p.605.
Bowers, T. S. and Helgeson, H. C. (1983) Calculation of the thermodynamic and geochemical consequences of nonideal mixing in the system H2O-CO2-NaCl on phase relations in geologic systems - Equation of state for H2O-CO2-NaCl fluids at high pressures and temperatures. v.47, p.1247.
Deniro, M. J. and Epstein, S. (1981) Influence of diet on the distribution of nitrogen isotopes in animals. v.45, p.341.
Harvie, C. E., Moller, N. and Weare, J. H. (1984) The prediction of mineral solubilities in natural waters - The Na-K-Mg-Ca-H-Cl-SO4-OH-HCO3-CO3-CO2-H2O-system to high ionic strengths at 25°C. v.48, p.723.
Krogh, T. E. (1982) Improved accuracy of U-Pb zircon ages by the creation of more concordant systems using an air abrasion technique. v.46, p.637.
Plummer, L. N. and Busenberg, E. (1982) The solubilities of calcite, aragonite, and vaterite in CO2-H2O solutions between 0°C and 90°C, and an evaluation of the aqueous model for the system CaCO3-CO2-H2O. v.46, p.1011.
Rimstidt, J. D. and Barnes, H. L. (1980) The kinetics of silica-water reactions. v.44, p.1683.
Tipping, E. (1981) The adsorption of aquatic humic substances by iron oxides. v.45, p.191.
Turner, D. R., Whitfield, M. and Dickson, A. G. (1981) The equilibrium speciation of dissolved components in fresh water and seawater at 25°C and 1 atm pressure. v.45, p.855.
Wasserburg, G. J., Jacobsen, S. B., Depaolo, D. J., MvCulloch, M. T. and Wen, T. (1981) Precise determination of Sm/Nd ratios, Sm and Nd isotopic abundances in standard solutions. v.45, p.2311.

Articles with a variety of geochemical topics published during the late 80's have remained influential, as can be seen in the following list of most cited papers:

Anders, E. and Grevesse, N. (1989) Abundances of the elements - Meteoritic and solar. v.53, p.197.
Broecker, W. S. and Denton, G. H. (1989) The role of ocean-atmosphere reorganizations in glacial cycles. v.53, p.2465.
Canfield, D. E. (1989) Reactive iron in marine sediments. v.53, p.619.
Debaar, H. J. W., Bacon, M. P., Brewer, P. G. and Bruland, K. W. (1985) Rare-earth elements in the Pacific and Atlantic oceans. v.49, p.1943.
Furrer, G. and Stumm, W. (1986) The coordination chemistry of weathering. I. Dissolution kinetics of _-Al2O3 and BeO. v.50, p.1847.
Gromet, L. P., Dymek, R. F., Haskin, L. A. and Korotev, R. A. (1985) The North-American shale composite - Its compilation, major and trace element characteristics. v.48, p.2469.
Harrison, T. M., Duncan, I. And McDougall, I. (1985) Diffusion of 40Ar in biotite - temperature, pressure and compositional effects. v.49, p.2461.
Lange, R. A. and Carmichael, I. S. E. (1987) Densities of Na2O-K2O-CaO-MgO-FeO-Fe2O3-Al2O3-TiO2-SiO2 liquids - New measurements and derived partial molar properties. v.51, p.2931.
Vondamm, K. L., Edmond, J. M., Grant, B. and Measures, C. I. (1985) Chemistry of submarine hydrothermal solutions at 21°N East Pacific Rise. v.49, p.2197.

Among the articles published during 1990 - 1994, the following have been most cited:

Canfield, D. E., Thamdrup, B. and Hansen, J. W. (1993) The anaerobic degradation of organic matter in Danish coastal sediments - Iron reduction, manganese reduction, and sulfate reduction. v.57, p.3867.
Elderfield, H., Upstillgoddard, R. and Sholkovitz, E. R. (1990) The rare-earth elements in rivers, estuaries, and coastal seas and their significance to the composition of ocean waters. v.54, p.971.
Mason, R. P., Fitzgerald, W. F. and Morel, F. M. M. (1994) The biogeochemical cycling of elemental mercury - anthropogenic influences. v.58, p.3191.
Mayer, L. M. (1994) Surface-area control of organic carbon accumulation in continental shelf sediments. v.58, p.1271.
Sharp, Z. D. (1990) A laser-based microanalytical method for the in situ determination of oxygen isotope ratios of silicates and oxides. v.54, p.1353.
Shaw, T. J., Geiskes, J. M. and Jahnke, R. A. (1990) Early diagenesis in differing depositional environments - The response of transition metals in pore water. v.54, p.1233.
Stoffler, D., Keil, K. and Scott, E. R. D. (1991) Shock metamorphism of ordinary chondrites. v.55, p.3845.
Tipping, E. and Hurley, M. A. (1991) A unifying model of cation binding by humic substances. v.56, p.3627.
Waychunas, G. A., Rea, B. A., Fuller, C. C. and Davis, J. A. (1993) Surface-chemistry of ferrihydrite. I. EXAFS studies of the geometry of coprecipitated and adsorbed arsenate. v.57, p.2251.

POSITIONS ANNOUNCEMENTS

UCDAVIS

ASSISTANT PROFESSOR

Aqueous Chemistry

Hydrology Program,
Dept. of Land, Air, and Water Resources
University of California, Davis

A tenure-track position is available for an Assistant Professor and Assistant Aqueous Chemist in the Agricultural Experiment Station. This is an academic year appointment; 11-month term employment will be offered and continued based on academic personnel review.

We are especially interested in candidates with strong credentials for creating an internationally recognized and independent research program in aqueous chemistry/geochemistry. The candidate must be capable of addressing watershed and water quality issues across broad scales of time and space with particular attention to interfaces between chemically distinct environments. The appointee will interact with multidisciplinary research teams and is expected to teach, advise, and supervise undergraduate and graduate students, and to participate in outreach programs.

For application and inquiries, visit our website http://LAWR.ucdavis.edu, or contact Dr. Thomas Harter, Search Committee Chair, Hydrology Program, Dept. of Land, Air and Water Resources, University of California, Davis, CA 95616-8628. Ph: (530) 752-1130, E-mail: searchwq@ucdavis.edu.

ASST./ASSOC. PROFESSOR

Environmental Chemistry

Department of Environmental Toxicology
University of California, Davis

A tenure-track position is available for an Assistant/Associate Professor and Assistant/Associate Environmental Chemist in the Agricultural Experiment Station. This is an academic year appointment; 11-month term employment will be offered and continued based on academic personnel review.

We are especially interested in individuals who have, or will establish, a strong and innovative research program in chemistry as it relates to the environment. Areas of interest could include sources, transport, and/or fate of organic toxicants in water, soil, air and/or biota. The successful applicant is expected to have or to develop an independent, internationally recognized and well-funded research program, to teach, train, and supervise undergraduate and graduate students and to collaborate with established programs within the University. Applicants at the Associate level should have demonstrated excellence in research and teaching.

For application and inquiries, visit our website http://EToxEnvChem.ucdavis.edu, or contact Dr. Ronald Tjeerdema, Chair, Search Committee, Environmental Toxicology Dept., University of California, Davis, CA 95616-8588. Ph: (530) 754-5192, E-mail: searchwq @ucdavis.edu.

These positions remain open until filled. To ensure consideration applications should be postmarked by November 30, 2001. The University of California, Davis, is an affirmative action/equal opportunity employer.

WESTERN MICHIGAN UNIVERSITY

DEPARTMENT OF GEOSCIENCES

SEDIMENTOLOGIST

The Department of Geosciences at Western Michigan University seeks to fill a faculty position (pending budgetary approval) in the field of sedimentary geology with a preferred research emphasis in carbonate sedimentology and/or petroleum geology. This will be a tenure track position at the rank of assistant professor. The applicant will be expected to initiate and sustain an active, externally funded research program. Projects should lead to the training of graduate students at both the masters and doctoral level. S/he should be prepared to take advantage of the Michigan Basin Core Research Laboratory and/or one or more of the strengths of the department which include (but are not limited to): petroleum geology, paleoclimatology, stable isotopes, geophysics, geodynamics, glacial geomorphology, hydrogeology and aqueous geochemistry. The applicant should be prepared to teach undergraduate historical geology and paleontology as well as a graduate course in his or her specialty. Submit a letter of application, concise statement of teaching and research interests, vita, graduate transcripts, and names and addresses of at least three references to: Search Committee, Dept. of Geosciences, Western Michigan University, 1903 West Michigan Ave., Kalamazoo, MI 49008-5241. Applications will be accepted until December 15, 2001 and continue until the position is filled. Starting date is Fall 2002. Additional information about the Geosciences Department may be viewed on the Web at: http://ww.wmich.edu/geology/index.html. Inquiries may be sent to kominz@wmich.edu. Western Michigan University if a Carnegie Classification Doctoral Research Extensive Institution, is an AA/EEO employer and encourages qualified women and minorities to apply.

POSITIONS ANNOUNCEMENTS

WESTERN MICHIGAN UNIVERSITY

DEPARTMENT OF CHEMISTRY

COMPUTATIONAL CHEMIST

The Department of Chemistry at Western Michigan University seeks applications for an Assistant Professor of Computational Chemistry beginning in the Fall, 2002. A Ph.D. degree and post-doctoral training are required with an interest in both teaching at the undergraduate and graduate levels and a vigorous research program. Research expertise should be interdisciplinary in the areas of environmental chemistry, geochemistry, biotechnology, or nanotechnology to complement existing research programs. All candidates will be required to develop and sustain an excellent research program in their specialized areas that must have an environmental component, participate in multi-investigator, interdisciplinary research grants, participate in collaborative research, mentor graduate and undergraduate students, teach undergraduate and graduate chemistry courses, and develop new courses in their area of expertise. Candidates for consideration at advanced rank must have externally funded research and a demonstrated record of scientific achievements.

The Chemistry Department offers the B.S. (ACS-approved), M.S. and Ph.D. degrees in chemistry and has as its focus research and teaching in environmental chemistry and related fields of basic chemistry. Western Michigan University is a student-centered research university with a Carnegie Classification of Doctoral/Research Universities-Extensive. Interested candidates should submit detailed curriculum vitae, transcripts, two or three research summaries, teaching philosophy and goals, and a minimum of three letters of recommendation to Dr. Jay C. Means, Chair, Department of Chemistry, Western Michigan University, Kalamazoo, Michigan 49008-3842 (e-mail: means@wmich.edu). The review of applications will begin Nov 1, 2001 but application materials will continue to be accepted until position is filled. Western Michigan University is an equal employer and has an affirmative action program that encourages applications from underrepresented groups.

DEPARTMENT OF CHEMISTRY / ENVIRONMENTAL INSTITUTE

POSTDOCTORAL RESEARCHER
BIOGEOCHEMISTRY / GEOMICROBIOLOGY

A postdoctoral research fellowship in Biogeochemistry/Geomicrobiology is available in association with the Department of Chemistry / Environmental Institute, Western Michigan University. Review of applications will begin immediately and will continue until the position is filled. This position is initially for a period of 12 months and may be extended based on funding success and availability. The successful candidate will investigate biogeochemical and microbiological factors that influence the speciation, transport and sequestration of Uranium in sediments and natural aquatic settings. Specific research activities are somewhat flexible, depending on the expertise and interests of the successful candidate, but are likely to involve a combination of field and laboratory investigations.

A qualified candidate is sought who offers expertise in geochemistry, aquatic chemistry, chemical oceanography, microbial ecology, and/or geomicrobiology. Experience in laboratory and/or field methods in analytical chemistry, geochemistry or microbiology is preferred. The successful candidate will be expected to conduct independent research and to contribute fully to an interdisciplinary research program involving geochemists and microbiologists. A completed Ph.D. is required at the time of appointment. Salary is $30,000 per year and includes a comprehensive fringe benefits package.

The WMU Environmental Institute is an interdepartmental research center comprising more than 35 faculty from the departments of Biological Sciences, Chemistry, Economics, Environmental Studies, Geography, Geosciences, Political Science, Mathematics and Statistics, and Sociology. Available research instrumentation includes ICP-MS, ICP-AES, AA, GC-MS, HPLC, NMR, FTIR, an Affymetrix mRNA expression probe array. and a wide range of chemical, geochemical, microbiological and genomics research facilities.

Applications, including a statement of research interests, a CV, a list of recent publications, and list of at least three references (including names, addresses, telephone numbers and email contact data) should be forwarded by mail or electronically (by Word file or PDF) to Johnson R. Haas, Department of Chemistry, Western Michigan University, Kalamazoo, MI 49008 (Phone 616-387-2878, Fax 616-387-2909, Email: jhaas@wmich.edu).

MEETING ANNOUNCEMENTS

Mineralogical Association of Canada **Short Course**

Synchrotron Radiation:
Earth, Environmental and Materials Sciences Applications

May 25 and 26, 2002

University of Saskatchewan campus, prior to the 2002 GAC-MAC meeting in Saskatoon.

THE short course will present what synchrotron radiation is, what the latest techniques are, what types of Earth, environmental and materials science problems can be investigated using synchrotron techniques, what the Canadian Light Source can do, how one gains access to the CLS and other sources, and how data are reduced and analyzed for specific techniques.

Most of the material will be at a level of understanding for most upper undergraduate and graduate students although recent results and ideas presented throughout the lectures will appeal to both pure and applied researchers working on Earth, environmental and materials sciences. The presentations of the first day (90-minute lectures) will be broad overviews of various aspects of synchrotron research. The second day will be dedicated to more specific applications, and some of the lecturers will go through the reduction and analysis of real raw data with the audience (where appropriate). On the afternoon of the second day, there will be a tour of the Canadian Light Source. A symposium on APPLICATIONS OF SYNCHROTRON LIGHT SOURCES TO THE EARTH SCIENCES will also be held during the GAC-MAC meeting. Both oral and poster presentations are welcome.

Organizers

G. Henderson, University of Toronto
D. Baker, McGill University

Contributors

G. Michæl Bancroft, Director, and **De-Tong Jiang**, Canadian Light Source, Saskatoon

Gordon E. Brown, Stanford Synchrotron Radiation Laboratory, Stanford University

T.K. Sham, Department of Chemistry, and **H. Wayne Nesbitt**, Department of Earth Sciences, University of Western Ontario

J.S. Tse, Steacie Institute for Molecular Sciences, NRC, Ottawa

John B. Parise, Departments of Geology and Chemistry and Center for High Pressure Research, SUNY, Stony Brook

Registration fee: $275CDN (Students $150CDN)

For more information, contact Grant S. Henderson at **henders@geology.utoronto.ca**
Or visit the web site of Saskatoon 2002 **www.usask.ca/geology/sask2002/**

www.mineralogicalassociation.ca

Mineralogical Association of Canada
Association minéralogique du Canada

P.O. Box 78087, Meriline Postal Outlet,
1460 Merivale Road Ottawa ON
Canada K2E 1B1
Tel. & fax: (613) 226-4651
canmin.mac.ottawa@sympatico.ca

Canadian Centre canadien Light de rayonnement Source synchrotron

CLSR Canadian Institute for Synchrotron Radiation Institut Canadien du Rayonnement Synchrotron

MEETING ANNOUNCEMENTS

32nd International Geological Congress, Florence, Italy, August 20-28, 2004
In collaboration with and under the sponsorship of the IUGS

From the Mediterranean toward a Global Renaissance

Geology, Natural Heritage and Cultural Heritage

The 32nd international Geologic Congress will be held in Florence, internationally known as city of artistic heritage and cultural traditions. The recently remodelled pentagonal fortress of the Fortezza Da Basso, a wide area in the heart of the town, will host the event. The congress centre has a variety of modern integrated spaces which enable to display a large number of posters nearby the session rooms, to organise short courses, meeting of Scientific Associations, a Geoexpo exhibition, etc.

The 32nd IGC is being organized in cooperation with a number of perimediterranean countries grouped in the GEOMED Consortium. Italy and the Mediterranean area offer a great variety of choice for outstanding fieldtrips on the most diverse geological subjects, from well studied mountain chains (Alps and Apennines) to the active volcanic areas surrounding Naples, the Etna Volcano in Sicily or the Aeolian Islands in the Tyrrhenian Sea, but also offer the possibility to focus on recent devastating natural hazards and on geological aspects of famous archeological sites such as Pompei and Paestum.

WEBSITE: HTTP://WWW.32IGC.ORG/

ACS, Division of Geochemistry
(Joint symposium with Fuel Chemistry)
April 7-11, 2002, Orlando, Florida,
223rd ACS National Meeting

Symposium on

Advances and Applications in Analytical Pyrolysis/Thermochemolysis

Topics for technical papers include but are not limited to

- advances in pyrolysis/thermochemolysis instrumentation and methodology
- hydrouspyrolysis, hydropyrolysis, thermochemolysis
- analysis of geo-macromolecules, fuel-based materials (e.g., biomass, coke, pitch), and extraterrestrial origin of life-related materials
- simulating natural thermal maturation of organic matter
- determining petroleum generation kinetic parameters
- petroleum expulsion and charge methodologies
- utility of pyrolysis in oil-to-rock correlations

Abstracts submitted electronically are due 11/21/01. The URL for electronic submission is http://oasys.acs.org/oasys.htm. Hard copy submissions are due on 11/07/01.

Symposium Organizers

David J. Clifford
The Pennsylvania State University
The Energy Institute
209 Academic Projects
University Park, Pa 16802
(814) 865-3523
djc175@psu.edu

Colin E. Snape
University of Nottingham
School of Chemical, Environmental
and Mineral Engineering
University Park
Nottingham NG7 2RD, UK
+44 115 951 4166
colin.snape@nottingham.ac.uk

Michael D. Lewan
U.S. Geological Survey
MS 977 Denver Federal Center
Denver, CO 80225
Phone: (303) 236-9391
mlewan@usgs.gov

MEETING ANNOUNCEMENTS

Call for Abstracts

BIOGEOMON 2002

4th International Symposium on Ecosystem Behaviour

August 17-21, 2002

The University of Reading, UK

Main Themes:

- Stable and radiogenic isotopes in the environment
- Archives of global change on the continents
- Scaling in biogeochemistry
- Nutrient and metal cycling in natural and restored ecosystem
- Catchment Monitoring/manipulations/modelling

Abstract submission deadline: 11th February 2002

For further details please contact: Dr Hannah Prior, Dept. of Geography, The University of Reading, Whiteknights, Reading, RG6 6AB, UK. Email: biogeomon@reading.ac.uk, Tel: +44 (0) 1189 316288

Or visit our website for registration and submission forms and updates at: **www.rdg.ac.uk/biogeomon**

INAUGURAL GORDON RESEARCH CONFERENCE

ENVIRONMENTAL BIOINORGANIC CHEMISTRY (EBIC)

Proctor Academy, Andover, New Hampshire, USA

June 16-21, 2002

Bioinorganic and environmental chemistry are both burgeoning fields. Moreover, potent synergic interactions between bioinorganic and environmental scientists are beginning to be forged. The new Gordon Research Conference (GRC) aims to accelerate the process.

This new GRC will focus on the bioinorganic chemistry of the natural elemental cycles, the perturbation of those cycles by human activities, and the role of toxic elements in the environment. The key steps in the biogeochemical cycles of carbon, nitrogen, hydrogen, oxygen, and sulfur are catalyzed by metalloenzymes that depend on iron, manganese, cobalt, nickel, copper, zinc, molybdenum, selenium, vanadium, and tungsten. The effects of these 'trace' elements on the macroscopic fluxes of major nutrients at the global, regional, local, and microscopic levels will each be explored *at the molecular/enzymatic level.* Examples include: the effects of iron, zinc, and cadmium on the carbon cycle; the role of iron versus copper enzymes in the nitrogen cycle; the use of Co, Ni, and Fe in the anaerobic reactions of the hydrogen cycle; the toxicity of heavy metals such as mercury and lead in the environment; and the degradation of hydrocarbons, produced naturally or from spills, under aerobic and anaerobic conditions. The conference will be multidisciplinary, involving major input from chemistry, microbiology, chemical oceanography, marine biology, and environmental science. An exciting inaugural conference in this growing field is anticipated.

Individual sessions will be devoted to, among other things: unusual environments; the carbon cycle and metal-carbon bonds in the environment; hydrocarbon degradation; the nitrogen cycle; the co-evolution of environments and life; toxic elements; and biomineralization. A substantial poster session is planned. The final program has not yet been set and the Co-Chairs welcome suggestions on particularly exciting areas/ speakers that would be appropriate as oral or poster presentations.

For information, visit the GRC Home Page at http://www.grc.uri.edu or contact:

Edward I. Stiefel, Co-Chair
101 Hoyt Laboratory, Department of Chemistry
Princeton University, Princeton, NJ 08544
Voice: 609-258-2065 / Fax: 609-258-6746
Email: estiefe@princeton.edu

François M. M. Morel, Co-Chair
153 Guyot Hall, Department of Geosciences
Princeton University, Princeton, NJ 08544
Voice: 609-258-2416 / Fax: 908-258-5242
Email: morel@princeton.edu

MEETING ANNOUNCEMENTS

THE ROYAL SOCIETY

The Royal Society, the UK's premier scientific body, runs international scientific symposia which concentrate on the rapid development of science.

CHEMICAL RESERVOIRS AND CONVECTION IN THE EARTH'S MANTLE

Wednesday 16 and Thursday 17 January 2002 (all day)

Mantle studies are at a critical juncture. On the one hand seismic evidence seems to show that the upper and lower mantles are mixing, while on the other hand observed geochemical and isotopic signals suggest multiple reservoirs. At the same time, seismological studies also indicate that some parts of the lower mantle may be significantly more heterogeneous than would be expected from simple thermal arguments. How can these observations be reconciled in a dynamic model where a single layer should be well mixed? Can we place everything neatly into whole-mantle convection with all anomalies coming from recycling of subducting slabs, or do we need other deep earth reservoirs? The meeting will discuss this problem of resolving the geochemical data in a dynamical context constrained by seismic, and petrologic data. This issue is fundamental not only for our understanding of mantle dynamics but also for the evolution of the planet.

Organising committee: Dr John Brodholt, Dr Huw Davies and Professor Bernard Wood FRS

Held at the Royal Society, London. Register online at www.royalsoc.ac.uk/events. Alternatively phone Hannah Jemmett on 020 7451 2575 or email hannah.jemmett@royalsoc.ac.uk for further details.

WWW.GOLDSCHMIDT-CONFERENCE.COM/GOLD2002/

MEETINGS CALENDAR

Sept. 30-Oct. 2, 2001: From Basins to Mountains: Rodinia at the Turn of the Century, Perth, Australia. Contact: K. Sircombe, TSRC, Dept. of Geology and Geophysics, University of Western Australia, 35 Stirling Highway, Crawley, Perth, Western Australia WA 6009, Australia; Phone: +61 8 9380 7871; Fax: + 61 8 9380 7848; ksircombe@tsrc.uwa.edu.au. http://www.tsrc.uwa.au/projects/440events/440events.html

Oct. 1-5, 2001: 6th International Carbon Dioxide Conference, Sendai, Japan. Contact: Shuji Aoki, Center for Atmospheric and Oceanic Studies, Graduate School of Science, Tohoku Univesity, Sedai, Japan; secre@co2.geophys.tohoku.ac.jp

Oct. 14-18, 2001: N2001 - The Second International Nitrogen Conference, Bolger Conference Center, Potomac, Maryland, USA. Optimizing Nitrogen Management in Food and Energy Production and Environmental Protection. http://esa.sdsc.edu/n2001/

Oct. 21-24, 2001: Third South American Symposium on Isotope Geology, Gran Hotel Pucón, Pucón, Chile. Organized by the Servicio Nacional de Geología y Minería de Chile (SERNAGEOMIN), Dept. de Geología, Universidad de Chile, and Sociedad Geológica de Chile. Contact: Eugenia Fonseca,Laboratorio Sernageomin, Til-Til 1993 —udoa, Santiago, Chile; Phone: + 56 2 2385292; ssagi@sernageomin.cl, http://www.sernageomin.cl/ssagi/

Oct. 21-25, 2001: 8th Annual Meeting of the International Society for Reef Studies (joint meeting with ICCB), Eilat, Israel. Contact: congress secretariat at Dan Knassim Ltd., P.O.Box 1931, Ramat-Gan 52118, Israel; Phone: +972 3 6133340 Ext. 209; Fax: +972 3 6133341; team4@congress.co.il.

Nov. 4-8, 2001: American Ceramic Society Pacific Rim IV meeting on Structure and Dynamics of Silicate Melts and Glasses: Natural and Synthetic, Maui, Hawaii, USA. Contact: The American Ceramic Society, P.O. Box 6136, Westerville, Ohio 43086-6136, USA; Phone: +1 614 890 4700; Fax: +1 614 899 6109; info@acers.org; http://www.acers.org/meetings/pacrimiv/

Nov. 5-8, 2001: Geological Society of America Annual Meeting, Boston, USA. Contact: GSA Meetings, Box 9140, Boulder, CO 80301-9140, USA; Phone: +1 303 447 2020 or 1 800 472 1988; Fax: +1 303 447 0648; meetings@geosociety.org. http://www.geosociety.org/meetings/index.htm.

Nov. 7-9, 2001: 3rd Asia Symposium on Environmental Geochemistry, Guangzhou, China. Contact: Dr. Ron T. Watkins, Secretary, SEGH, Asia/Pacific Branch, Environmental Inorganic Geochemistry Group, Curtin University of Technology, GPO Box U1987, Perth 6845, Australia; iwatkins@info.curtin.edu.au. http://www.gigac.cn/apseg.htm.

Dec. 10-14, 2001: Fall Meeting of the American Geophysical Union, San Francisco, California, USA. http://www.agu.org

Dec. 16-18, 2001: ICCE - 2001 International Congress of Chemistry and Environment, Indore, M.P., India. Contact: Dr. Shankar Lal Gargh, A/80, Scheme No. 54, Vijay Nagar, Indore 452 010 (M.P.) India; Phone: +91 731 552837; chemjyot@sancharnet.in, http://www.chemenviron.com/

Jan. 21-25, 2002: Chapman Conference: Explosive Subaqueous Volcanism, Dunedin, New Zealand. Abstract and travel deadlines: October 1, 2001. Contact: J.D.L. White, University of Otago, Dunedin, New Zealand (james.white@stonebow.otago.ac.nz) and Bruce F. Houghton, University of Hawaii, Honolulu (bhought@soest.hawaii.edu).

Jan. 27-30, 2002: Tailings and Mine Waste '02, Colorado State University, Fort Collins, Colorado, USA. Contact: Linda Hinshaw, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523-1372, USA; Phone: +1 970 491 6081; Fax: +1 970 491 3584/7727; lhinshaw@engr.colostate.edu.

Jan. 28-31, 2002: WG/IGCP 433 and 2nd Italian-LatinAmerican Meeting and field trip on the Motagua Suture Zone of Guatemala, Guatemala. http://www.ig.utexas.edu/CaribPlate/news/guat_announce1.htm and http://www.ig.utexas.edu/CaribPlate/news/guat_circ1.htm

Feb. 11-15, 2002: AGU Ocean Sciences Meeting, Honolulu, Hawaii, USA. http://www.agu.org.

Feb. 25-27, 2002: 2002 SME Annual Meeting and Exhibit: Minerals for the future, Phoenix, Arizona, USA. http://www.smenet.org/meetings/2002_Call.html

March 4-7, 2002: GeoProc2002, Bremen, Germany..Topic: Geochemical processes with long-term effects in anthropogenically affected seepage and groundwater. Contact: Fachbereich 5 - Geowissenschaften, Universität Bremen, Postfach 330 440, D-28 334 Bremen, Germany; Prof. Dr. Horst D. Schulz; Phone / Fax: +49 421 218 3393 / 432; hdschulz@uni-bremen.de; Dr. Astrid Hadeler; Phone / Fax: +49 421 218 3950 / 4321; ahadeler@uni-bremen.de; http://www.geochemie.uni-bremen.de/index.html?/projects/spp/geoproc/geoproc.html.

March 10-13, 2002: 2002 AAPG National meeting, Houston, Texas., with poster session on Geochemical Indicators of Depositional Environments. http://www.aapg.org/indexaapg.html

March 11-13, 2002: Geo 2002: The 5th Middle East Geosciences Exhibition and Conference, Bahrain. Contact: Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, UK; Phone: +44 207 8622000; Fax: +44 202 862 2078; pmckean@montnet.com.

March 18-19, 2002: TSG meeting: transport and flow processes within shear zones, Burlington House, Piccadilly, London, UK. Convenors: Ian Alsop, Crustal Geodynamics Group, School of Geography & Geosciences, University of St.Andrews, Fife, Scotland, KY16 9AL UK, gia@st-andrews.ac.uk; Ken McCaffrey & Bob Holdsworth, Reactivation Research Group, Dept of Geological Sciences, University of Durham, Durham DH1 3LE, UK; k.j.w.mccaffrey@durham.ac.uk, R.E.Holdsworth@durham.ac.uk; Martin Hand, Geology & Geophysics, University of Adelaide, Adelaide SA 5005, Australia; martin.hand@adelaide.edu.au; http://www.st-and.ac.uk/~www_sgg/tsg2001.html

March 19-22, 2002: 19th Colloquium of African Geology, El Jadida, Morocco. Organized by Chouaïb Doukkali University, Faculty of Sciences, El Jadida, Morocco and the Geological Society of Africa. Field trips start on March 23. Contact: Secretariat du 19Ëme CIGA, Université Chouaïb Doukkali, Faculté des Sciences, Département de Géologie, B.P.20, 24000, El Jadida, Maroc; Phone: + 212 23 34 23 25 / 23 34 30 03; Fax : +212 23 34 21 87; cag19@ucd.ac.ma. http://www.ucd.ac.ma/geologie/cag19.html.

March 20-27, 2002: Annual Meeting National Earth Science Teachers Association, San Diego, CA, USA. Contact: NESTA Meetings, 2000 Florida Avenue, N.W., Washington, D.C. 20009, USA; Phone: +1 202 462 6910: Fax: +1 202 328 0566; E -mail: fireton@kosmos.agu.org.

March 24.-27, 2002: EMPG IX - Ninth International Symposium on Experimental Mineralogy, Petrology and Geochemistry. Zurich, Switzerland. Contact: EMPG IX Organizing Committee, Institute for Mineralogy and Petrography, Department of Earth Sciences, ETH Zentrum, Sonneggstrasse 5, CH-8092 Zurich, Switzerland; Phone: +41 1 632 3779 (or 3955); Fax: +41 1 632 1294; empg@erdw.ethz.ch; http://eurasia.ethz.ch/empg/

MEETINGS CALENDAR

March 25-27, 2002: 17th Himalaya-Karakoram-Tibet Workshop, Gantok, Sikkim, India. Contact: Chandra Shekhar Dubey; csdubey@vsnl.com, chandrasdubey@vsnl.net, csdubey@yahoo.com. http://csdubey.topcities.com/fpexp/index.htm

April 7 - 11, 2002: Geochemistry Division, American Chemical Society 223rd National Meeting, Orlando, Florida, USA. Symposia http://membership.acs.org/G/GEOC/. Abstract submission at: http://oasys.acs.org/.

April 24-26, 2002: 15th Argentine Geological Congress, El Calafate, Santa Cruz Province, Southern Patagonia, Argentina. (Contact: President Dr. Miguel Haller, or Secretary Dr. Roberto Page, Asociacion Geologica Argentina, Maipu 645, 1er Piso, Buenos Aires, Argentina; Phone: + 54 11 4325 3104; haller@cenpat.edu.ar or fomicruz@internet.siscotel.com.

April 29 - May 1, 2002: 3rd International Conference on Applications of Stable Isotope Techniques to Ecological Studies, Flagstaff, Arizona, USA. Contact: Dr. Joseph Shannon, Northern Arizona University, Department of Biological Sciences, P.O. Box 5640, Beaver St. Building 21, Flagstaff, AZ 86011, USA; Phone: +1 928 523 1740; Fax: +1 928 523 7500; joseph.shannon@nau.edu; 207.195.94.13/isoecol/

May 8, 2002: 100th Anniversary of the eruption of Mt. Pelee. International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) workshop, Martinique. http://www.iavcei.org.

May 28-June 1, 2002: AGU Spring Meeting, Washington, DC, USA. www.agu.org.

June 3 - 7, 2002: Zeolite 2002, Aristotle University, Thessaloniki, Greece. Under the auspices of the International Committee on Natural Zeolites (ICNZ), by the Aristotle University of Thessaloniki and the Institute of Geology and Mineral Exploration (IGME). Contact: Prof. Panagiotis Misaelidis, Aristotle University, Department of Chemistry, P.O. Box 1547, GR-540 06 Thessaloniki, Greece; Phone: +30 31 997789; Fax: +30 31 997753; misailid@chem.auth.gr. http://www.chem.auth.gr/activities/zeo2002/.

June 12-15, 2002: GEORAMAN 2002 - 5th International Conference on Raman Spectroscopy Applied to the Earth Sciences, Prague, Czech Republic. Contact: georaman@natur.cuni.cz; www.natur.cuni.cz/~georaman

July 14-17, 2002: Fifth International Conference on arsenic exposure and health effects, San Diego, California, USA. Society for Environmental Geochemistry and Health. http://www.cudenver.edu/as2000/

July 21-25, 2002: 9th International Platinum Symposium, Holiday Inn - Grand Montana, Billings, MT, USA. By the IGCP 427/SEG/SGA. Contact: Roger Cooper, Dept. of Geology, Lamar University, P.O. Box 10031, Beaumont, TX 77710, USA; Phone: +1 409 880 8239; cooperrw@hal.lamar.edu. http://www.platinumsymposium.org/.

July 22-26, 2002: The Earth System and Metallogenesis - 11th Quadrennial IAGOD Symposium and GEOCONGRESS 2002, Windhoek, Namibia. Theme: Sedimentary and magmatic responses to compressional and extensional tectonics and the associated ore-forming processes. Hosted by: The Geological Society of Namibia, the Geological Society of South Africa, The Geological Society. Contact: IAGOD / Geocongress 2002 Conference Secretariat, P.O. Box 9870, Windhoek, Namibia; Phone: + 264 61 251014; Fax: + 264 61 272032; (Alice Kaukuetu-Hue): geoconference2002@conferencelink.com.na. www.geoconference2002.com.

July 22-26, 2002: 65th Annual Meeting of the Meteoritical Society, UCLA DeNeve Plaza Conference Center, Los Angeles, CA, USA , the Meteoritical Society, Lunar and Planetary Institute. Contact: Paul H. Warren, Institute of Geophysics, UCLA, Los Angeles, CA 90095-1567, USA; Phone: +1 3108253202; pwarren@ucla.edu; http://www.lpi.usra.edu/meetings/upcomingmeetings.html/

Aug. 18-23, 2002: Twelth Annual V.M. Goldschmidt Conference, incorporating ICOG X, Davos, Switzerland. Contact: Cambridge Publications, P.O. Box 27, Cambridge CB1 8TR, U.K; Gold2002@campublic.co.uk. http://www.goldschmidt-conference.com/gold2002/.

Sept. 1-6, 2002: Mineralogy for the new millenium (IMA 2002), 18th General Meeting of the International Mineralogical Association, Edinburgh, United Kingdom. Contact: Mr K. Murphy, Executive Secretary, Mineralogical Society of Great Britain and Ireland, 41 Queen's Gate, London SW7 5HR, United Kingdom: Phone: +44 171 584 7516; IMA@minersoc.demon.co.uk; http://www.minersoc.org/IMA2002

Sept. 2-7, 2002: Holocene environmental catastrophes and recovery, Brunel Univesity, West London, UK. Co-sponsored by Brunel University, INQUA and PAGES. Contact: Contact: Prof. Suzanne A. G. Leroy, Department of Geography and Earth Sciences, Brunel University, Uxbridge, Middlesex UB8 3PH, (West London), UK; Phone: +44 1895 20 31 78; Fax: +44 1895 20 32 17; Phone secr: +44-1895-20 3215; suzanne.leroy@brunel.ac.uk. http://www.brunel.ac.uk/depts/geo/Catastrophes/.

Sept. 8-13, 2002: Fifth International Conference on Subsurface Microbiology (ISSM02), Copenhagen, Denmark. Deadline abstracts: 15 March 2002. Contact: ISSM02, Helsingevej 23, DK-2830 Virum, Denmark; Fax: +45 4583 9727; issm02@er.dtu.dk, http://www.er.dtu.dk/.

Sept. 16-20, 2002: Uranium Mining and Hydrogeology III - International Mine Water Association. Symposium - Mine Water and The Environment, Freiberg, Germany. Contact: Prof. Dr. B. Merkel, Dr. Christian Wolkersdorfer, Lehrstuhl f¸r Hydrogeologie; Gustav-Zeuner-Str. 12; D-09596 Freiberg/Sachsen, Germany; Phone: +49 3731 39 3309; Fax: +49 3731 39 2720; UMH@IMWA.de. http://www.IMWA.de.

Oct 24-26, 2002: Synchrotrons, Low Temperature Geochemistry, and Environmental Science, Estes Park, Colorado, U.S.A.

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

Dec. 6-10, 2002: AGU Fall Meeting, San Francisco, California, USA. www.agu.org.

Mar 29-Apr 2, 2003: 3rd International Limnogeology Congress, Presidio Plaza Hotel, Tucson, AZ, USA. Contact: Andrew Cohen, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721, USA; Phone: +1 520 621 4691; acohen@geo.arizona.edu.

May 20-23, 2003: GERM 4, Lyon, France. Contact: Janne Blichert-Toft, Laboratoire de Sciences de la Terre (CNRS UMR 5570), Ecole Normale Supérieure de Lyon, 46, Allée d'Italie, 69364 Lyon Cedex 7, France; Phone: +33 (0)472 72 84 88; Fax: +33 (0)472 72 86 77; jblicher@ens-lyon.fr.

Sept. 7-11, 2003: 6th International Symposium on Environmental Geochemistry (ISEG), Edinburgh, UK. Contact: Dr. John G. Farmer, Department of Chemistry, University of Edinburgh, West Mains Road, Edinburgh EH9 3JJ, UK; J.G.Farmer@ed.ac.uk.

Nov. 2–5, 2003: Annual meeting GSA, Seattle, Washington. http://www.geosociety.org/meetings/index.htm.

Dec. 8-12, 2003: AGU Fall Meeting, San Francisco, California, USA. www.agu.org.

THE GEOCHEMICAL SOCIETY

Special Publications Series Order Form

(last revised 9/25/2001)

Volume	Title	Price (US$)	Quantity	Total by Volume
1	Magmatic Processes: Physicochemical Principles. A volume in honor of Hatten S. Yoder, Jr., edited by B.O. Mysen (1987) (ISBN 0-941809-00-5)	25.00		
2	Fluid-Mineral Interactions: A Tribute to H.P. Eugster, edited by R.J. Spencer and I.-M. Chou (1990) (ISBN 0-941809-01-3)	25.00		
3	Stable Isotope Geochemistry: A Tribute to Samuel Epstein, edited by H.P. Taylor *et al.* (1991) (ISBN 0-941809-02-1)	25.00		
4	Victor Moritz Goldschmidt: Father of Modern Geochemistry, by Brian Mason (1992) (ISBN 0-941809-03-X)	20.00		
5	Mineral Spectroscopy: A Tribute to Roger G. Burns, edited by M.D. Dyar *et al.* (1996) (ISBN 0-941809-04-8)	40.00*/60.00		
6	Mantle Petrology: Field Observations and High-Pressure Experimentation, A Tribute to Francis R. (Joe) Boyd, edited by Y. Fei, C.M. Bertka and B.O. Mysen (1999) (ISBN 0-941809-05-6)	60.00*/90.00		
LAST CHANCE	**Special Offer For Members Only!!!** The COMPLETE SIX VOLUME SET (a $195.00 value) Offer expires December 31, 2001	120.00*		
7	**The David A Crerar Tribute Volume**	**TBA**		

*** members only discount price**

Grand Total $_____

Name: _____
(First) (MI) (Last)

I am:
☐ A member of the Geochemical Society
☐ Not a member of the Geochemical Society

Affiliation/Address/Contact Information

Department _____
Institution _____
Street Address _____
City, State _____
Postal Code _____
Country _____
Phone _____
Fax _____
Email _____

Mail or Fax Completed form to:
The Geochemical Society
Department of Earth & Planetary Sciences
Washington University
One Brookings Drive
St. Louis, MO 63130-4899, USA

Payment/Payment Method

Payment in US Dollars only. Payment may be made by check, money order, or by credit card authorization. Please do not send cash. Sorry, we cannot invoice, accept purchase orders, or process bank transfers. All payments must be made to The Geochemical Society. *Prices include Shipping*. Please send payment to the address at the bottom left.

Payment Type:

☐ Check ☐ Money Order

☐ MasterCard ☐ Visa ☐ American Express

Card Number _____

Expiration Date ____/____

Mineralogical Society of America

Publications Price List and Order Form

Reviews in Mineralogy and Reviews in Mineralogy and Geochemistry (25% member discount)

___v. 08: Kinetics of Geochemical Processes (1981) **$20**
___v. 9A: Amphiboles and Other Hydrous Pyriboles - Mineralogy (1981) **$20**
___v. 9B: Amphiboles: Petrology and Experimental - Phase Relations (1982) **$20**
___v. 10: Characterization of Metamorphism through Mineral Equilibria (1982) **$20**
___v. 11: Carbonates: Mineralogy & Chemistry (1983) **$24**
___v. 12: Fluid Inclusions (1984) **$32**
___v. 13: Micas (1984) **$28**
___v. 14: Microscopic to Macroscopic: Atomic Environments to Mineral Thermodynamics (1985) **$20**
___v. 15: Mathematical Crystallography (rev.) (1990) **$24**
___v. 16: Stable Isotopes in High Temperature Geological Processes (1986) **$24**
___v. 17: Thermodynamic Modeling of Geological Materials: Minerals, Fluids, Melts (1987) **$28**
___v. 18: Spectroscopic Methods in Mineralogy and Geology (1988) **$28**
___v. 19: Hydrous Phyllosilicates (Exclusive of Micas) (1988) **$28**
___v. 20: Modern Powder Diffraction (1989) **$28**
___v. 21: Geochemistry and Mineralogy of Rare Earth Elements (1989) **$28**
___v. 22: The Al_2SiO_5 Polymorphs (1990) **$24**
___v. 23: Mineral-Water Interface Geochemistry (1990) **$36**
___v. 24: Modern Methods of Igneous Petrology (1990) **$24**
___v. 25: Oxide Minerals: Petrologic and Magnetic Significance (1991) **$28**
___v. 26: Contact Metamorphism (1991) **$32**
___v. 27: Minerals and Reactions at the Atomic Scale: Transmission Electron Microscopy (1992) **$28**
___v. 28: Health Effects of Mineral Dusts (1993) **$32**
___v. 29: Silica: Physical Behavior, Geochemistry and Materials Applications (1994) **$32**
___v. 30: Volatiles in Magmas (1994) **$30**
___v. 31: Chemical Weathering Silicate Minerals (1995) **$32**
___v. 32: Silicate Melts (1995) **$30**
___v. 33: Boron (1996) **$32**
___v. 34: Reactive Transport in Porous Media (1996) **$32**
___v. 35: Geomicrobiology (1997) **$32**
___v. 36: Planetary Materials (1998) **$40**
___v. 37: Ultra-High Pressure Mineralogy (1998) **$32**
___v. 38: U Minerals & Chemistry (1999) **$32**
___v. 39: Mineral Transformation Processes (2000) **$32**
___v. 40: Sulfate Minerals (2000) **$32**
___v. 41: High T & P Crystal Chemistry (2001) **$36**
___v. 42: Molecular Modeling (2001) **$32**

Monographs (25% member discount)

___Crystallography & Crystal Chemistry, F. D. Bloss **$32**
___v. 1: Metamorphic Phase Equilibria, Spear **$60**
___v. 2: Crystal Structures v. 1, O'Keeffe & Hyde **$36**
___v. 3: Teaching Mineralogy **$28**
___v. 4: Bowen, D. A. Young **$16**
___v. 5: Optical Crystallography, F. D. Bloss **$32**

Handbook of Mineralogy (25% member discount, except shipping)

___v. I: Elements, Sulfides, Sulfosalts ..... **$94+$11** shipping
___v. II: Silica, Silicates (two books) ..... **$144+$20** shipping
___v. III: Halides, Hydroxides, Oxides ..... **$100+$11** shipping
___v. IV: Arsenates, Phosphates, Vanadates ..... **$108+$11** shipping

European Mineralogical Union Notes (25% member discount)

___v. 1: Modular Aspects of Mineral (1997) **$24**
___v. 2: Environmental Mineralogy (2000) **$24**
___v. 3: Mixing in Silicate and Oxide Systems (2001) **$24**

Mineralogical Society Series (25% member discount)

___v. 2: High-Temp. Metamorphism (1990) **$168**
___v. 3: Stability of Minerals (1993) **$210**
___v. 4: Clay-Pore Fluid Interactions (1993) **$230**
___v. 5: Mineral Surfaces (1994) **$74**
___v. 6: Microprobe Techniques (1994) **$83**
___v. 7: Rare Earth Minerals (1995) **$74**
___v. 8: Deformation-Enhanced Fluid Flow (1997) **$122**

Other Publications (no member discount)

___Fifth International Kimberlite Conference Proceedings ..... **$45** shipping: U.S.-**$4**/set, Canada -**$16**/set, Elsewhere-**$20**/set.
___Centennial History Geological Society of Washington **$10**

To Order: Indicate quantity, shipping, and cost information. MSA, CMS, and GS Members may take the 25% discount where noted. Prepay orders under $300. Send entire form to: Mineralogical Society of America, 1015 18th Street NW Ste 601, Washington, DC 20036-5212 USA Phone: (202) 775-4344 Fax: (202) 775-0018 E-mail: business@minsocam.org. You may also order all these publications online at http://www.minsocam.org using our secure server. Publications may not be returned for refund or credit.

Name:_____

Address:_____

_____

_____

City: _____ State: _____Zip:_____

Country: _____Postal Code:_____

Payment: check in US$ drawn on a US bank, money order, UNESCO coupons, or credit card:

[ ] Visa [ ] MasterCard [ ] Diners Club [ ] American Express

Card #: _____Exp Date:_____

Signature:_____

Print name as it appears on card:_____

Shipping: Please add the following amounts for postage to book orders for which shipping is not indicated. Shipping is by surface mail that may take up to 4 months to some destinations. Contact the MSA Business Office for shipping rates by air mail, United Parcel Service, Federal Express, or other express service.

Shipping cost (**per book**)

# of books	US	Canada	other
1	$2.50	$6.50	$8.00
2	$1.75	$7.00	$9.00
3 to 4	$1.00	$5.00	$7.00
5 to 7	$1.00	$4.00	$5.00
8 or more	$1.00	$3.00	$4.00

A. Total for member discount books	
B. less 25% member discount (A x 0.25)	
C. Total for non-discounted items	
D. Shipping (see above)	
Total (A-B+C+D)	

THE GEOCHEMICAL NEWS
c/o Johnson R. Haas / Carla Koretsky, Editors
Department of Chemistry / Geosciences
Western Michigan University
Kalamazoo, MI 49008
USA