The Geochemical News

Newsletter of the Geochemical Society

Number 82 Spring 1992

Inquiries and announcements regarding *Geochemical News* should be sent to S.B. Shirey, Carnegie Institution of Washington, 5241 Broad Branch Rd., NW, Washington, DC 20015 USA.

In this issue:

LETTER FROM GS PRESIDENT, DONALD H. LINDSLEY

Our Society is well and active; here are some of the things that are going on at present:

The response to the questionnaire on the future of our journal was heartening. Not only did many of you read the Newsletter, you also took the time to respond. The key result is that you voted overwhelmingly (224-7) that the Society must start a new journal to which we would have title. The Publications Committee and the Board of Directors are working on this.

Special Publication No. 4, the biography of V. M. Goldschmidt by Brian Mason, will be ready shortly. You will get an announcement soon about a special prepublication price. With its publication, Al Levinson will step down for a second time as Special Publications Editor. Al has served our Society with distinction and in many ways, and he has our heartfelt thanks.

Rumor has it that Brian Mason will be at the Goldschmidt Conference in Reston (May 8-10) and will autograph your copies of the biography. Whether you want an autograph or not, be sure to attend. This will probably be the last (North American) Goldschmidt Conference that will be held independently of AGU. As you know, the GS has become a co-sponsor, along with the Mineralogical Society of America, of the Spring AGU meeting, beginning in 1993. Details still have to be worked out for the 5th Goldschmidt Conference (1996) but we will probably have it begin 1 or 2 days before the Spring AGU (to allow special symposia and the like), and overlap with the early part of that meeting. Sessions sponsored by GS would be identified in the program as part of the Goldschmidt Conference in the years the Conference is in North America. Some of you had hoped to have the Conferences in locales somewhat more exotic than Baltimore, but that desire must be balanced off against reducing the proliferation of meetings and the organizational and intellectual benefits we will derive by meeting with AGU and MSA.

Our By-Laws are in need of overhaul. Not only do we need the By-Laws to reflect changes in the Society, but also some unexpected and unintended changes were introduced when the By-Laws were re-written as a part of our incorporation. The ad hoc committee to rewrite the By-Laws consists of Steve Shirey, John Dickey, Mike Drake, Steve Macko, and myself. If you have suggestions, please let us know. Among the changes being considered are special memberships

(and rates) for retired members who no longer wish to receive the journal. We will also remove the language that specifies Geochimica et Cosmochimica Acta as the Society's journal. I am also suggesting that we amend the requirement for a joint Publications Committee and joint sponsorship of the journal with the Meteoritical Society. Emphatically, this is not to require that the present ties will be broken, but only to allow the Society flexibility as it decides what is best as we move towards our own journal. For example, we might decide it would be preferable to cosponsor a journal with the European Association of Geochemistry. No decision has been taken, but it is essential that the Society have flexibility during this important period.

The Organic Geochemistry Division is an important part of our Society. I am working with OGD Chair Cindy Lee and Secretary Steve Macko to strengthen the OGD within the Society, and to give it a more dependable voice in decisions by the Board.

We are planning to have an exhibit at the Cincinnati GSA meeting (as an affiliated society we get a free booth). If you have any ideas for the exhibit, please let me know. We will sign up members, and offer our Special Publications for sale. I expect that the Goldschmidt biography in particular will be quite popular, even among geologists who are not active geochemists. I am also thinking of having a business meeting at GSA time, partly because our By-Laws seem to mandate one, and partly so you can learn what the Society is doing.

Don Lindsley

EAG MEETING AND 4th GOLDSCHMIDT CONFERENCE TO BE IN EDINBURGH, 1994

Following the success of the first major European Association of Geochemistry (EAG) Meeting in Paris in 1988, it was intended to hold the second meeting in 1992. However, since that would be in the same year as the 3rd V.M. Goldschmidt Conference in Reston, VA, USA , it has been agreed between the Geochemical Society and the EAG that the EAG will be a of sponsor the 3rd V.M. Goldschmidt Conference and that there will be a major geochemical meeting in Europe in 1994. The second major EAG Meeting will therefore be held at Edinburgh on Sunday 28 August - Saturday 3 September 1994, under the auspices of the EAG and the Geochemical Society, and this will also be the 4th V.M. Goldschmidt Conference. The convenor is Dr. B. Harte, Department of Geology and Geophysics, Grant Institute, University of Edinburgh, West Mains Road, Edinburgh, EH9 3JW. The 3rd V.M. Goldschmidt Conference will be held on May 8-10, 1992, Hyatt Town Center, Reston, VA. Chairman: Dr. B.R. Doe. Detailed program information for this conference is given in the back section of this issue of *The Geochemical News*.

SPECIAL PUBLICATIONS SERIES NOS 3 AND 4 -- SPECIAL THANKS TO AL LEVINSON

With the death of Special Publication Series Editor, Doug Brookings last year, Al Levinson picked up the management of these two volumes and assured that they would be monographs of which the Geochemical Society could be proud. Al, who has served the Society so well in so many ways over the years, has done it once again. Our sincere thanks for the success of this difficult job.

Stable Isotope Geochemistry: A Tribute to Samuel Epstein This volume is out and is available! Regular non-member and institutional price is $65 US. It consists of 39 papers (516 pages) covering seven different aspects of stable isotope geochemistry (e.g., experimental isotope fractionation studies, the hydrosphere and ancient oceans, climatology and glaciology). The editors are H.P. Taylor, Jr., J.R. O'Neil, and I.R. Kaplan. For those members that did not take advantage of the pre-publication offer, the price is $45 US.

Victor Moritz Goldschmidt: Father of Modern Geochemistry This volume is the biography of the world's greatest geochemist written by Brian Mason, the last person to start graduate work under his direction. It covers Goldschmidt's life and work in fascinating detail, augmented by a 24-page insert containing 43 photographs, which capture his greatness and complexities. The volume is presently being printed and bound. Comments from the four reviewers have been uniformly glowing. This may well turn out to be the most widely read biography of any earth scientist. The pre-publication price for this volume to members of the Society has been set at $18 US. After this special offer, the regular price will be $30 US (to members) and $40 US (to non-

members and institutions). This 210 page book will be available at the 3rd Goldschmidt Conference at which time Brian Mason will be available to autograph copies purchased there. THE PRE-PUBLICATION OFFER WILL BE DISTRIBUTED IN APRIL TO THOSE UNABLE TO ATTEND THE CONFERENCE.

CALL FOR NOMINATIONS FOR GEOCHEMICAL SOCIETY AWARDS

This is a reminder that nominations are being accepted for the three awards that the Geochemical Society confers: the ***V.M. Goldschmidt Award***, the ***F.W. Clarke Award*** and the ***Alfred Treibs Award***. Nominations are closed for 1992 awards but it is not too early to be thinking about the 1993 Goldschmidt and Clarke awards. The Goldschmidt Award, consisting of a gold medal and a certificate, is to be made yearly for major achievements in geochemistry or cosmochemistry (nomination deadline: 12/15/92). The Clarke Award, consisting of a medal and a certificate, is to be made yearly to a young scientist for a single outstanding contribution to geochemistry or cosmochemistry, published as either a paper or a series of papers on a single topic. The award must be received no later than the year of the recipient's thirty-fifth birthday. (nomination: deadline 11/30/92). The Treibs Award consisting of a gold-filled medal and a certificate, shall be awarded every odd-numbered year for major achievements, over a period of years, in organic geochemistry. The nomination deadline for the 1993 award is 10/15/92. Those interested in making a nomination for any of these awards should consult April, 1992 *Geochimica et Cosmochimica Acta* and contact directly the appropriate award committee chairperson:

V.M. Goldschmidt Award:
Dr. Nobu Shimizu
Woods Hole Oceanographic Institute
Department of Geology and Geophysics
Woods Hole, MA 02543 USA
Ph: 508 457-2000 Fax: 508 457-2187

F.W. Clarke Award:
Dr. P.R. Buseck
Department of Geology
Arizona State University
Tempe, AZ 85287 USA
Ph: 602 965-3945 Fax: 602 965-8102

Alfred Treibs Award:
Dr. Michael J. Whiticar
School of Earth and Ocean Sciences
P.O. Box 1700, University of Victoria
Victoria, B.C. CANADA
Ph: 604 721-7334 Fax: 604-721-7715

MSA SHORT COURSE ON HIGH-RESOLUTION TEM

The Mineralogical Society of America is sponsoring a Short Course entitled *"Minerals and Reactions at the Atomic Scale -High-Resolution TEM"* at Hueston Woods State Park Lodge, College Corner, Ohio, October 23-25, 1992 (just before the GSA Meeting). The Organizer is Peter R. Buseck, Arizona State University. The goals of the course are to (a) provide a background into the TEM as a mineralogical tool, (b) give an introduction to the principles underlying its operation, and (c) explore mineralogical applications and ways in which electron microscopy can augment our knowledge of mineral structures, chemistry, and origin. Special attention will be devoted to mineralogical applications. We expect to have a modern TEM for hands-on demonstrations and exercises. Topics to be covered include the following: general principles of transmission electron microscopy; principles I: electron diffraction- SAED & CBED; principles II: high resolution image formation, simulation, and analysis; inelastic interactions - EDS chemical analysis; EELS & electron channeling (ALCHEMI); non-stoichiometry, polysomatism, and reactions in minerals; polytypism & stacking disorder; phase definition by HRTEM; diagenetic reactions & processes: clays & shales; carbonates; analysis of deformation in geological materials; imaging transformation-induced microstructures. For a registration form, write or call: MSA Business Office, 1130 Seventeenth Street, NW, Suite 330, Washington, DC 20036. Phone: (202) 775-4344 FAX: (202) 775-0018

RESULTS OF THE GEOCHEMICAL SOCIETY MEMBERSHIP SURVEY ABOUT THE FUTURE OF OUR JOURNAL

The results of our membership survey about the future of our journal are given below. The Directors of the Geochemical Society wish to thank each of you who took the time to respond and many others who thought about the issues involved as a result of the questionnaire and the open letter that preceded it. To get a feel for what percentage of the membership responded, a response of 231 members to the first question represents 13.3% of the total membership (regular + students).

What is your preference for the official journal of the Geochemical Society?

224 a. Start a new journal to which the Society owns title. As described in the newsletter, the aim would be that this journal would be similar to the present GCA, and could supplant a Pergamon-owned GCA as the premier journal in geochemistry. This course would involve some risk because Pergamon would presumably try to continue to publish GCA.

7 b.Maintain our affiliation with Pergamon in order to keep the title Geochimica et Cosmochimica, even if the terms are deemed unfavorable to the Geochemical Society

What is your preference for publishing a new journal? (Note: this is a complex question with considerable financial ramifications. We ask your opinion on an "other things being equal" basis. The Directors and the Publications Committee will gather information on the pros and cons of each of these choices over the next few months.)

123 a. Own journal title and use a non-profit publisher such as University of Chicago Press, American Chemical Society or AGU. The journal would function essentially as it does now, with the publisher financing the operation of the editorial office, contracting with the printer, advertising, etc. We would have almost total control over financial and other aspects of the journal (assuming we set prices so as not to run a large deficit) and would pay the publisher overhead (probably 10 to 15% of sales). This option holds less financial risk but perhaps also a little less independence.

56 b Have the Society assume the role of publisher. This is the model used by the Mineralogical Society of America. It provides more independence, but substantially more financial risk because all expenses must be met by the Society up front (setting up editorial office, advertising, permanent staff, etc.).

4 c. Negotiate a contract with another commercial publisher under which we would own title and have some financial say in the running of the journal.

56 d. Agree with whatever choice Directors and Publications Committee deem best.

If we start a new journal that replaces GCA as the official journal of theSociety, how is this likely to affect your Geochemical Society membership?

133 a. Strengthen your ties to the Society 2 b. Weaken your ties to the Society. 95 c. Indifferent.

Would you be willing to lobby your library to subscribe to the new journal from the very first issue if it is packed with superb papers?

225 a. Yes 3 a. No

Would you still lobby your library to subscribe to the new journal even if it meant that your library had to cancel another journal subscription?

221 a. Yes 5 a. No

Would you be willing to submit your own best papers to the new journal in order to insure its success?

223 a. Yes 3 a. No

Would you be willing to campaign with your non-GS colleagues to submit their best geochemical papers to the new journal?

211 a. Yes 15 a. No

NEW ADMINISTRATOR FOR THE GEOCHEMICAL SOCIETY OFFICE

The Geochemical Society is happy to welcome Wanda Davis, our new administrator who is staffing the Geochemical Society Office at the Ohio State University. Wanda has actually been on board since October, replacing Connie Meyers who left the position in August. In fact, Wanda helped get the last Newsletter out. It is important for our members to know about Wanda and her office because they represent a major step forward in service to you.

Wanda works for the Society in two ways. One is to maintain the membership list which is used to collect member dues and make up labels for mailing out *Geochimica et Cosmochimica Acta*, *The Geochemical News* and other special mailings of the Society. The Society has tried hard to streamline communications about the status of one's membership and now a simple phone call, letter, FAX or E-Mail message to Wanda will do. She will handle general inquiries about membership and your subscription to *Geochimica et Cosmochimica Acta*. Specifically, if you have requests for membership applications, changes of address, want to order back issues of *Geochimica et Cosmochimica Acta* and obtain replacements for damaged *GCA* issues, give Wanda a call. **In this vein, it is important for members to note that the fastest way and the recommended way to appraise the Society and Pergamon of your new address (should you change your address) is to call or write Wanda directly**. She is the source of Pergmon's mailing list for the members, regularly updates their files and prints the actual mailing labels by which *GCA* and *The Geochemical News* are mailed. **You can send in the address change form included in the GCA mailing envelope to Pergamon but it is slower by more than a month over sending the address change directly to Wanda. Often this delay causes the Society to pay extra to obtain back issues for members.**

Wanda's second role is to facilitate communication for Society members. She can pass along Special Publication information and orders, redirect *GCA* journal matters to the *GCA* offices and serve as a liaison between Society members, Directors of the Society and the Editorial Board of *GCA*. Please feel free to contact Wanda at the address or numbers below. Her hours are 9:30 AM to 3:00 PM, daily except Thursdays when her hours are 9:30 AM to 1:00 PM.

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IDEAS FOR GEOCHEMICAL SOCIETY SESSIONS AT GSA AND AGU MEETINGS NEEDED

Theme Session and Symposia ideas and organizers are needed for the 1993 Geochemical Society meetings, Spring AGU in Baltimore, 24-28 May 1993, and GSA Annual Meeting in Boston, 25-28 October 1993. Your Society encourages you to take advantage of these opportunities to directly influence the scientific and technical content of these meetings.

Geological Society of America Meeting: The Geochemical Society is an affiliated society of the Geological Society of America and as such holds its annual meeting as part of the GSA meeting. The GSA meeting provides two special formats in addition to the volunteered technical sessions. One is the symposium, which consists entirely of invited papers. The presentations can be either oral or poster, but not mixed and are organized by the conveners. Symposia are sponsored by GSA sections and associated societies. The second format is the theme session. The theme session consists entirely of volunteered papers and is designed to arrange abstracts into interdisciplinary sessions. Theme sessions have an advocate, someone who will encourage the submittal of abstracts to the session and will act as liaison to the Joint Technical Program Committee. The theme session will fall under one or more (but no more than three) categories listed on the right-hand side of the abstract form. Any abstract not included in the theme session is then considered in the selected category. The Geochemical Society is soliciting topics for its symposium and for theme sessions. If you have an idea for a topic or would like to be an advocate for a theme session

under the geochemistry category, please contact Ted Labotka at the Department of Geological Sciences, University of Tennessee, Knoxville 37996-1410, 615-974-2366, Fax 615-974-2368, E-Mail LABOTKA@TLXRAY.DNET.UTK.EDU. If you are interested in advocating a theme session, he can send you the necessary information and forms. The deadline for submitting symposium and theme session proposals to JTPC is by the end of December, 1992.

American Geophysical Union Meeting: Starting in 1993, the GS will be a sponsoring society of the Spring American Geophysical Union (AGU) meeting with the opportunity to hold our own sessions and to sponsor sessions jointly with the Mineralogical Society of America and AGU sections. Please consider symposium topics for this meeting. Each symposium, according to AGU policy, must have two chairpersons. L. Peter Gromet is the GS's delegate to the AGU program committee. His address is Department of Geological Sciences, Brown University, Providence, RI 02912 401-863-1920, E-Mail LPG@AVALON. GEO.BROWN.EDU. Please contact him with your ideas for session topics for the joint AGU-MSA-GS meeting. Note that from June 1 to Nov. 1, 1992 Peter will be in Sweden at the Laboratory for Isotope Geology, Swedish Museum of Natural History, P.O. Box 50007, S-104 05 Stockholm, Sweden Fax 46-8-666-4085. The first call for session topics will appear in EOS, AGU's weekly newspaper, in December, 1992. Ideas for sessions can be submitted through January, 1993.

MEMORIAL TO RICHARD LEE ARMSTRONG 1937-1991

Richard Lee Armstrong died, a victim of cancer, on August 9, 1991 at the pinnacle of his prolific and remarkable career as an earth scientist. He is survived by his mother Bernice, children Becky, Karl, and Kathy, and their mother Julie. Dick, as he was known to colleagues and friends, was born on August 4, 1937 in Seattle, Washington. During his illness, Dick remarked that his life was composed of three parts, each 18 years in duration. The first 18 years were spent in Seattle where his aptitude for science was evident early on. The next 18 years were his Yale University days. He left home in 1955 to attend Yale, first as an undergraduate (B.S. 1959), then as a Ph.D. graduate student (Ph.D. 1964), and afterward until 1973 as assistant and associate professor in the Geology Department. During his time as a Yale professor, he spent two years away, first in 1963-64 on a National Science Foundation Postdoctoral Fellowship at the University of Bern, and in 1968-69 as a Morse and Guggenheim Fellow at the Australian National University and California Institute of Technology. At the beginning of the last 18 years in 1973, Dick moved back to the west coast to the University of British Columbia in Vancouver, where he was associate and then full professor until his death. He became a Canadian citizen in 1979.

Dick's insight into an enormous variety of earth science problems is nothing short of remarkable. He was regarded as an expert in fields as diverse as isotope geochemistry and geochronology, geochemical evolution of the earth, geology of the entire North American Cordillera, and large magnitude crustal extension. His passion, in the words of his former thesis supervisor Karl Turekian, "was to understand the earth". Dick pursued this goal throughout his career, and interwove these diverse fields into a research program which significantly affects our view of tectonic processes in the earth. His bibliography contains more than 170 published papers, and he strived to get nearly every isotopic study which he or his students produced into the professional literature. Dick's analytical work was not at the leading edge of high-tech and ultra precise measurement; he never strived for these goals. Instead, he applied methods that were reliable and suited the geological problems which he wanted to solve. His work began with K-Ar methods, including neutron activation and isotope dilution methodologies, and then branched to include Rb-Sr, U-Pb and Nd-Sm. By maintaining an academic and laboratory environment with colleagues and students which was very productive, he produced a huge volume of isotopic data which shed light on the chronology of magmatism, metamorphism and tectonics over most regions of western North America. Several fundamental first order syntheses of Mesozoic and Tertiary magmatism in western North America were produced by Dick during the last 20 years of his career using this large database.

Dick was a patient and caring teacher who always had time for those students who needed a bit of extra help; I recall him repeatedly editing my thesis manuscripts with numerous red pencil marks, and returning them to me usually within 3 days after he received them unannounced; his duty to students was not to delay or obstruct their progress. Dick was generous to a fault, particularly with students. His intellect and geological intuition moved at a pace which easily eclipsed his students, but I don't recall him revealing that he already knew the answer if it was a student project. He would gently nudge and direct, all the while letting his students discover for themselves and take pride in the accomplishment. This sense of generosity was also characteristic of his relationship to his family and friends outside of his professional life, though few of us saw that side of Dick because he was a very private person.

Dick was very active in the community of geoscientists in its broadest sense. In spite of his position in the forefront in several geoscience fields, Dick was not an "ivory tower" scientist. On the local scene, he was an active member of the Vancouver-Victoria geoscience community, which is dominated by mining exploration geologists. As part of his recreation, he attended local lectures and field trips whenever possible, the last being a field trip in southern British Columbia organized for mining explorationists one month before he was diagnosed as having cancer. He was an active member of the Geological Society of America and editorial boards for several journals, participated actively in the peer review process of the National Science Foundation and Canada's Natural Sciences and Engineering Research Council, and played an active role in Canada's Lithoprobe program. He did his duty in organizing meetings held locally, including the 1985 GSA Cordilleran Section and the 1987 IUGG meetings held in Vancouver. He was always available to act as a scientific sounding board and gave well-considered advice. His distinguished career was rewarded with election to the Royal Society of Canada in 1981, a Killam Prize at UBC in 1986, and the Logan Medal of the Geological Association of Canada in 1990.

Richard Lee Armstrong's scientific contributions which will be remembered decades from now are numerous; perhaps surprisingly, three of these advances were conceived before 1970, during and within a few years after he gained the Ph.D. degree. He published 43 papers prior to his 35th birthday, including most of the main conceptual breakthroughs of his career. The concepts advanced by Dick required both great intellect and intuition because at the time a convincing supportive database did not exist; this put Dick squarely in the midst of professional controversy with well-established colleagues.

One of these breakthroughs evolved from his Ph.D. thesis work in the Sevier orogenic belt of Nevada-Utah. As part of this overall geological study, he examined existing maps of low-angle faults which mainly placed younger rocks on older ones and he concluded that these were rotated Tertiary normal faults. His interest in Tertiary magmatism no doubt helped him focus on the involvement of these younger rocks in the faulting, because he realized that the distribution of older rocks that were demonstrably overlain by Tertiary volcanics required that the low-angle faults were younger Tertiary normal faults and not older thrust faults as was previously assumed. His 1972 paper on this subject was a watershed which spurred on a generation of scientists to fully describe and study the now famous metamorphic core complexes of the Great Basin of the Cordillera.

Secondly, Dick was interested in using isotopic methods to determine the chronology of magmatism, plutonism, and cooling of crystalline rocks, and thereby understand crustal processes better. Through his Ph.D. work and the Postdoctoral Fellowship in Bern in 1963-1964, he recognized the effect of metamorphism and thermal disturbance on mineral isotopic ages, and interpreted dates in metamorphic areas as ages of cooling. His 1966 paper on the metamorphic veil remains a key seminal paper; subsequent research by many others involved quantifying the thermal retentivity of daughter isotopes into closure temperature theory.

The third main breakthrough was probably the most misunderstood and controversial of Dick's remarkable contributions: his formulation of a terrestrial geochemical model incorporating recycling of crustal materials, including sediments and continental crust, in a plate tectonic context. This model was formulated at a time when most earth scientists did not even accept the main tenets of plate tectonics! It was a view 20 years ahead of its time. Using initially a very meagre database and arguments of continental freeboard, Dick explained the evolution of first Pb, then Sr and finally Nd isotopes by a near-steady state process of crustal recycling in a dynamic earth with near constant

volume of continental material from the early Archean. His views were controversial to say the least, and contested by many prominent isotope geochemists of the last 20 years. In his final paper on this subject entitled, "The persistent myth of crustal growth" he was unrepentant and continued to argue that if all other planetary bodies in our solar system differentiated at their earliest stages, why then did the earth have to wait and have its own differentiation dragged out over billions of years of time? A growing number of isotope geochemists are adopting Dick's view, after such a long period of gestation, and his 1968 proposal of crustal recycling has now clearly been proven with ^{10}Be and other geochemical evidence. The evolution of this controversy is puzzling and ironic, but reminiscent of other brilliant scientists whose ideas had to wait decades for acceptance and vindication. Dick was very happy at the recognition which he finally received for his model of crustal recycling at the 1990 ICOG meeting in Canberra. It is very fitting that the writing of his final paper on this subject and the vindication of his ideas occurred while he was still alive.

Finally, most of Dick's professional effort was spent not on these lofty breakthroughs, but instead on the gruelling effort of systematically working with rock after rock, area after area, student after student to built the enormous database in the Cordillera which presently exists. A large number of geological colleagues are indebted to him for his efforts which have made their work more fruitful and interesting. All those who knew Dick felt a great sense of loss at his premature passing, and know that such talented, inspiring, and thoughtful scientists as he touch our lives much too rarely. He was very concerned that his work in radiogenic isotope geochemistry and geochronology be carried on at UBC in a vigorous tradition, a hope which is shared by all of his students and professional colleagues. An endowed scholarship in Dick's name has been established at the Department of Earth Sciences, University of British Columbia.

Selected Bibliography of Richard Lee Armstrong

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Ottawa, Canada, K1A 0E8

NORTH AMERICAN LECTURE TOUR FOR STEVEN MOORBATH

Dr. Stephen Moorbath, Professor at Oxford University and an international Director of the Geochemical Society, will undertake a Geochemical Society sponsored lecture tour preceding the 3rd Goldschmidt Conference. Dr. Moorbath will speak on *"Continental Magmatism as an Indicator of Mantle/Crust Differentiation"*. His tour will take him to the University of Pittsburgh Wed., April 22; the University of Michigan (Ann Arbor) Fri., April 24; the Ohio State University (Columbus) Mon., April 27; the University of Wisconsin (Madison) Wed., April 29; the U. S. Geological Survey (Denver) Fri., May 1; and the University of Arizona (Tucson) Tue., May 5. If you are interested in attending the lecture, please contact the hosting department regarding details of time and place. Dr. Moorbath's lecture tour is part on an ongoing GS effort to bring internationally-known scientists to North American universities at minimal expense. If interested in co-sponsoring such a visit by an international Director in the future, please contact Julie Morris, International Secretary, Dept. of Terrestrial Magnetism, 5241 Broad Branch Rd, N.W., Washington DC, 20015, (202)686-4391; FAX: (202)364-8726; E-mail : MORRIS@CIW.SPAN.NASA.GOV

UPCOMING MEETINGS OF INTEREST TO GECHEMICAL SOCIETY MEMBERS

April 5-10, 1992 *203rd National Meeting of the American Chemical Society*, San Francisco, CA USA. (ACS Meetings Department, 1155 16th Street, NW, Washington, DC 20036. Ph: 800-227-5558 or 202-872-6059)

May 8-10, 1992 *3rd V.M. Goldschmidt Conference*, Reston, VA USA (Geochemical Society, Donna Ricketts, Conference Coordinator, 409 Keller Conference Center, The Pennsylvania State University, University Park, PA 16802. Ph 814-863-1743)

May 11-15, 1992 *AGU, MSA, and CGU Spring Meeting*, Montreal, Canada. (Meetings, AGU, 2000 Florida Ave., N.W., Washington, DC 20009; Ph: 202 462-6900; Fax 202 328-0566.

May 22-24, 1992 *Pan-American Current Research on Fluid Inclusion (PACROFI IV)*, Lake Arrowhead, Calif. (Michael A. McKibben, Department of Earth Sciences, University of California, Riverside, CA 92521-0423;; Ph: 714 787-3444; Fax 714 787-4324)

May 25-27, 1992 *Geological Association of Canada/Mineralogical Association of Canada Joint Annual Meeting*, Wolfville, Nova Scotia, Canada. (Aubrey Fricker, General Secretary, Atlantic Geoscience Centre, Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, Nova Scotia, Canada, B2Y 4A2; Ph: 902 426-6759; Fax 902 426-4465)

June 21-24, 1992 *Society of Economic Paleontologists and Mineralogists (SEPM)*, Calgary, Alberta. OGD members of the GS note the symposium on "Molecular and Isotopic Stratigraphic Records of Paleoenvironmental Change" to be held at this meeting. (Contact Lisa Pratt, Biogeochemical Labs, Geology Building, Indiana University, Bloomington, IN 47405, Ph: 812 855-5610, Fax: 812 855-7899)

June 21-24, 1992 *American Association of Petroleum Geologists*, ann. mtg., Calgary, Alberta, (AAPG, Box 979, Tulsa, Okla. 74101-0979. Ph: 918 584-2555, Fax: 918 584-0469)

June 28-July 1, 1992 *North American Paleontological Congress V*, Chicago, IL. OGD members of the GS note the symposia on "Biomolecular and Isotopic Paleontology" and "Molecules in the Fossil Record" to be held at this meeting. (Contact John Hayes, Biogeochemical Labs, Geology Building, Indiana University, Bloomington, IN 47405, Ph: 812 855-5610, Fax: 812 855-7899)

July 13-18, 1992 *Symposium on Water-Rock Interaction*, Park City, Utah. Sponsors: AGU; U.S. Geological Survey (Yousif Kharaka, Secretary-General WR1-7, U.S.G.S., MS 427, 345 Middlefield Rd., Menlo Park, CA 94025, Ph. 415 329-4535; Fax: 415 329-5110)

Aug. 8-10, 1992 *Venus*, int'l mtg., Pasadena, Calif. (Pamela Jones, Program SErvice Department, Lunar and Planetary Institute, 3303 NASA Road, 1, Houston, 77058-4399. Ph: 713 486-2150. Fax: 713 486-2160)

Aug. 24-Sept. 3, 1992 *29th International Geological Congress*, Kyoto, Japan. (Secretary General, IGC-92 Office, P.O. Box 65, Tsukuba, Ibaraki 305, Japan; Ph. 81-298-54-3627; Fax : 81-298-54-3629)

Aug. 31-Sept. 2, 1992 *International Conference on Large Meteorite Impacts and Planetary Evolution*, Sudbury, Ontario, Canada. Sponsors: Ontario Geological Survey; Lunar and Planetary Institute; IUGS Commission on Comparative Planetology. (Sudbury 1992, c/o B. Dressler, Ontario Geological Survey, 77 Grenville St., Toronto, Ontario, Canada, M7A 1W4; Ph. 416 965-4817; Fax 416 324-4933)

Sept. 9-15, 1992. *Transition from Basalt to Metabasalt: Environments, Processes, and Petrogenesis*, Davis, Calif. Sponsors: IGCP Project 294; others. (Peter Schiffman, Dept. of Geology, University of California, Davis, CA 95616; Ph. 916 752-3669)

Oct. 4-9, 1992. *Fluid/volcano interactions*, GSA Penrose Conference, Warm Springs, Ore. (Steve Ingebritsen, USGS, MS 439, 345 Middlefield Road, Menlo Park, Calif. 94025. Ph: 415 329-4422. Fax: 415 329-4463)

Oct. 26-29, 1992. *Geological Society of America*, and affiliated societies, ann. mtg., Cincinnati. (Vanessa George, GSA, Box 9140, Boulder, Colo. 80301. Ph: 303 447-2020)

SPECIAL SECTION ON THE 3rd GOLDSCHMIDT CONFERENCE MAY 8-10, 1992 HYATT RESTON TOWN CENTER RESTON, VA

GOLDSCHMIDT AWARD TO GO TO A.E. RINGWOOD AT 3rd GOLDSCHMIDT CONFERENCE

The V.M. Goldschmidt Award will be given to A.E. Ringwood, Research School of Earth Sciences, The Australian National University at the 3rd Goldschmidt Conference in Reston, VA. The award will be given at a 6:00 pm reception on Saturday, May 9th, 1992. The reception will be followed by the Goldschmidt Banquet. See details below. The award is normally given at the Geochemical Society's Awards luncheon at the Geological Society of America Annual Meeting but was deferred until the Goldschmidt Conference because of Ringwood's travel schedule. The Award Committee cited Ringwood for his major contributions in understanding the composition and mineralogy of the mantle, high-pressure research, lunar petrogenesis and origin of the moon and the Earth's core.

SPRING MEETING OF BOARD OF DIRECTORS OF THE GEOCHEMICAL SOCIETY

At the present time, the 1992 spring meeting of the Board of Directors of the Geochemical Society is scheduled for just after the end of the 3rd Goldschmidt Conference in Reston, VA on Sunday May 10, 1992 from 12 noon to 4 pm at the Hyatt Reston Town Center.

SPECIAL EVENTS AT THE 3rd GOLDSCHMIDT CONFERENCE

At the Goldschmidt Conference there will be a total of about 300 papers given. I am happy to say that the meeting room rental is the same as two years ago and that the sleeping room rental is $10 less than two years ago at Hunt Valley.

The following events are planned: Thursday night there will be a keg reception at the Hyatt Reston; Friday night there is a banquet for Dick Holland given by his friends that is not on the preregistration circular; Saturday afternoon there will be a plenary session at 5:00 PM to include a welcome by Dallas Peck, Director of the U.S. Geological Survey and the Distinguished Lecture of the International Association of Geochemistry and Cosmochemistry (IAGC) given by Al Levinson, "Age, Origin, and Emplacement Of Diamonds: Application to Exploration"; the lecture will be followed by the Goldschmidt Reception at about 6:00 PM and then the Goldschmidt Banquet. At the banquet, the Goldschmidt Medal will be presented to Ted Ringwood of ANU.

There are two geochemical field trips. As of 3/19/92, 15 have preregistered for the first field trip and 17 for the second. (1) One is by Al Froelich and David Gottfried (both of the U.S. Geological Survey) with Dick Tollo of George Washington University to the basalts and intrusives of the Culpeper Basin. The USGS study has just been completed and participants will get a floppy Open File of the extensive amount of geochemical data that has just been released. (2) The other is by Owen Bricker (U.S. Geological Survey) on the geochemistry of two sub-basins of a small drainage basin; one acid sensitive and the other not.

Abstracts of oral presentations in 13 symposia plus the poster sessions are up to about 650 words, more than twice the normal meeting length. The Program with Abstracts ($20 US) is available from Donna Ricketts, 409 Keller Conference Center, The Pennsylvania State University, University Park, PA 16802: Telephone (814) 863-1743; Fax (814) 865-3749. Abstract volumes from the 2nd Goldschmidt Conference (1990) are also available from Donna Ricketts for a price of $15 US. As of 3/19/92, preregistration was 229. From past experience, we expect to hit 400 registrants. Also at the meeting, people will be able to purchase a copy of the biography of Goldschmidt written by Brian Mason ($18) and have it autographed by Brian.

Bruce Doe, Chairman

SCHEDULE OF PRESENTATIONS

FRIDAY MAY 8, 1992

Poster Session

Location: Regency Ballroom B

Session Chair: Bruce R. Doe

Posters will be set up by 9:00 a.m. and on display all day. Authors will be present 6:30 - 8:30 p.m.

I. Economic Geology

1. Nora K. Foley, Robert A. Ayuso
TRACE ELEMENT AND Pb ISOTOPIC CHARACTER OF MINERALIZED ROCKS OF THE Au-Ag NORTH AMETHYST VEIN, MINERAL COUNTY, COLORADO

2. David A. Scorgie, Mohammed Ikramuddin
THALLIUM IN OXIDIZED AND UNOXIDIZED PORTIONS OF AN EPITHERMAL GOLD-SILVER DEPOSIT AT THE BUCHHORN MINE, NEVADA

3. Robert B. Finkelman
CONTROLS ON EPIGENETIC CLEAT-FILLING MINERALIZATION IN BITUMINOUS COAL SAMPLES

4. William H. Orem, Harry E. Lerch, Sandra G. Neuzil
CHEMICAL STRUCTURAL STUDIES OF DISSOLVED ORGANIC MATTER FROM INDONESIAN PEAT SWAMPS

5. Jeffrey M. Rosenbaum
CARBON DIOXIDE/CALCITE ISOTOPIC FRACTIONATION: EQUILIBRIUM AND KINETICS

6. Lawrence D. Hoy
THE GENERALIZED APPLICATION OF ONE DIMENSIONAL WATER-ROCK INTERACTION MODELS TO THE PREDICTION OF O AND H ISOTOPIC CHANGES IN ORE-FORMING SYSTEMS

7. A. Jiange, G.C. Amstutz
$Cu_{1-x}S$ MINERALS AND DOLOMITES: THEIR PARAGENETIC POSITIONS AND GEOCHEMICAL FEATURES IN THE DONGCHUAN COPPER DEPOSIT, SOUTHERN CHINA

8. S.M. Billo
GEM AND INDUSTRIAL MINERALS IN ECONOMIC GEOLOGY

9. Wang Shengyuan, Wang Xiuzhang, Cheng Jingping, Wang Nan
TRANSPORT AND CONCENTRATION OF GOLD IN METAMORPHIC-HOSTED REWORKED STRATABOUND GOLD DEPOSITS IN CHINA

10. Jun Chen, C. Halls, C.J. Stanley
MINERAL ASSOCIATION AND MINERALOGICAL CRITERIA FOR FORMATION CONDITIONS OF A B-F-Sn-Bi SKARN IN DAMOSHAN, GEJIU TIN FIELD, SOUTHWEST CHINA

II. International Geochemical Mapping

Poster Session affiliated with the Symposium on **International Geochemical Mapping**; *Organized by* P. H. Davenport; *Sponsored by* Association of Exploration Geochemists

11. P.W.B. Friske, M. McCurdy, S.W. Adcock
GEOCHEMICAL MAPPING–PROGRESS IN CANADA

12. P.R. Simpson, F. Fordyce, C. McDermott
VARIABLE SAMPLE DENSITY SIMULATION OF REGIONAL GEOCHEMICAL SURVEY MAPS

13. B. Bølviken, P.R. Stokke
FRACTALS AND GEOCHEMICAL EXPLORATION

14. Bing-Quan Zhu
THE MAPPING OF GEOCHEMICAL PROVINCES IN CHINA BASED ON Pb ISOTOPES

III. Diagenesis of Clay Minerals

Poster Session affiliated with the Symposium on **Diagenesis of Clay Minerals in Sedimentary Basins**; *Organized by* Virginia Colten-Bradley, Lee Kump, and George Kacandes

15. S. Kelly Sears, Reinhard Hesse
FACTORS AFFECTING THE RELIABLE RATIO DETERMINATIONS OF EXPANDABLE TO NON-EXPANDABLE COMPONENTS IN MIXED-LAYER ILLITE-SMECTITE

16. A.V. Shanwal
ILLITE TRANSFORMATION TO HIGH-CHARGE SMECTITE IN LATE PLEISTOCENE SEDIMENTS OF INDO-GANGETIC ALLUVIAL PLAIN, INDIA

17. Liberto De Pablo-Galan
THE ROLE OF CALCIUM ALUMINUM SILICATE CARBONATE HYDRATES IN THE FORMATION OF PALYGORSKITE

18. P.P. Chowdhury, S.K. Gupta, J.N. Bhadra Chaudhuri
GEOCHEMICAL SIGNIFICANCE OF THE CHARGE DISTRIBUTION OF THE GANGES CLAY AT THE DELTA OF BAY OF BENGAL

19. Sylvia C. Anjos
CLAY MINERALOGY AND DIAGENETIC EVOLUTION OF THICK SEQUENCES OF SHALES FROM CRETACEOUS/TERTIARY BASINS IN BRAZIL

IV. Surface Chemistry of Natural Materials

Poster Session affiliated with the Symposium on **Surface Chemistry of Natural Materials**; *Organized by* James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

20. Yigal Erel
THE EFFECT OF SURFACE REACTIONS ON THE RELATIVE ABUNDANCES OF TRACE METALS IN AQUATIC SYSTEMS: A TOOL FOR THE INTERPRETATION OF GEOCHEMICAL OBSERVATIONS

21. Larry Benninger
PARTICLE-REACTIVE ELEMENTS IN SANDS OF THE ATLANTIC CONTINENTAL SHELF - UPPER SLOPE

22. Ruben M. Kretzschmar, Wayne P. Robarge, Sterling B. Weed
COLLOID AND SURFACE PROPERTIES OF KAOLINITIC SOIL FINE CLAYS (<0.2 μm)

23. K.A. Bolton, L.J. Evans
MODELLING CADMIUM RETENTION IN SOILS

24. Alan L. Rachlin, Grant S. Henderson
AN ATOMIC FORCE MICROSCOPE (AFM) STUDY OF THE APOPHYLLITE CLEAVAGE PLANE

25. N. Pingitore Jr., P. Borrego, C. Podpora, K. Love
INDEPENDENCE OF BET-MEASURED SURFACE AREA AND GRAIN SIZE IN BIOGENIC CARBONATES

26. Yong Ran, Liu Zheng
THE ADSORPTION-DESORPTION AND SPECIFIC ADSORPTION MECHANISM OF RARE EARTH ELEMENTS BY SYNTHETIC OXIDES, AND SOILS

V. Petrology

27. Shaoxiong Wen, Hanna Nekvasil
CONSTRAINTS ON THE PRODUCTION OF "MINIMUM MELTS"

28. C.P. DeWolf, A.N. Halliday, K. Mezger, E.J. Essene, Z. Sharp
U-Pb AND Sm-Nd SYSTEMATICS OF LEACHED GARNETS FROM THE NORTHERN WIND RIVER RANGE, WYO., U.S.A.: IMPLICATIONS FOR HIGH GRADE GARNET GEOCHRONOLOGY

29. A. Cocherie, C. Guerrot, M. Ohnenstetter, Z. Johan
AGE AND CONDITIONS OF EMPLACEMENT OF THE WEST ANDRIAMENA PAN-AFRICAN ULTRAMAFIC COMPLEXES IN MADAGASCAR: TRACE ELEMENT AND U-Pb AND ND ISOTOPE GEOCHEMISTRY

30. Jianghai Wang
THE REE MODELING AND PETROGENESIS OF DABIE COMPLEX, IN DABIE MTS., CHINA

31. Liming Zhang
THE DISTORTION OF COORDINATION POLYHEDRON AND THE APPLICABILITY OF THE BOND VALENCE MODEL

VI. Environmental Geochemistry

Poster Session affiliated with the Symposium on **Environmental Geochemistry and Health**; *Organized by* Bobby G. Wixson and Betsy T. Kagey; *Sponsored by* Society of Environmental Geochemistry and Health

32. Katherine Witherell, David E. Krantz
PALEOENVIRONMENTAL INTERPRETATIONS OF SHALLOW MARINE SYSTEMS USING MOLLUSK SHELL STABLE ISOTOPIC COMPOSITION

33. J.N. Valette-Silver, G.G. Lauenstein
CONCENTRATION OF ARTIFICIAL RADIONUCLIDES IN BIVALVES COLLECTED IN THE COASTAL UNITED STATES

34. Liisa Carlson, Jerry M. Bigham
RETENTION OF ARSENIC BY PRECIPITATES FROM ACID MINE DRAINAGE

35. J.L. Mogollon, C. Bifano, B.E. Davies
GEOCHEMICAL BEHAVIOR OF ANTHROPOGENIC AND NATURAL METALS IN A TROPICAL LAKE

36. M. Fiori, S.M. Grillo, A. Marcello, S. Pretti, S. Vacca, H. Muntau
METAL POLLUTION IN SEDIMENTS FROM LAKE MULARGIA, SARDINIA, ITALY

37. Armando J. Ramirez, Carlos E. Yanes, Henry D. Briceño, Fernando Ramos
POLLUTION BY MERCURY IN THE CARONI RIVER, VENEZUELA

38. Carlos E. Yanes, Armando J. Ramirez, Henry O. Briceño
ESTIMATION OF THE CHEMICAL WEATHERING IN THE VENEZUELAN GUIANA SHIELD

39. Liliana Lopez, Jean Pasquali
PRIMARY MIGRATION WITHIN THE QUERECUAL FORMATION, VENEZUELA

40. Hong Yetang, Yongxuan Zhu, Hongbin Zhang, Hechun Piao, Hongbo Jiang, Guangshen Liu
SOME ENVIRONMENT ISOTOPIC CHARACTERS OF STABLE SULFUR IN CHINA CONTINENT

FRIDAY MORNING

Symposium in Honor of H. D. Holland

Location: Lake Fairfax

Symposium organized by H. Ohmoto

Geochemistry of Hydrothermal and Magmatic Systems

Session Chair: H.L. Barnes

8:30 H. Ohmoto
OPENING REMARKS

8:35 Wolfgang Polster, H.L. Barnes
CONSISTENCY AMONG RATE CONSTANTS FOR REACTIONS OF QUARTZ WITH AQUEOUS SOLUTIONS

8:55 David R. Cole, David J. Wesolowski, S.E. Drummond
THE SOLUBILITY OF CALCITE AND DOLOMITE TO TEMPERATURES OF 300°C AND PRESSURES OF 1.3 KBARS

9:15 Julia Peck, Gordon Brown Jr., Jonathan Stebbins
CHLORINE NMR OF AQUEOUS Zn(II) AND Au(III) CHLORIDES: A NEW GEOCHEMICAL PROBE OF INNER SPHERE/OUTER SPHERE COORDINATION AND LIGAND EXCHANGE

9:35 Ursula M. Graham, Hiroshi Ohmoto
FORMATIONAL MECHANISM OF FRAMBOIDAL PYRITE ON SULFUR SURFACES

9:55 H. Ohmoto, K. Hayashi, Y. Kajisa
SOLUBILITIES OF IRON-SULFIDES AND -OXIDES IN WATER AND CHLORIDE-BEARING AQUEOUS SOLUTIONS AT 250°C TO 350°C

10:15 BREAK

Session Chair: M. Mottl

10:30 Kang Ding, W.E. Seyfried Jr.
EXPERIMENTAL INVESTIGATION OF Fe-Cl COMPLEXING IN THE LOW PRESSURE SUPERCRITICAL REGION (NaCl FLUID): APPLICATIONS TO SUBSEAFLOOR HYDROTHERMAL SYSTEMS

10:50 W.E. Seyfried Jr., K. Ding
PHASE EQUILIBRIA CONSTRAINTS ON DISSOLVED Cu, Fe, AND Cu/Fe RATIO OF HOT SPRING FLUIDS AT MID-OCEAN RIDGES

11:10 Bruce R. Doe
IMPORTANCE OF SOURCE ROCKS IN THE GENESIS OF METALLIC SULFIDE DEPOSITS: OCEAN RIDGE ENVIRONMENT

11:30 Naotatsu Shikazono
PRECIPITATION MECHANISM OF BARITE IN THE KUROKO DEPOSITS

11:50 A.C. Lasaga, D.M. Rye, C.I. Steefel
COUPLING FLUID FLOW AND CHEMICAL KINETICS: A NEW LOOK AT CURRENT MODELS

International Geochemical Mapping

Location: Lake Anne

Symposium organized by P. H. Davenport; *Sponsored by* Association of Exploration Geochemists

I. Introduction and Progress with National Mapping Programs

Session Chair: Arthur Darnley

8:30 P.H. Davenport and J.M. McNeal
INTRODUCTORY REMARKS AND OVERVIEW OF PROGRESS IN GEOCHEMICAL MAPPING IN CONTINENTAL NORTH AMERICA

8:40 Agnete Steenfelt
GEOCHEMICAL MAPPING - PROGRESS IN GREENLAND

9:00 V.K. Lukashev
GEOCHEMICAL STUDY AND MAPPING OF QUATERNARY DEPOSITS IN BYELORUSSIA

9:20 B. Bølviken, J. Bogen, R.T. Ottesen
GEOCHEMICAL MAPPING IN WESTERN EUROPE

9:40 DISCUSSION: "The future of International Geochemical Mapping"

10:00 BREAK

II. Applications

Session Chair: J.M. McNeal

10:20 P.F. Matysek, E.C. Grunsky, W. Jackaman
THEMATIC MAPPING OF SOUTHERN BRITISH COLUMBIA USING REGIONAL GEOCHEMICAL DATA

10:40 Peter J. Rogers
GEOCHEMICAL MAPPING: THE NOVA SCOTIA EXPERIENCE

11:00 Steven M. Smith, Richard F. Sanzolone
GEOCHEMICAL MAPPING AS AN AID IN THE INTERPRETATION OF STREAM SEDIMENTS FROM THE UPPER ILLINOIS RIVER BASIN IN ILLINOIS, INDIANA, AND WISCONSIN

11:20 P.H. Davenport, L.W. Nolan
THE ROLE OF GEOCHEMICAL MAPPING IN ESTABLISHING BASELINES FOR THE MEASUREMENT OF ENVIRONMENTAL CHANGE; AN EXAMPLE FROM NEWFOUNDLAND, CANADA

11:40 Manfred Birke, Uwe Rauch
ENVIRONMENTAL-GEOCHEMICAL ASPECTS OF THE REGIONAL GEOCHEMICAL SURFACE PROSPECTING IN THE SOUTH OF EAST GERMANY

Advances in Laser- and Ion-probe Mass Spectroscopy

Location: Reston Suite A

Symposium organized by W.C. Shanks III and Douglas E. Crowe

8:00 W.C. Shanks III and D.E. Crowe
OPENING REMARKS

8:10 William Compston
TRACE-ELEMENT ANALYSIS RULES FOR SIMS FROM U-Pb DATING

8:40 N.S. Belshaw, K.W. Burton, D.L. Martel, R.K. O'Nions
HIGH PRECISION Pb-ISOTOPE RATIO MEASUREMENTS WITH THE ISOLAB-120

9:00 Gerald K. Czamanske, Ian H. Campbell, G. Brent Dalrymple, Robert I. Hill, Vladimir E. Kunilov, Valentin Stephanov
NEW U-Pb AND $^{40}Ar/^{39}Ar$ EVIDENCE FOR SYNCHRONISM OF SIBERIAN FLOOD BASALT MAGMATISM, NORIL'SK-TALNAKH ORE DEPOSITION, AND THE PERMIAN-TRIASSIC BOUNDARY

9:20 Mary F. Horan, John W. Morgan, Michael P. Foose, Gerald K. Czamanske, Richard J. Walker, Valentin Stepanov
RHENIUM-OSMIUM ISOTOPE SYSTEMATICS OF ORES RICH IN PLATINUM GROUP ELEMENTS, NORIL'SK-TALNAKH DISTRICT, SIBERIA

9:40 Brian J. Fryer, Simon E. Jackson, Henry P. Longerich
IN-SITU U(Th)-Pb GEOCHRONOLOGY BY LASER ABLATION MICROPROBE-INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (LAM-ICP-MS)

10:00 BREAK

10:30 Zachary D. Sharp
APPLICATIONS OF THE LASER-BASED OXYGEN ISOTOPE EXTRACTION TECHNIQUE TO IGNEOUS AND METAMORPHIC ROCKS

11:00 Colin MacPherson, D.P. Mattey, J. Harris
OXYGEN ISOTOPE ANALYSIS OF MICROGRAM QUANTITIES OF SILICATE BY A LASER-FLUORINATION TECHNIQUE: DATA FOR SYNGENETIC INCLUSIONS IN DIAMOND

11:20 Rebecca W. Carmody, W.C. Shanks III, E. Young, D. Rumble
CONVENTIONAL AND LASER OXYGEN ISOTOPE RESULTS ON ROCKS AND MINERALS OF THE SLAUFRUDALUR STOCK, SE ICELAND: HYDROTHERMAL AND SOURCE MATERIAL EFFECTS

11:40 James R. O'Neil, H. Masuda, Zachary D. Sharp
OXYGEN ISOTOPE ANALYSES OF MICROSAMPLES OF SILICATES AND OXIDES

Diagenesis of Clay Minerals in Sedimentary Basins

Location: Lake Anne B

Symposium organized by Virginia Colten-Bradley, Lee Kump, and George Kacandes

I. Crystal Chemistry, Isotopic Exchange, and Thermodynamics of Clay Minerals

8:30 Robert C. Reynolds Jr.
MICA POLYTYPES IN MIXED-LAYERED ILLITE/SMECTITE

8:50 Paul A. Schroeder
FAR IR, ^{27}Al NMR AND CHEMICAL EVIDENCE FOR THE HETEROGENEOUS DISTRIBUTION OF OCTAHEDRAL Fe AND Al IN MIXED-LAYER ILLITE/SMECTITES

9:10 P.D. Lundegard
MODELING CLAY-WATER ISOTOPIC EXCHANGE DURING BURIAL DIAGENESIS OF SHALES

9:30 Stephen U. Aja
A SOLUBILITY DETERMINATION OF THE STABILITY OF ILLITE-BEARING ASSEMBLAGES

9:50 Yves Tardy
A METHOD FOR ESTIMATING GIBBS FREE ENERGIES OF FORMATION OF HYDRATED AND DEHYDRATED CLAY MINERALS

10:10 BREAK

II. Dating of Diagenetic Clay Minerals

10:30 M. Ohr, G. Li, D.R. Peacor, A.N. Halliday
Sm-Nd DATING OF DIAGENETIC VS TECTONIC EVENTS IN A PROGRADE SEQUENCE OF PELITES, WALES, U.K.

10:50 J. Reed Glasmann
GEOCHRONOLOGIC RECONSTRUCTION OF SHALE DIAGENESIS AND HYDROCARBON MATURATION, COLEVILLE BASIN, NORTH SLOPE, ALASKA

11:10 D.R. Pevear
DIAGENETIC AND DETRITAL END-MEMBER K/Ar AGES FROM SHALES: METHODS AND APPLICATIONS

11:30 Poster Titles (read by George Kacandes)

Surface Chemistry of Natural Materials

Location: Regency Ballroom A

Symposium organized by James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

Session Chair: James A. Davis

8:15 Opening Remarks

8:20 **Plenary Address:** Werner Stumm
THE ROLE OF THE MINERAL-WATER INTERFACE IN THE CYCLING OF ELECTRONS IN NATURAL SYSTEMS

9:00 DISCUSSION

Microscopic Reactions and Properties

9:10 Gordon E. Brown Jr., George A. Parks, Peggy A. O'Day, Catherine J. Chisolm-Brause
MICROSCOPIC STUDIES OF CHEMISORPTION REACTIONS AT MINERAL-WATER INTERFACES

9:40 Yeongkyoo Kim, R. James Kirkpatrick
^{31}P MAS NMR INVESTIGATION OF PHOSPHATE ADSORBED ON KAOLINITE, BOEHMITE, AND γ-Al_2O_3

10:00 BREAK

10:20 D.E. Morris, C.J. Chisholm-Brause, S.D. Conradson, C.D. Tait, M.E. Barr
SPECTROSCOPIC STUDIES OF URANYL SORPTION ON LAYERED CLAYS

10:40 William M. Murphy, James F. Spencer, John L. Russel
COMPARISON OF NATURALLY WEATHERED AND ARTIFICIALLY FRACTURED FELDSPAR SURFACES USING AUGER ELECTRON SPECTROSCOPY

11:00 William F. Bleam
"THROUGH-BOND" AND "THROUGH-SPACE" INTERACTIONS AT THE OXIDE/WATER INTERFACE

11:20 Willem H. Van Riemsdijk, Tjisse Hiemstra
REACTIVE BINDING SITES OF METAL(HYDR)OXIDES, THEORY, MODELS AND EXPERIMENTAL VERIFICATION

Measurement and Estimation of Kinetic and Thermodynamic Data for Low Temperature Geochemistry

Location: North Point/Tall Oaks

Symposium organized by J. Donald Rimstidt and Patricia M. Dove

8:30 Everett L. Shock
PREDICTIONS OF THERMODYNAMIC DATA FOR AQUEOUS SPECIES FROM 0° TO 1000° AND 1 TO 5000 BARS

9:00 David J. Wesolowski, Donald A. Palmer, Robert E. Mesmer
USE OF HYDROGEN-ELECTRODE POTENTIOMETRIC CELLS FOR THE DETERMINATION OF THE EQUILIBRIUM QUOTIENTS OF ACID/BASE, METAL HYDROLYSIS AND COMPLEXATION REACTIONS IN AQUEOUS ELECTROLYTE SOLUTIONS IN THE 0-300°C RANGE

9:30 Dimitri A. Sverjensky
A GENERAL METHOD FOR PREDICTION OF THE GIBBS FREE ENERGIES OF CRYSTALLINE SILICATES AND OXIDES

10:00 BREAK

10:30 D. Kirk Nordstrom
THERMODYNAMIC CONSISTENCY AND UNCERTAINTY IN AQUEOUS GEOCHEMICAL MODELING

11:00 Thomas H. Giordano
EXPERIMENTAL TECHNIQUES USED TO STUDY THERMODYNAMIC PROPERTIES OF METAL-ORGANIC COMPLEXES

11:20 M.A.A. Schoonen, T. Douthit
EXPERIMENTAL DETERMINATION OF THE SOLUBILITY PRODUCT OF DOLOMITE

11:40 Noel Scrivner, Marshall Rafal
DISTRIBUTION COEFFICIENTS OF DIVALENT CATIONS BETWEEN AQUEOUS SOLUTION AND $CaCO_3$ (CALCITE) USING THE LINEAR FREE ENERGY METHOD

FRIDAY AFTERNOON

Symposium in Honor of H. D. Holland

Location: Lake Fairfax

Symposium organized by H. Ohmoto

Geochemistry of Hydrothermal and Magmatic Systems

Session Chair: B. Potty

1:30 R.C. Burruss, C.K. Richardson, J.N. Grossman, F.E. Lichte, M.B.
REGIONAL AND MICROSCALE ZONATION OF RARE EARTH ELEMENTS IN FLUORITE OF THE ILLINOIS-KENTUCKY FLUORSPAR DISTRICT: IMPLICATIONS FOR FLUID FLOW

1:50 Geoffrey S. Plumlee, Robert O. Rye
MINERALOGIC, ISOTOPIC, AND OTHER CHARACTERISTICS OF THE FRINGES OF DIVERSE HYDROTHERMAL SYSTEMS: THE PERITHERMAL ENVIRONMENT

2:10 A. Tsusue, H. Shimazaki
JURASSIC AND CRETACEOUS GRANITOIDS AND ASSOCIATED ORE DEPOSITS IN SOUTH KOREA

2:30 J. Mullis, J. Dubessy, B. Poty, B.P. Cregu, J. O'Neil
FLUID REGIME DURING THE LATE STAGES OF A CONTINENTAL COLLISION: A CASE STUDY BASED ON FLUID INCLUSION DATA ALONG THE BASEL-CHIASSO GEOTRAVERSE (SWITZERLAND)

2:50 I-Ming Chou, S. Michael Sterner, Kenneth S. Pitzer
QUANTITATIVE REPRESENTATION OF EQUILIBRIUM LIQUID-SOLID(S) COMPOSITIONS IN THE TERNARY SYSTEM NaCl-KCl H_2O AT ELEVATED PRESSURES AND TEMPERATURES

3:10 BREAK

Session Chair: Phil Candella

3:30 Philip Piccoli, Philip Candela
CHLORINE AND FLUORINE IN MAGMATIC SYSTEMS

3:50 Elizabeth A. Zbinden
ACTIVITY OF SnO_2 IN SILICIC MELTS

4:10 James G. Blencoe, Charles V. Guidotti, Francesco P. Sassi
THERMODYNAMIC ANALYSIS OF SOLVUS DATA FOR SYNTHETIC, BINARY PARAGONITE-MUSCOVITE MICAS

4:30 Fuxing Zhou, Donald Lindsley, Darby Dyar
EXPERIMENTAL STUDY AND THERMODYNAMIC PROPERTIES OF Mg-Fe BIOTITES AT 700-800°C

4:50 Ulrich Petersen
MINING THE HYDROSPHERE

International Geochemical Mapping

Location: Lake Anne

Symposium organized by P. H. Davenport; *Sponsored by* Association of Exploration Geochemists

III. Data Levelling and Media Comparisons

Session Chair: P.R. Simpson

1:30 A.G. Darnley, P.H. Davenport, A. Steenfelt
A COMPARISON OF AIRBORNE GAMMA-RAY SPECTROMETRY DATA WITH STREAM SEDIMENT AND LAKE SEDIMENT GEOCHEMICAL DATA

1:50 P.J. Henney, J.A. Plant, P.R. Simpson
COMPARISON OF LITHOGEOCHEMICAL AND STREAM SEDIMENT GEOCHEMICAL DATA FOR GRANITIC ROCKS IN NORTHERN BRITAIN: IMPLICATIONS FOR PETROGENETIC, ECONOMIC AND ENVIRONMENTAL STUDIES

2:10 J.W. McConnell, P.H. Davenport, C. Finch, G.E.M. Hall, S.E. Jackson, H.P. Longerich, B.J. Fryer
MULTI-MEDIA GEOCHEMICAL MAPPING EMPLOYING ACTIVE AND OVERBANK STREAM-SEDIMENT, LAKE SEDIMENT AND SURFACE WATER IN TWO AREAS IN NEWFOUNDLAND

2:30 Agnete Steenfelt
SIMILARITIES AND DIFFERENCES BETWEEN THE GEOCHEMICAL PATTERNS OBTAINED FROM DIFFERENT SAMPLE MEDIA COLLECTED IN THE NORDKALOTT PROJECT IN SCANDINAVIA

2:50 J.A.C. Fortescue
EXPERIENCE IN GEOCHEMICAL MAPPING USING THE CLARKE INDEX-I

3:10 BREAK

IV. "New" Methodologies and Media

Session Chair: P.H. Davenport

3:30 R.G. Garrett, L.H. Thorleifson
INVESTIGATION INTO ULTRA-LOW DENSITY GEOCHEMICAL MAPPING ON THE CANADIAN PRAIRIE

3:50 A.M. Siad, G. Matheis
LATERITIC SOIL PATTERN ABOVE LATE-PROTEROZOIC METAVOLCANIC SEQUENCES IN NIGERIA: A GEO-MATHEMATICAL APPROACH RELATED TO RARE-METAL MINERALIZATION

4:10 Colin E. Dunn
BIOGEOCHEMICAL MAPPING IN THE MARITIME PROVINCES

4:30 P.R. Simpson, G.E.M. Hall, W.M. Edmunds, C. Finch, D. Flight, N. Breward, T.R. Lister
STREAM AND LAKE WATER AS MEDIA FOR GEOCHEMICAL MAPPING IN ENVIRONMENTAL STUDIES AND MINERAL EXPLORATION

5:00 GENERAL DISCUSSION

Isotopic and Trace Element Modeling

Location: North Point/Tall Oaks

Symposium organized by Robert E. Zartman and Fred A. Frey

1:30 M.J. Daines, D.L. Kohlstedt
KINETICS AND DYNAMICS OF MELT MIGRATION IN UPPER MANTLE ROCKS

1:55 Jean-Louis Bodinier, Jacques Vernieres
VARIATIONS OF RADIOGENIC ISOTOPES ASSOCIATED WITH PERCOLATION OF MANTLE MAGMAS: THEORETICAL MODELLING AND APPLICATIONS

2:20 Sarah Watson
SOME GEOCHEMICAL CONCSEQUENCES OF THE PHYSICS OF MELT GENERATION AND MIGRATION

2:45 Francis Albarede
RESIDENCE TIME ANALYSIS OF GEOCHEMICAL FLUCTUATIONS IN VOLCANIC SERIES AND THE SIZE OF DEEP-SEATED MAGMA RESERVOIRS

3:10 BREAK

3:30 M.J. Bickle, D.A.H. Teagle
ADVECTIVE TRACER TRANSPORT WITH KINETIC DISPERSION: MID-OCEAN RIDGE HYDROTHERMAL CIRCULATION

3:55 Timothy L. Grove
ASSIMILATION IN SUBDUCTION-RELATED MAGMATIC SYSTEMS: A COMPARISON OF PROCESS MODELS AND NATURAL PROCESS AT MEDICINE LAKE VOLCANO, N. CALIFORNIA

4:20 Kerry Gallagher, Chris Hawkesworth
DEHYDRATION MELTING, LITHOSPHERE SOURCE REGIONS, AND THE GENERATION OF THE PARANA CFB

4:45 Tim Bradshaw, Kerry Gallagher, Chris Hawkesworth
EXTENSION AND MAGMATISM IN THE COLORADO RIVER TROUGH

By title only: Marguerite Godard, Jean-Louis Bodinier, Guy Vasseur, Jacques Vernieres
TRANSPORT OF TRACE-ELEMENTS IN PERCOLATING MANTLE MAGMAS: MODELING INVOLVING SOLID-LIQUID REACTIONS

Advances in Laser- and Ion-probe Mass Spectroscopy

Location: Reston Suite A

Symposium organized by W.C. Shanks III and Douglas E. Crowe

1:30 R.J. Cumbest, T.C. Onstott
$^{40}Ar/^{39}Ar$ LASER MICROPROBE ANALYSIS OF MYLONITIC AMPHIBOLITE: APPLICATIONS TO DATING FAULT MOVEMENT AND FLUID FLOW

2:00 Philip E. Brown
MICRO-INFRARED SPECTROSCOPIC ANALYSIS OF FLUID INCLUSIONS AND MINERALS

2:20 Douglas E. Crowe, W.C. Shanks III
LASER MICROPROBE $\delta^{34}S$ STUDY OF RECENT AND ANCIENT VOLCANOGENIC MASSIVE SULFIDE DEPOSITS

2:40 Michael A. McKibben, C. Stewart Eldridge
SULFUR ISOTOPIC ZONING IN MINERALS FROM MODERN AND ANCIENT HYDROTHERMAL SYSTEMS: STUDIES USING THE SHRIMP ION MICROPROBE

3:00 BREAK

3:30 Graham C. Wilson, Linas R. Kilius, John C. Rucklidge
SINGLE-CRYSTAL AU-AG-PGE CHEMISTRY OF COMMON ORE MINERALS FROM SELECTED GOLD, PGE AND BASE-METAL DEPOSITS, MEASURED BY ACCELERATOR MASS SPECTROMETRY

4:00 David D. Lambert, C.A. Morrison, W.W. Ahlers, A.J. Losada-Calderson, M.S. Bloom, R.R. Keays
QUANTITATIVE ANALYSIS OF TRACE ELEMENTS IN PYRITE BY LASER ABLATION INDUCTIVELY-COUPLED PLASMA MASS SPECTROMETRY (LA-ICP-MS): APPLICATIONS IN MINERAL EXPLORATION

4:20 Donald D. Hickmott
S-ISOTOPIC AND TRACE-ELEMENT MICROANALYSIS OF COAL SULFIDES: A COMBINED PIXE AND SIMS APPROACH

4:40 Christopher S. Romanek, Everett K. Gibson, Richard A. Socki
LASER SAMPLING OF CARBONATE IN A LOW O_2 ENVIRONMENT FOR CARBON AND OXYGEN STABLE ISOTOPE ANALYSIS

Diagenesis of Clay Minerals in Sedimentary Basins

Location: Lake Anne B

Symposium organized by Virginia Colten-Bradley, Lee Kump, and George Kacandes

III. Field Observations and Interpretations of Clay Mineral Diagenesis

1:30 Barbara Ransom
ANOMALOUS FLUID PRESSURES AND SMECTITE DEHYDRATION

1:50 R.L. Freed, D.R. Peacor
DISSOLUTION/CRYSTALLIZATION MECHANISM FOR THE SMECTITE TO ILLITE REACTION IN GULF COAST SHALES: STEM STUDY OF CLAY SSEPARATES AND ION-MILLED SAMPLES

2:10 James J. Howard
FLOW RATES AND ILLITE/SMECTITE REACTION KINETICS IN FRIO FORMATION SANDSTONES AND SHALES

2:30 Le Huy Tho
CLAY DIAGENESIS IN THE MIOCENE SEDIMENTS OF THE BELCHATÓW BROWN-COAL BASIN, POLAND

IV. Experimental Studies of Clay Mineral Diagenesis

2:50 Kathryn L. Nagy
THE KINETICS OF CLAY MINERAL DISSOLUTION AND PRECIPITATION AT IN SITU TEMPERATURES IN SEDIMENTARY BASINS

3:10 G.H. Kacandes, H.L. Barnes, L.R. Kump
EXPERIMENTAL STUDY ON THE REACTION OF SMECTITE TO ILLITE IN SILICA-DEFICIENT INPUT FLUIDS

Surface Chemistry of Natural Materials

Location: Regency Ballroom A

Symposium organized by James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

Microscopic Reactions and Properties

Session Chair: John M. Zachara

1:00 Jacob A. Marinsky
GIBBS-DONNAN-BASED INTERPRETATIONS OF THE SENSITIVITY OF SURFACE REACTIONS TO COUNTERION CONCENTRATION LEVELS OF THE SOLUTION IN CONTACT

1:20 Christopher C. Fuller, Jennifer A. Coston, James A. Davis, Brigid A. Rea
EVALUATION OF MINERAL SURFACES CONTROLLING METAL ION ADSORPTION IN A SAND AND GRAVEL AQUIFER

1:40 Philippe Van Cappellen, Laurent Charlet
A SURFACE COMPLEXATION MODEL OF THE CARBONATE MINERAL-AQUEOUS SOLUTION INTERFACE

2:00 Richard J. Reeder
INTRASECTORAL ZONING IN DOLOMITE: FURTHER EVIDENCE FOR SURFACE STRUCTURAL CONTROL ON ELEMENT INCORPORATION DURING CRYSTAL GROWTH

2:20 Glenn A. Waychunas, Brigid A. Rea, Christopher C. Fuller, James A. Davis
WIDE ANGLE X-RAY SCATTERING (WAXS) STUDY OF "TWO LINE" FERRIHYDRITE AND THE EFFECT OF ARSENATE SORPTION: COMPARISON WITH EXAFS RESULTS

2:40 E.H. De Carlo, D. Koeppenkastrop
RELATIONSHIP BETWEEN THE SURFACE MORPHOLOGY AND TOPOGRAPHY OF SYNTHETIC AND NATURAL OXIDE PARTICLES AND THEIR CHEMICAL REACTIVITY

3:00 DISCUSSION

3:10 BREAK

3:25 Grant S. Henderson, J. Jeffrey Fawcett
THE STRUCTURE OF THE (001) SHERIDANITE AND COOKEITE CLEAVAGE SURFACE

3:45 D.A. Backhus, S.J. Eisenreich, P.M. Gschwend
SORPTION OF NONPOLAR ORGANIC CHEMICALS TO INORGANIC SURFACES

4:05 E.M. Murphy, J.M. Zachara, S.C. Smith, J.L. Phillips, T. Wietsma
INTERACTION OF HYDROPHOBIC ORGANIC COMPOUNDS WITH MINERAL-BOUND HUMIC SUBSTANCES

4:25 Mark Schlautman, James Morgan
MINERAL SURFACES AND HUMIC SUBSTANCES: PARTITIONING OF HYDROPHOBIC ORGANIC POLLUTANTS

4:45 Christine Tiller, Charles O'Melia
COLLOIDAL STABILITY IN AQUATIC ENVIRONMENTS: THE ROLE OF NATURAL ORGANIC MATTER (NOM)

5:05 Lawrence M. Mayer
ADSORPTION BUFFERING OF ORGANIC MATTER ACCUMULATION IN SOILS AND SEDIMENTS

SATURDAY MAY 9, 1992

SATURDAY MORNING

Symposium in Honor of H. D. Holland

Location: Lake Anne

Symposium organized by H. Ohmoto

Global Geochemical Cycles and Chemical Evolution of the Atmosphere and Oceans

Session Chair: Mark Logsdon

8:30 Rodney C. Ewing, Takashi Murakami
THE EFFECT OF NUCLEAR RADIATION ON THE STRUCTURE OF ZIRCON

8:50 Udo Fehn
DETERMINATION OF SOURCE AGES AND RESIDENCE TIMES OF BRINES AND HYDROTHERMAL FLUIDES USING COSMOGENIC ISOTOPES

9:10 Michael J. Mottl, C. Geoffrey Wheat
HYDROTHERMAL CIRCULATION THROUGH MID-OCEAN RIDGE FLANKS: HEAT AND CHEMICAL FLUXES

9:30 Malcolm D. Siegel
THE PAST AS KEY TO THE FUTURE: PAST AND FUTURE CHEMICAL EVOLUTION OF GROUNDWATER IN THE CULEBRA DOLOMITE NEAR THE WASTE ISOLATION PILOT PLANT, NEW MEXICO

9:50 James I. Drever
EFFECT OF LAND PLANTS ON MINERAL WEATHERING RATES

10:10 BREAK

Session Chair: Lee Kump

10:30 G.R. Helz, C.V. Miller, J.M. Charnock, D.J. Vaughan, C.D. Garner
MECHANISM OF MOLYBDENUM SCAVENGING FROM SEAWATER

10:50 Robert A. Berner, Ji-Long Rao
FORMS OF PHOSPHORUS IN SEDIMENTS OF THE AMAZON RIVER

11:10 M. Schidlowski, H. Gorzawski, I. Dor
MICROBIAL LIFE IN A HYPERSALINE POND: CARBON ISOTOPE RESPONSE TO ENVIRONMENTAL GRADIENTS

11:30 Boaz Lazar and Jonathan Erez
PHOTOSYNTHETIC EFFECTS OF MICROBIAL MATS ON THE CARBON GEOCHEMISTRY OF THE ASSOCIATED BRINES IMPLICATIONS FOR ANCIENT STROMATOLITIC ENVIRONMENTS

11:50 Walter E. Dean, Michael A. Arthur
SEDIMENTS FROM THE BLACK SEA AND PERU

MARGIN AS ANALOGUES FOR METALLIFEROUS BLACK SHALES: WHERE'S THE BEEF?

Geochemical and Isotopic Record of Global Change

Location: Lake Fairfax

Symposium organized by Milan Pavich and Maureen Raymo

8:00 Milan Pavich
INTRODUCTORY COMMENTS

8:10 W.S. Broecker, Tsung-Hung Peng
INTERHEMISPHERIC TRANSPORT OF CARBON THROUGH THE OCEAN

8:30 M.A. Arthur, E.D. Neff, W.E. Dean, S. Wakeham, B.J. Hay
LATE HOLOCENE ENVIRONMENTAL EVOLUTION OF THE BLACK SEA

8:50 M.E. Raymo
ORGANIC CARBON BURIAL IN THE LATE CENOZOIC: A NEGATIVE FEEDBACK TO CLIMATIC COOLING?

9:10 W.F. Ruddiman
PLATEAU UPLIFT: NEW CLIMATIC AND TECTONIC PARADIGMS

9:30 Thure E. Cerling, Jan Quade, Yang Wang
GLOBAL CHANGE DURING THE LATE NEOGENE: ISOTOPIC RECORDS FROM FOUR CONTINENTS

9:50 Paulo M. Vasconcelos, Tim A. Becker, Paul R. Renne, George H. Brimhall
PALEOCLIMATES DEDUCED FROM ^{40}K-^{40}Ar AND FINE-SCALE LASER ^{40}Ar-^{39}Ar DATING OF SUPERGENE K-Mn OXIDES

10:10 BREAK

10:30 Cirbus L. Sloan, Eric J. Barron
GLOBAL CLIMATE MODEL PREDICTIONS VERSUS PROXY DATA: BRIDGING THE GAP

10:50 Lee R. Kump
CLUES ABOUT END-PERMIAN ENVIRONMENTAL CHANGES FROM CARBON ISOTOPIC COMPOSITION OF COALS

11:10 Ethan L. Grossman, Horng-Sheng Mii, Thomas E. Yancey
THE STABLE ISOTOPE RECORD FOR REGIONAL AND GLOBAL CHANGE IN THE CARBONIFEROUS

11:30 Miriam Kastner, Gretchen Robertson
SULFATE INCORPORATION IN NATURAL AND SYNTHETIC DOLOMITE AND IN BIOGENIC CALCITE: IMPLICATIONS FOR PALEODIAGENESIS AND PALEOCEANOGRAPHY

11:50 Harald Strauss, Dieter Buhl
SULFUR AND STRONTIUM ISOTOPIC RECORD OF PRECAMBRIAN SULFATES, NEW DATA AND A CRITICAL EVALUATION OF THE EXISTING RECORD

12:10 Carl N. Drummond, Bruce H. Wilkinson
ISOTOPIC COMPOSITION OF GLOBAL METEORIC WATER: AN EVALUATION OF LATITUDE AND ELEVATION CONTROLS ON MASS FRACTIONATION USING THE IAEA-WMO DATABASE

Isotopic and Trace Element Modeling

Location: Reston Suite A

Symposium organized by Robert E. Zartman and Fred A. Frey

8:30 Tim Elliott, Chris Hawkesworth
THE INTERPRETATION OF U/Th ISOTOPIC SYSTEMATICS FOR SMALL DEGREE MELTS FROM LA PALMA, CANARIES

8:50 J.A. Hoogewerff, J. Hertogen, M.J. Van Bergen
ACROSS-ARC TH-U ISOTOPE SYSTEMATICS IN AN ISLAND ARC - CONTINENT COLLISION ZONE, EASTERN SUNDA ARC, INDONESIA

9:10 C. Class, S.L. Goldstein, S.J.G. Galer, D. Weis
PLUME TRACKS, EVOLVING HOTSPOT SOURCES, AND THEIR YOUNG FORMATION AGES

9:30 Lynn Oschmann, Stan Hart
GLOBAL ISOTOPIC SIGNATURES OF OCEANIC ISLAND BASALTS

9:50 P.D. Noll Jr., H.E. Newsom
Pb/Ce RATIOS IN ISLAND ARC BASALTS: IMPLICATIONS FOR THE GENESIS OF OCEAN ISLAND BASALTS

10:10 BREAK

10:30 N.S. Bortnikov, M.G. Dobrovol'skaja, A.D. Genkin, V.B. Naumov, V.V. Shapenko
SPHALERITE - GALENA GEOTHERMOMETERS: DISTRIBUTION OF CADMIUM, MANGANESE AND FRACTIONATION OF SULFUR ISOTOPES

10:50 R.A. Ayuso
TRACE ELEMENT AND ISOTOPE GEOCHEMISTRY (Pb,O) OF THE BOTTLE LAKE COMPLEX AND THE ORIGIN OF REVERSE ZONING IN GRANITIC ROCKS

11:10 O. Tapani Rämö, Hannu Huhma
INSIGHTS INTO THE ISOTOPIC COMPOSITION OF ARCHEAN LOWER CONTINENTAL CRUST AS REVEALED BY MODELING TWO EASTERN FENNOSCANDIAN ANATECTIC GRANITE SUITES

11:30 A.W. MacFarlane, A. Danielson, H.D. Holland
BEHAVIOR OF REE DURING SOIL FORMATION IN THE ARCHEAN

By title only: Yong-Fei Zheng, Jochen Hoefs
THEORETICAL MODELS FOR THE INTERPRETATION OF CARBON, OXYGEN AND SULFUR ISOTOPE DATA FROM HYDROTHERMAL MINERAL DEPOSITS

Surface Chemistry of Natural Materials

Location: Regency Ballroom A

Symposium organized by James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

Kinetics

Session Chair: Peggy A. O'Day

8:00 Bernhard Wehrli
ADSORPTION KINETICS OF INERT METAL IONS AT THE OXIDE-WATER INTERFACE

8:30 Donald L. Sparks, Scott E. Fendorf
KINETICS OF RAPID SORPTION PROCESSES ON COLLOIDAL SURFACES

8:50 S.E. Fendorf, D.L. Sparks
AN EPR STOPPED-FLOW KINETIC STUDY OF Mn(II) SORPTION ON MnO_2

9:10 Ronald V. Nicholson, W.L. Noble
COPPER (II) UPTAKE ON THE SURFACE OF PHYRRHOTITE: A NEW LOOK AT SURFACE KINETICS AND DIFFUSION CONTROL

9:30 D. Koeppenkastrop-Lueker, E.H. De Carlo
THERMODYNAMIC AND KINETIC STUDIES ON THE INTERACTION OF RARE EARTH ELEMENTS WITH METAL OXIDES

9:50 DISCUSSION

10:00 BREAK

10:20 Richard H. Loeppert Jr.
$CaCO_3$-DISSOLUTION AND Ca/Na-ION-EXCHANGE KINETICS AND $CaCO_3$ EQUILIBRIUM IN $CaCO_3$/CLAY SYSTEMS

10:40 Susan A. Welch, William J. Ullman
MICROBIALLY PRODUCED COMPOUNDS AND FELDSPAR DISSOLUTION

11:00 Gary Curtis, Martin Reinhard
APPLICATION OF A DIFFUSION-REACTION MODEL TO THE REDUCTIVE DEHALOGENATION OF HEXACHLOROETHANE BY AQUIFER SAND

11:20 Martin Reinhard, James Farrell, Peter Grathwohl
SORPTION AND DESORPTION KINETICS OF SOME VOLATILE CHLORINATED HYDROCARBON COMPOUNDS IN SOILS AND AQUIFER MATERIAL UNDER UNSATURATED CONDITIONS

11:40 Douglas B. Hunter, Paul M. Bertsch
CLAY SURFACE FACILITATED DEGRADATION REACTIONS AND MECHANISMS OF TETRA-PHENYLBORON STUDIED NONINVASIVELY BY IR

Geochemistry of Accessory Minerals

Location: Reston Suite B

Symposium organized by Bruce Watson, Frederick J. Ryerson, Calvin F. Miller, and T. Mark Harrison

I. Petrogenic Indicators of Igneous Processes

8:30 J.M. Hanchar, C.F. Miller
INTERPRETATION OF CRUSTAL HISTORIES USING ZIRCON ZONATION PATTERNS

8:50 Pierre Barbey, Paul Allé, Marc Brouand, Francis Albarede
RARE-EARTH ELEMENT DISTRIBUTION IN ZIRCON: A PETROGENETIC MARKER

9:10 Owen C. Evans, Gilbert N. Hanson
CONSTRAINING THE ROLE OF ACCESSORY MINERALS IN THE EVOLUTION OF REE ABUNDANCES IN GRANITOID PLUTONS

9:30 Jean-Marc Montel
MONAZITE AS PETROGENETIC INDICATOR IN GRANITE GENESIS

9:50 Peter J. Michael
CONTROL OF TRACE ELEMENT DIFFERENTIATION TRENDS IN GRANITES BY ACCESSORY PHASES

10:10 BREAK

10:30 Linda R. Richard, Michel Pichavant, D. Barrie Clarke, Jean-Marc Montel
EFFECTS OF TEMPERATURE, COMPOSITION AND fO_2 ON APATITE SOLUBILITY AND PHOSPHORUS BEHAVIOUR IN PERALUMINOUS GRANITIC MELTS

10:50 Suzanne Y. O'Reilly, W.L. Griffin
TRACE-ELEMENT GEOCHEMISTRY OF MANTLE-DERIVED APATITES

11:10 Stephen F. Foley, Gerhard P. Brey
THE ROLE OF ACCESSORY MINERALS IN THE ORIGIN OF THE ENRICHED GEOCHEMICAL SIGNATURES OF ALKALINE VOLCANICS

11:30 W.L. Griffin, C.G. Ryan, R.O. Moore, J.J. Gurney
GEOCHEMISTRY OF MAGNESIAN ILMENITES FROM KIMBERLITES AND BASALTS

Trace Element Chemistry/Crystal Chemistry of the Rock Forming Silicates

Location: Lake Audubon

Symposium organized by J.J. Papike and N. Shimizu

8:30 N. Shimizu
SIMS APPROACHES TO DETERMINATION OF TRACE

ELEMENTS IN ROCK-FORMING SILICATES

9:00 J.J. Papike, C.K. Shearer
TRACE ELEMENT SYSTEMATICS IN EXTRATERRESTRIAL SILICATES AS RECORDERS OF IGNEOUS EVOLUTION

9:30 Joseph R. Smyth
CRYSTAL STRUCTURE CONTROLS ON ELEMENT PARTITIONING IN GEOLOGIC SYSTEMS

10:00 BREAK

10:30 F.C. Hawthorne
SPECTROSCOPIC METHODS FOR THE LOCATION OF TRACE ELEMENTS IN ROCK-FORMING SILICATE STRUCTURES

11:00 Gordon McKay, Jerry Wagstaff, Loan Le
CRYSTAL CHEMICAL CONTROL OF REE PARTITION COEFFICIENTS FOR CLINOPYROXENE AND WHITLOCKITE

11:30 Ben Harte
TRACE ELEMENT CHARACTERISTICS OF DEEP-SEATED ECLOGITE PARAGENESES - AN ION MICROPROBE STUDY OF INCLUSIONS IN DIAMONDS

SATURDAY AFTERNOON

Symposium in Honor of H. D. Holland

Location: Lake Anne

Symposium organized by H. Ohmoto

Global Geochemical Cycles and Chemical Evolution of the Atmosphere and Oceans

Session Chair: M. Schidlowski

1:00 Lee R. Kump, Michael A. Arthur
CENOZOIC CHEMICAL WEATHERING AND THE CARBON CYCLE

1:20 James F. Kasting
CONTROLS ON THE ISOTOPIC COMPOSITION AND BURIAL RATE OF ORGANIC CARBON THROUGH TIME

1:40 Peter Deines
CARBON ISOTOPE STUDIES OF DIAMONDS AND THEIR IMPLICATIONS FOR THE GEODYNAMIC CYCLE OF CARBON: DATA FROM THE ORAPA KIMBERLITE, BOTSWANA

2:00 David W. Schwartzman, Steven N. Shore, Tyler Volk
SELF-ORGANIZATION OF THE EARTH'S SURFACE SYSTEM - GEOCHEMICAL OR GEOPHYSIOLOGICAL?

2:20 Charles Harper Jr., Stein B. Jacobsen
ISOTOPIC VESTIGES OF A BEGINNING: EXTINCT RADIONUCLIDE SIGNATURES AS CHRONOMETERS OF THE EARLIEST STAGES OF TERRESTRIAL DIFFERENTIATION

2:40 BREAK

Session Chair: A.C. Lasaga

3:00 Juske Horita, Heinrich D. Holland
THE EVOLUTION OF SEAWATER DURING THE PHANEROZOIC

3:20 H. Naraoka, T. Hanamuro, M. Ohtake, K. Hayashi, S. Maruyama, H. Ohmoto, M. Rosing
GEOCHEMISTRY OF ARCHEAN SEDIMENTARY ROCKS: I. CLUES TO THE P_{O2} OF THE ARCHEAN ATMOSPHERE

3:40 H. Ohmoto, T. Hanamuro, M. Ohtake, K. Hayashi, H. Naraoka, S. Maruyama, T. Kakegawa, M. Haruna
GEOCHEMISTRY OF ARCHEAN SEDIMENTARY ROCKS: II. THE RED SEA MODEL FOR FORMATION OF CHERTS AND BANDED IRON FORMATIONS IN ARCHEAN OCEANS

4:00 H.D. Holland
EARLY PROTEROZOIC ATMOSPHERIC CHANGE

Environmental Geochemistry and Health

Location: Lake Fairfax

Symposium organized by Bobby G. Wixson and Betsy T. Kagey; *Sponsored by* Society of Environmental Geochemistry and Health

1:00 Fazli Rabbi, Mohammed Ikramuddin
TRACE ELEMENT GEOCHEMISTRY OF STREAM SEDIMENTS AND WATERS AFFECTED BY MINING OF A SULFIDE DEPOSIT

1:30 George Guthrie, Kathy McLeod, Neil Johnson, David Bish
EFFECT OF EXCHANGEABLE CATION ON ZEOLITE CYTOTOXICITY

2:00 J.N. Valette-Silver
BEHAVIOR OF THE TOXIC METALS Al, Cu, Be, AND Cr DURING PERCOLATION OF ACID COAL LEACHATES THROUGH MARYLAND COASTAL PLAIN MATERIAL

2:30 BREAK

3:00 Gerald R. Feder, Robert B. Finkleman, William H. Orem, Philip W. Hall III
BALKAN ENDEMIC NEPHROPATHY: POSSIBLE LINK TO LEACHING OF PLIOCENE LIGNITES BY GROUNDWATER

3:30 Carl S. Kirby, J. Donald Rimstidt
MUNICIPAL SOLID WASTE INCINERATOR ASH TREATED AS A GEOCHEMICAL PROBLEM

4:00 V. Savary, J-M. Luck, D. Ben Othman
HEAVY METAL (Pb, Zn, Cd, Tl) CONCENTRATIONS AND Pb ISOTOPIC COMPOSITION IN WATER SAMPLES AROUND A Pb-Zn MINE JUST BEFORE ITS CLOSING-DOWN: REFERENCE FOR FUTURE ENVIRONMENTAL STUDIES IN THE AREA

Ocean Ridge Magmatic Processes

Location: Reston Suite A

Symposium organized by Emily M. Klein

1:30 Emily M. Klein
OCEAN RIDGE BASALT PHENOCRYST COMPOSITIONS REVEAL VARIATIONS IN EXTENT OF MELTING

1:45 Wilfred B. Bryan, Peter S. Meyer
LOCAL AND REGIONAL MODAL MINERAL VARIATIONS IN MORB: INFERENCES FROM THE GLOBAL DATABASE

2:00 J.F. Allan
CR-SPINEL IN MORBS AND OTHER THOLEIITES: THE MOST VALUABLE MINERAL PHASE FOR PETROGENETIC INTERPRETATION

2:15 Peter J. Michael, Winton C. Cornell
CL IN MORB: EVIDENCE FOR A SPREADING RATE DEPENDENCE ON ASSIMILATION IN MAGMA CHAMBERS

2:30 Michael P. Ryan
NEUTRAL BUOYANCY MAGMA TRANSPORT AND THE STRUCTURE AND DYNAMICS OF MID-OCEAN RIDGE MAGMA RESERVOIRS AND RIFT SYSTEMS

2:45 H.J.B. Dick, L. Dmitriev, P. Kelemen, A. Sobolev, B. Basylev
A PODIFORM DUNITE AT THE 15°20' FRACTURE ZONE: IMPLICATIONS FOR MAGMA GENESIS BENEATH OCEAN RIDGES

3:00 BREAK

3:30 Yaoling Niu, Rodey Batiza
SPREADING RATE DEPENDANCE OF MORB SYSTEMATICS: IMPLICATIONS FOR STYLE AND GEOMETRY OF MANTLE UPWELLING

3:45 Rosamond J. Kinzler, Timothy L. Grove
THE GENERATION AND EVOLUTION OF MID-OCEAN RIDGE BASALTIC MAGMAS

4:00 N. Shimizu
GEOCHEMICAL SIGNIFICANCE OF GLASS INCLUSIONS IN MORB

4:15 F.A. Frey, D. Stakes, R. Nielsen, A. LeRoex, N. Walker, S.R. Hart
COMPOSITIONAL AND ISOTOPIC CHARACTERISTICS OF LAVAS FROM THE AMAR AND NARROWGATE VALLEYS (36°-37°N ON THE MID-ATLANTIC RIDGE): CONSTRAINTS ON PETROGENETIC PROCESSES

4:30 D. Graham, J. Lupton
HELIUM ISOTOPE VARIATIONS ALONG MID-OCEAN RIDGES: IMPLICATIONS FOR MAGMA HISTORY AND MANTLE HETEROGENEITY

Surface Chemistry of Natural Materials

Location: Regency Ballroom A

Symposium organized by James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

Multiple Reaction Phenomena

Session Chair: Liyuan Liang

1:20 Laurent Charlet, Alain Manceau, Philippe Van Cappellen, Paul W. Schindler
PROBING PROCESSES AT THE MINERAL-WATER INTERFACE: THE SCENE BEHIND A SORPTION ISOTHERM

1:50 P.A. O'Day, G.E. Brown Jr., G.A. Parks
X-RAY ABSORPTION SPECTROSCOPY AND SOLUTION STUDIES OF Co(II) SORPTION COMPLEXES ON KAOLINITE AND QUARTZ

2:10 L.E. Katz, K.F. Hayes
SURFACE COMPLEXATION MODELING OF COBALT ION SORPTION AT THE ALPHA-Al_2O_3-WATER INTERFACE: MONOMER, POLYMER, AND PRECIPITATION REACTIONS

2:30 DISCUSSION

2:40 BREAK

3:00 Ning Xu, Gordon E. Brown Jr., Michael F. Hochella, George A. Parks
SPECTROSCOPIC STUDIES OF Co^{2+} AT THE CALCITE-WATER INTERFACE

3:20 John W. Morse, Takeshi Arakaki
ADSORPTION AND CORRECIPITATION OF DIVALENT METALS WITH MACKINAWITE (FeS)

3:40 Alan T. Stone, Kathy L. Godfredsen, Barbara R. Coughlin
SOLUBILIZATION OF FeOOH- AND MnO_2-BOUND METALS BY NATURALLY-OCCURRING ORGANIC COMPOUNDS

4:00 William Fish, Karel Mesuere
RE-ADSORPTION OF Fe-OXALATE COMPLEXES AND ITS EFFECT ON THE LIGAND-PROMOTED DISSOLUTION OF IRON OXIDES

4:20 John M. Zachara, C. Thomas Resch, Gary T. Turner
CONTRIBUTIONS OF HUMIC SUBSTANCES TO METAL ION BINDING IN A SUBSURFACE MATERIAL CONTAINING Fe/Al OXIDES AND LAYER SILICATES

4:40 A.P. Robertson, J.O. Leckie
COPPER BINDING IN SYSTEMS WITH GOETHITE AND HUMIC ACID - IMPLICATIONS FOR THE TRANSPORT AND FATE OF METALS IN GROUNDWATERS

5:00 Birgit Satmark, Liyuan Liang
THE CHEMICAL EFFECTS OF INORGANIC COLLOIDS ON THE TRANSPORT OF RADIONUCLIDES THROUGH A QUARTZ PACKED COLUMN

Measurement and Estimation of Kinetic and Thermodynamic Data for Low Temperature Geochemistry

Location: Lake Thoreau

Symposium organized by J. Donald Rimstidt and Patricia M. Dove

1:00 William H. Casey, Henry R. Westrich
THE DISSOLUTION RATES OF SOME SIMPLE SILICATE AND OXIDE MINERALS

1:30 Art F. White, Alex E. Blum, Tomas D. Bullen, Jennifer W. Harden
CALCULATION OF KINETIC WEATHERING RATES OF SILICATE MINERALS: A CASE STUDY BASED ON SOIL CHRONOSEQUENCES

2:00 Timothy E. Burch, K.L. Nagy, A.C. Lasaga
FREE ENERGY DEPENDENCE OF MINERAL-FLUID REACTION KINETICS: RESULTS AND IMPLICATIONS

2:30 BREAK

3:00 Patricia M. Dove
DISSOLUTION KINETICS OF QUARTZ IN SODIUM CHLORIDE SOLUTIONS: NEW HYDROTHERMAL DATA AND A COMPREHENSIVE RATE MODEL FOR 25 TO 300°C

3:20 W.L. Bourcier
CONTROLS ON THE LONG-TERM DISSOLUTION RATE OF BOROSILICATE GLASS

3:40 Shaojun Zhong, Alfonso Mucci
EXPERIMENTAL STUDY OF CALCITE PRECIPITATION KINETICS IN SEAWATER USING A CONSTANT ADDITON SYSTEM AT 25°C

4:00 J. Donald Rimstidt, William D. Newcomb
METHODS OF MEASUREMENT AND ANALYSIS OF RATE DATA: THE RATE OF REACTION OF FERRIC IRON WITH PYRITE

4:20 Mark A. Williamson, J. Donald Rimstidt
THE KINETICS OF THE DECOMPOSITION OF THE FERRIC THIOSULFATE COMPLEX IN ACIDIC AQUEOUS SOLUTIONS

4:40 Walton R. Kelly, Janet S. Herman, Patricia W. Guy
THE NATURE AND RATES OF GEOCHEMICAL CHANGES IN GROUNDWATER AS A RESULT OF BTX BIODEGRADATION

Geochemistry of Accessory Minerals

Location: Reston Suite B

Symposium organized by Bruce Watson, Frederick J. Ryerson, Calvin F. Miller, and T. Mark Harrison

II. Thermochronology and Kinetics

1:30 Urs Scharer
U-Pb GEOCHRONOLOGY IN ACCESSORY MINERALS: A DISCUSSION

1:50 Daniele Cherniak
LEAD DIFFUSION AND RADIATION DAMAGE IN TITANITE

2:10 L.M. Heaman, A.N. Lecheminant
U-Pb SYSTEMATICS OF MANTLE-DERIVED ZIRCON AND BADDELEYITE XENOCRYSTS: IMPLICATIONS FOR EXCESS ^{206}Pb IN THE MANTLE

2:30 Martin Hand, Paul H.G.M. Dirks
THE INTERPLAY BETWEEN ZIRCON, PARTIAL MELTING AND DEFORMATION AND THE IMPLICATION FOR DATING

2:50 BREAK

3:10 James M. Brenan
DIFFUSION OF FLUORINE AND CHLORINE IN FLUORAPATITE

3:30 W.T. Akers, M. Grove, T.M. Harrison, Ferdrick J. Ryerson
THE STABILITY OF RHABDOPHANE AND ITS IMPLICATIONS FOR MONAZITE THERMOCHRONOLOGY

3:50 K. Mezger, C.P. DeWolf
SIGNIFICANCE OF ACCESSORY MINERALS FOR THE U-Th-Pb SYSTEMATICS AND HISTORY OF HIGH GRADE TERRANES

4:10 Gerhard Vavra
QUANTIFICATION OF ZIRCON GROWTH KINEMATICS: A NEW APPROACH USING ZIRCON MORPHOLOGY AS A PETROGENETIC TRACER

Trace Element Chemistry/Crystal Chemistry of the Rock Forming Silicates

Location: Lake Audubon

Symposium organized by J.J. Papike and N. Shimizu

1:30 C.K. Shearer, J.J. Papike
MELTING PROCESSES ON THE EUCRITE PARENT BODY: EVIDENCE FROM TRACE ELEMENT CHEMISTRY OF ORTHOPYROXENE FROM OLIVINE DIOGENITES

1:50 W.L. Griffin, C.G. Ryan
TRACE-ELEMENT PATTERNS IN MANTLE-DERIVED CHROME-PYROPE GARNETS

2:10 R. Vannucci, L. Ottolini, P. Bottazzi, G.B. Piccardo
ION MICROPROBE EVIDENCE FOR SUBSOLIDUS HFSE/REE FRACTIONATION IN MANTLE MINERALS

2:30 E. Rampone, G.B. Piccaro, R. Vannucci, P. Bottazzi, L. Ottolini
TRACE ELEMENT REDISTRIBUTION BETWEEN MANTLE MINERALS DURING SP- TO PL-FACIES TRANSITION: THE EVIDENCE OF THE NORTHERN APENNINE PERIODOTITES (ITALY)

2:50 Melissa B. Kirkley, John J. Gurney, Ben Harte
REE CHARACTERISTICS OF GARNETS AND CLINOPYROXENES IN ECLOGITE XENOLITHS FROM THE ROBERTS VICTOR KIMBERLITE

3:10 L. Ottolini, P. Bottazzi, R. Vannucci
SIMS INVESTIGATIONS OF Li, Be, B IN SILICATE MINERALS USING CEF

3:30 Keith Scott
TRACE AND MINOR COMPONENTS OF WHITE MICAS IN WEATHERED ROCKS - INDICATORS OF ROCK TYPE AND PROXIMITY TO Au MINERALIZATION, WESTERN AUSTRALIA

Distinguished Lecture, International Association of Geochemistry and Cosmochemistry

Location: Grand Ballroom A-C

5:00 A. A. Levinson
AGE, ORIGIN, AND EMPLACEMENT OF DIAMONDS

Reception and Banquet

Reception 6:00 - 7:00 p.m.

Location: Grand Ballroom D

Goldschmidt Banquet 7:00 - 9:00

Location: Grand Ballroom A-C

SUNDAY MAY 10, 1992

SUNDAY MORNING

Isotopic and Trace Element Modeling

Location: North Point/Tall Oaks

Symposium organized by Robert E. Zartman and Fred A. Frey

8:30 Robert E. Zartman
IN PURSUIT OF A "PERFECT" PLUMBOTECTONIC MODEL

8:55 Stein B. Jacobsen, Charles Harper Jr.
ISOTOPIC MODELING OF CRUST AND MANTLE EVOLUTION

9:20 Albrecht W. Hofmann
PLUMBING THE DEPTHS OF MANTLE LEAD

9:45 S.L. Goldstein, S.J.G. Galer, R.L. Rudnick
Pb ISOTOPIC CONSTRAINTS ON THE TH/U RATIO OF THE CONTINENTAL CRUST AND THE EARTH

10:10 BREAK

10:30 S.J.G. Galer, S.L. Goldstein
INFLUENCE OF ACCRETION ON Pb IN THE EARTH

10:55 Jonathan E. Snow, Stan R. Hart, Henry J.B. Dick
Os ISOTOPES IN THE DEPLETED MID-OCEAN RIDGE MANTLE: IMPLICATIONS FOR THE EVOLUTION OF THE EARLY EARTH

11:20 Irma Azbel, Igor Tolstikhin
EVOLUTION OF THE EARTH: ISOTOPIC MODELLING OF TERRESTRIAL GEODYNAMICS

Ab-initio Methods

Location: Hunter's Woods

Symposium organized by A.C. Lasaga

8:30 M. Boisen Jr., G. Gibbs
AB INITIO BASED MODELS OF THE STRUCTURAL AND VOLUME COMPRESSIBILITY PROPERTIES OF SILICA POLYMORPHS SUCH AS QUARTZ, CRISTOBALITE AND COESITE

8:55 G. Gibbs, M. Boisen Jr., K. Bartelmehs
BOND LENGTH-BOND STRENGTH VARIATIONS FOR NITRIDE, OXIDE, FLUORIDE AND SULFIDE MOLECULES AND CRYSTALS

9:20 J.A. Tossell
THEORETICAL STUDIES OF THE SPECIATION OF Zn AND Cd IN Cl- AND SH-CONTAINING AQUEOUS SOLUTIONS

9:45 Y. Xiao, A.C. Lasaga
AB-INITIO QUANTUM MECHANICAL STUDIES OF SILICATE DISSOLUTION KINETICS: ACID, BASE, AND ALKALI CATION CATALYSIS

10:10 BREAK

10:30 R.E. Cohen
FIRST-PRINCIPLES DENSITY FUNCTIONAL CALCULATIONS OF THE HIGH TEMPERATURE AND HIGH PRESSURE PROPERTIES OF MINERALS AND MELTS

10:55 Lars Stixrude
ATOMIC STRUCTURE OF LIQUID, VITREOUS AND CRYSTALLINE TECTOSILICATES AND THEIR RESPONSE TO PRESSURE

11:20 J.C. van Moort, E. Pernicka, A. Agel, M. Hotchkis
RELATIONS BETWEEN TRACE ELEMENT CONTENT AND PARAMAGNETIC PROPERTIES OF A BANDED SMOKY QUARTZ CRYSTAL

11:45 DISCUSSION

Surface Chemistry of Natural Materials

Location: Lake Anne

Symposium organized by James A. Davis and John M. Zachara; *Sponsored by* Division of Geochemistry, American Chemical Society and The Geochemical Society

Field Studies

Session Chair: Laurent Charlet

8:20 Douglas B. Kent, James A. Davis
UNDERSTANDING THE ROLE OF SORPTION IN AQUEOUS GEOCHEMISTRY ON THE FIELD-SCALE

8:50 William P. Ball, Dirk F. Young
EXPERIMENTAL AND MODELING STUDIES OF THE SORPTION OF NONPOLAR ORGANIC CHEMICALS–COMPARISON OF BATCH AND COLUMN TECHNIQUES

9:10 Kenneth G. Stollenwerk
EFFECT OF VARIABLE GROUND WATER COMPOSITION ON SORPTION AND TRANSPORT OF MOLYBDATE IN A SAND AND GRAVEL AQUIFER, CAPE COD, MASSACHUSETTS

9:30 André Tessier
BINDING OF TRACE ELEMENTS IN OXIC LAKE SEDIMENTS

9:50 DISCUSSION

10:00 BREAK

10:20 Edward R. Sholkovitz
THE RARE EARTH ELEMENT COMPOSITION OF RIVER WATER: FRACTIONATION, COLLOIDS AND ADSORPTION

10:40 Liyuan Liang, John F. McCarthy
IN SITU IRON OXIDE COLLOID FORMATION DURING A FORCED INJECTION OF OXYGENATED WATER INTO A SANDY AQUIFER

11:00 Marilyn R. Buchholtz ten Brink, Brian E. Viani, Susan I. Martin
CHARACTERIZATION OF INORGANIC COLLOIDS IN GROUNDWATERS

Special Topics

11:20 K.F. Hayes, A.H. Demond, F.N. Desai, G.-R. Duh, B. Witherell, H.R. Hammad
THE INFLUENCE OF SURFACTANT SORPTION ON THE FLOW OF ORGANIC LIQUIDS IN GROUNDWATER

11:40 J.A. Tossell, D.J. Vaughan
CALCULATION OF THE PROPERTIES OF XANTHATES, METAL-XANTHATE COMPLEXES AND DIXANTHOGEN

Measurement and Estimation of Kinetic and Thermodynamic Data for Low Temperature Geochemistry

Location: Lake Thoreau

Symposium organized by J. Donald Rimstidt and Patricia M. Dove

8:30 A.M. Bailey, H.H. Roberts, J.H. Blackson, S.W. Tam
DIAGENESIS IN SEDIMENTS OF THE MISSISSIPPI DELTA PLAIN

8:50 Xiandong Cong, R. James Kirkpatrick
MULTI-NUCLEAR SOLID STATE NMR STUDY OF THE HYDRATION OF SILICATES AND ALUMINATES

9:10 Mark A. Williamson, Carl S. Kirby, J. Donald Rimstidt
THE KINETICS OF IRON OXIDATION IN ACID MINE DRAINAGE

9:30 Neil E. Johnson, J. Donald Rimstidt
SUPERGENE DEVELOPMENT OF WIDMANSTATTEN TEXTURES IN BORNITE: AN EXAMPLE OF EXSOLUTION VIA OXIDATIVE LEACHING

9:50 Jaime A. Arias, Nelsón C. Guerra
SUPERGENE ENRICHMENT OF SULPHIDES: II ENRICHMENT MECHANISMS

10:10 BREAK

10:30 Alison E. Clark, Janet S. Herman, Anthony F. Randazzo
GEOCHEMICAL INTERPRETATION OF A DEPTH PROFILE THROUGH A HETEROGENEOUS CARBONATE AQUIFER

10:50 D.I. Kaplan, P.M. Bertsch, D.C. Adriano
PHYSICOCHEMICAL AND MINERALOGICAL CHARACTERIZATION OF MOBILE COLLOIDS FROM TWO SOIL PROFILES

11:10 J.L. Mogollon, E. Querales
SIMULATED ACID RAIN-TROPICAL SOILS INTERACTIONS

11:30 Salvador Lo Monaco, J. Armando Ramirez
MINERALOGY AND GEOCHEMISTRY OF PHOSPHATES IN LATERITES FROM VENEZUELAN GUAYANA

Geochemistry of Accessory Minerals

Location: Lake Fairfax

Symposium organized by Bruce Watson, Frederick J. Ryerson, Calvin F. Miller, and T. Mark Harrison

III. Behavior during Metasomatism, Metamorphism, and Hydrothermal Alteration

8:30 S.S. Sorensen, J.N. Grossman
THE ROLE OF ACCESSORY MINERALS IN PRESERVING OR ENRICHING TH, HFSE, AND REE IN HIGH-GRADE BLOCKS AND RELATED ROCKS FROM SUBDUCTION COMPLEXES

8:50 John C. Ayers, E. Bruce Watson
PARTITIONING OF RARE EARTH ELEMENTS AND STRONTIUM BETWEEN APATITE AND AQUEOUS FLUIDS AT 1.0 GPA AND 1000°C

9:10 Jeffrey N. Rubin, Christopher D. Henry, Jonathan G. Price
ZIRCONIUM IN HYDROTHERMAL SYSTEMS: A MOBILE ELEMENT

9:30 A.K. Sinha
PHYSICAL, CHEMICAL AND ISOTOPIC RESPONSE OF ZIRCONS TO VARYING P-T-X CONDITIONS

9:50 BREAK

10:10 Harvey E. Belkin
BADDELEYITE (ZrO_2), A HYDROTHERMAL MINERAL IN MESOZOIC MAFIC INTRUSIVE ROCKS, EASTERN NORTH AMERICA: IMPLICATIONS FOR AQUEOUS TRANSPORT AND SOLUBILITY OF ZIRCONIUM

10:30 M.R. Van Baalen
A REVIEW OF TITANIUM MOBILITY IN METAMORPHIC SYSTEMS

10:50 Jillian F. Banfield
MICROSTRUCTURE, REACTION, AND SUBSTITUTION MECHANISMS IN TiO_2 ACCESSORY MINERALS

11:10 Reto Gieré
FORMATION OF ACCESSORY REE-MINERALS IN TITANIUM-RICH VEINS

Crystal Chemistry and Trace Elements

Location: Reston Suite A

Symposium organized by C.B. Sclar

8:30 Nicholas J.G. Pearce, William T. Perkins
MINERAL MICRO-ANALYSIS BY LASER ABLATION INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY

8:50 William T. Perkins, Nicholas Pearce, Teresa E. Jeffreys
LASER ABLATION INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY: A NEW TECHNIQUE FOR THE DETERMINATION OF TRACE AND ULTRA-TRACE ELEMENTS IN ROCKS

9:10 Simon E. Jackson, Henry P. Longerich, Brian J. Fryer
PROGRESS IN HIGH RESOLUTION, IN-SITU TRACE ANALYSIS OF MINERALS BY LASER ABLATION MICROPROBE-INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETRY (LAM-ICP-MS)

9:30 Y. Xiao, R.J. Kirkpatrick, Y.J. Kim, R. Hay
^{27}Al, ^{29}Si MAS NMR AND XRD STUDY OF Al, Si ORDER OF AUTHIGENIC K-FELDSPARS

9:50 John B. Fanselow, Reid F. Cooper
REDOX REACTIONS, CHEMICAL DIFFUSION AND NUCLEATION IN NATURAL BASALTIC GLASSES

10:10 BREAK

10:30 Huifang Xu, David R. Veblen
DOMAIN STRUCTURES AND LOW SYMMETRY IN KALSILITE

10:50 Youxue Zhang
PREDICTION OF UPHILL DIFFUSION AND VARIATIONS OF EFFECTIVE BINARY DIFFUSIVITIES

11:10 A.I. Benimoff, C.B. Sclar
REE GEOCHEMISTRY OF A PARTLY FUSED XENLITH IN THE PALISADES SILL, STATEN ISLAND, NY: A TEST OF THE IGNEOUS SOURCE-ROCK CONCEPT IN REE GEOCHEMISTRY

11:30 H.E. Newsom, Kenneth W. Sims
CHEMICAL FRACTIONATION IN THE CONTINENTAL CRUST: CLUES FROM As, Sb, W, Mo, AND Pb IN LOWER CRUSTAL ZENOLITHS

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