

RARE-EARTH INFORMATION CENTER NEWS

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Editor's Trip Switzerland—1985

IREC

The first International (European) Rare Earth Conference—IREC—was held in Zürich, Switzerland on March 3-8, 1985. The scope of this conference was quite broad, covering almost all aspects of rare earth research and technology. In this regard it is similar to the North American Rare Earth Research Conference (RERC). The meeting was held at the Höngrgerberg campus of the Eidgenössische Technische Hochschule—Zürich.

About 225 people attended IREC. Most of the Russian scientists and a few of the Chinese and Soviet bloc countries' scientists who were scheduled to present contributed papers, unfortunately, did not attend. A number of excellent invited talks were presented, but about 75 percent of them were scheduled in parallel sessions, which caused some difficulties for the attendees. Many excellent posters were presented. In addition, a number of companies set up displays exhibiting some of their products.

The main themes of the conference were: thermodynamics, metallurgy, magnetic materials, general and analytical chemistry, solution chemistry, synthesis, crystal growth, structure, solid state physics, coordination and bioinorganic chemistry, optical properties, miscellaneous physical properties, organo-metallics, and catalysis. The proceedings of this conference are to be published in the *Journal of the Less-Common Metals*.

The IREC and RERC organizational committees are working closely together, especially in scheduling conferences (see p. 4 for an open letter to the rare earth community concerning this matter). Tentative

RE HANDBOOK #7

Volume 7 of the *Handbook on the Physics and Chemistry of Rare Earths*, edited by K. A. Gschneidner, Jr. and L. Eyring is available from North-Holland Physics Publishing. In what could be described as three books in one, extensive review of three areas of the rare earth field are incorporated into this volume.

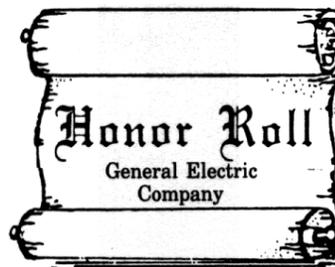
In volume 7, P. Rogl summarizes the present knowledge of ternary and higher order compounds and alloys formed by the rare earth metals and silicon with another element. In the second chapter, K. H. J. Buschow reviews the contributions of the rare earths to the present scientific activity in the preparation, properties, and applications of amorphous materials. The last chapter by H. Schumann and W. Genthe provides the reader with an introduction to the place of the rare earths in the present revival of interest in the scientifically significant and technologically important organo-metallic compounds.

Volume 7 was published in 1984 and contains 589 pages. The price in the U.S.A. and Canada is U.S. \$128.75. The price elsewhere is Dfl. 335.00. Lower rates are available on a subscription basis. Volume 7 and the previous six volumes are available from Elsevier Science Publishers, P.O. Box 211, 1000 AE Amsterdam, The Netherlands or from Elsevier Science Publishing Company, Inc., P.O. Box 1663, Grand Central Station, New York, N.Y. 10163, U.S.A.

plans call for future RERC meetings to be held in even years, and IREC meetings in odd years.

Our thanks go to Dr. Emanuel Kaldis, chair, and his coworkers for their fine efforts in making this a

(Continued on page 3)



THANKS

This fiscal year only General Electric Company joined our select list of sponsors that have supported the center for 10 years. They thus gain their place on our honor roll and join the 24 other companies who have been with us longer than 10 years. We are appreciative of all our sponsors but wish to express a special thanks to all of these faithful sponsors.

X-Ray Lasers

Physicist D. Matthews and his group at the Lawrence Livermore National Laboratory have succeeded in getting yttrium to lase with a radiation at 155Å. The green laser light from the Laboratory's Novette laser was focused on a thin metal film target. The laser pulse vaporizes, ionizes, and strips the metal ions of all but 10 electrons (neon-like ions). This sets up the "population inversion" of excited species necessary for the lasing process. As the excited ions relax, stimulated emission of x-rays occurs perpendicular to the initial laser pulse. The single pulses of soft x-rays are 700 times more powerful than would occur spontaneously.

The effort to develop x-ray lasers has been going on for more than a decade. Matthews admits that this set up is not practical because the Novette is as long as a football field

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MEETINGS

I.C.L.A.

The dates of the 2nd International Conference on the Basic and Applied Chemistry of the *f*-Transition (Lanthanide and Actinide) and Related Elements have been changed from September 1-5, 1986 [*RIC News XIX* (4) 3 (1984)] to April 6-10, 1987. This response to the plea by many rare earth scientists to hold only one broad scope conference per year is very welcome. Instead of 3 months there are now 10 months between the Rare Earth Research Conference in Canada and the 2nd I.C.L.A.

For more information contact Professor A. Pires de Matos, Dept. de Quimica, Instituto de Energia, LNETI, Estrada Nacional 10, 2685 Sacavem, Portugal.

São Paulo Symposium

The X Annual Symposium of the São Paulo Academy of Science will be held November 6-8, 1985, at the Chemistry Institute of São Paulo, SP, Brazil. The scientific program will consist of plenary lectures and contributed papers in several fields of the lanthanide and actinide chemistry.

Papers will be presented in most part in Portuguese with some in English. The deadline for the receipt of abstracts is July 31, 1985 and for the complete paper, November 6. For more information contact Professors L. B. Zinner or G. Vicentini, Universidade de São Paulo, C.P. 20.780, 01498 São Paulo, Brazil.

I.C.A.R.E.A. 86

The International Conference on Anomalous Rare Earths and Actinides (I.C.A.R.E.A.) will be held July 7-11, 1986 in Grenoble, France. The theme of the conference will be experimental and theoretical aspects of the hybridization of *f*-electrons with band electrons in rare earth and actinide compounds and alloys. Topics will include heavy fermion systems, valence instabilities, dense Kondo behavior, and itinerant versus localized magnetism.

The conference is open to everyone, with a program of invited and con-

(Continued in next column)

CONFERENCE CALENDAR

Intl. Conf. on Rare Earth Development and Applications and Intl. Fair for Rare Earths and Their Application Products
Beijing, People's Republic of China
September 10-14, 1985
RIC News XIX (2) (1984)

*Chemistry of Lanthanides and Actinides at X Annual Symposium of São Paulo Academy
São Paulo, Brazil
November 6-8, 1985
This issue

17th Rare Earth Research Conference (RERC)
Hamilton, Ontario, Canada
June 8-12, 1986
RIC News XIX (2) 3 (1984) and *XX* (1) 3 (1985)

*Intl. Conf. on Anomalous Rare Earths and Actinides (I.C.A.R.E.A.)
Grenoble, France
July 7-11, 1986
This issue

*2nd Intl. Conf. on the Basic and Applied Chemistry of the *f*-Transition (Lanthanide and Actinide) and Related Elements (2nd I.C.L.A.)
Lisbon, Portugal
April 6-10, 1987
This issue and *RIC News XX* (4) 4 (1984)

*New listing or change

New Organosamarium Complex

Scientists at the University of California, Irvine, have claimed the first synthesis and structural characterization of a new organolanthanide complex containing only two cyclopentadienyl ligands. The species, bis(pentamethylcyclopentadienyl)samarium is the closest known rare earth or actinide analog to the transition metal metallocenes such as ferrocene. Previously discovered "sandwich" compounds of the rare earths had eight-carbon rings or contained other ligands in addition to the two five-carbon rings. Discovered by Professor W.J. Evans and coworkers, L. A. Hughes, and T. P. Hanusa, the new compound is described in *J. Am. Chem. Soc.* **106**, 4270-2 (1984).

tributed papers on the latest achievements and current trends in research. The proceedings of the conference will be published.

For more information, contact Dr. J. X. Boucherle, Conference Secretary, CENG-DRF, 38041 Grenoble Cedex, France.

Magnetic Glasses

Transition metal oxides have been added since antiquity to glassware and ceramic glazes to give them color, but according to the authors, the magnetic properties of these or of metallic glasses containing 3*d* or 4*f* elements have been thoroughly studied only the last 15 to 20 years. The book, *Magnetic Glasses*, authored by K. Moorjani and J. M. D. Coey, presents a unified account of the magnetism of amorphous solids. It is devoted to both sorts of glasses and provides a coherent description of the phenomena associated with their magnetic behavior. The book not only covers amorphous ferro- and ferrimagnets and their practical applications as soft magnetic materials and perpendicular recording materials, but also spin glasses, and the novel forms of random magnetic order that result from the frustrated exchange coupling or random anisotropy in noncrystalline solids.

Although references to rare earths are found throughout the book, Chapter VI, "Random Anisotropy-Rare Earth Alloys," should be of special interest to our readers. The 102-page chapter presents a balance of theory and experimental results and has a bibliography containing 266 references.

Physicists will be interested in how the absence of crystal structure modifies collective magnetic phenomena, which are mainly governed by short-range interactions. Material scientists will be interested in the wide spectrum of materials provided by methods capable of yielding microscopically homogeneous alloys of compositions not attainable in crystals, and the possibility of being able to tailor the magnetic properties of a glass to fit those desired. Electronic and electrical engineers will be interested in the possible uses they can make of metallic glasses in electronic or power applications.

Magnetic Glasses was published in 1984 by Elsevier Science Publishers. The book contains 525 pages and costs U.S. \$127.00 (Canada and United States) or Dfl. 230.00 (rest of the world). It can be obtained in the U.S.A. or Canada from P.O. Box 1663, Grand Central Station, New York, N.Y. 10163 or for others from P.O. Box 211, 1000AE Amsterdam, The Netherlands.

1984 IR 100

Two of the top 100 significant new technological developments of 1983 as determined by *Research and Development* [26, No. 10, 77-134 (1984)] contain rare earth materials.

In the analytical instruments division, J. W. Butler and A. D. Colvin of Ford Motor Company were honored for their development of the Ford lambda oxygen analyzer. The analyzer was designed to measure the oxygen equivalences and air/fuel ratios of diesel and spark-ignited internal combustion engines burning both conventional and nonconventional fuels. It also can be used with oil and coal power producing combustion and in home or commercial heating systems. The oxygen partial pressure is monitored in a mixture of combustion products and a known quantity of air. The mixture is oxidized over a platinum oxidation catalyst and the air/fuel ratio calculated. The oxygen concentrations are measured with a yttria stabilized zirconia sensor.

In the materials division, R. B. Herchenroeder of Cabot Wrought Products Division was honored for his development of Cabot alloy no. 214. It is a new nickel base alloy containing 16 percent chromium, 2.5 percent iron, 4.5 percent aluminum, and a small amount of yttrium. The alloy has outstanding resistance to oxidation through 2200°F. as well as good resistance to carburization and chlorine attack.

Industrial Review

"Rare Earth Elements and Yttrium," a chapter from the 1985 edition of *Mineral Facts and Problems*, is available as a preprint from Bulletin 675. The complete book is not available at this time but the preprint, as well as information on the book, is available from the author of the preprint, James B. Hedrick. His address is MS 4050, U.S. Bureau of Mines, 2401 E Street NW, Washington, D.C. 20241, U.S.A. *Mineral Facts and Problems* is published every five years by the Bureau of Mines of the United States Department of the Interior. The complete book covers the production, processing, and uses of most minerals and metals.

The chapter devoted to the lanthanides and yttrium is 18 pages. It covers the producers and production of ores and concentrates around the world. It deals with the processing of different minerals and concentrates to produce the materials used in the industry. Other sections of the review are devoted to the reserves available, uses, supply-demand relationships, economic factors, and outlook for the future.

Editor's Trip

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scientifically exciting, stimulating, and well organized conference.

Neutron Scattering

While in Europe the editor also had the opportunity to visit the Laboratory für Neutronenstreuung outside of Zürich, in Würenlingen, Switzerland. This laboratory was formerly known as the Institute für Reaktortechnik and was headed by Dr. W. Hälg. In October 1984 Dr. Hälg retired and Dr. A. Furrer became head and the name of the Institute was changed at the same time. This laboratory is a national research center and there are about 15 members (including about 5 graduate students) in the group operating 4 diffractometers (2 double axis and 2 triple axis spectrometers). Most of their work is carried out in collaboration with many other scientists—mostly Swiss but also others from various European countries.

Their work on hydride materials and magnetic rare earth materials was of greatest interest to me. The hydride work, which is supervised by Dr. P. Fischer, concerned chemical

Business News Rhone-Poulenc

The Special Products Division of Rhone-Poulenc, Inc. has announced the appointment of Nicholas Sullo as manager of product development of rare earths. He will be responsible for developing new rare earth products in several polymer and petrochemical markets. A chemical engineer, he has held various product and sales management positions during his 11 years with the company.

Molycorp, Inc.

The take-over movement has reached the rare earth field. Unocal, parent of Union Oil Company of California of which Molycorp, Inc. is a subsidiary has become a target for T. Boone Pickens, Jr. of Mesa Petroleum Company and of Mesa Partners II and its wholly owned subsidiary Mesa Eastern, Inc. Mesa offered to buy 64 million shares at \$54.00 per share, which coupled with the 23.7 million shares they already own would give them a majority of the 173.9 million shares issued. Unocal countered by offering to buy about 29 percent of its shares for \$72.00 and another 20 percent with notes if Pickens' group gets a majority. The \$6.28 billion move would wipe out Unocal's equity and make it a much less desirable acquisition. Unocal also proposed to put 45 percent of its domestic oil and gas reserves into a master limited partnership.

As the *RIC News* was going to press it appeared that Unocal has won its fight with T. Boone Pickens for control of the company. A newspaper report stated that Pickens and Mesa Partners have agreed to sell back their stock in Unocal under conditions that could possibly lead to a financial loss for Pickens and Mesa Partners.

structures, transformations, and magnetic structures of a variety of materials. The work on magnetic rare earth materials, which is mainly under the supervision of Dr. Furrer, deals with magnetic structures, crystal field levels, magnetic phase diagrams, magnetic excitations (spin waves), and spin dynamics.

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* A Good Year *

Fiscal year 1985, despite its ominous start, has been a pleasant and satisfying year. Faced with a financial crisis, we waged a letter writing campaign to find new sponsors. During the fiscal year we received positive action from 28 new and welcome sources of support. We had 7 new benefactors join our family in the fourth quarter and received continued support from 9 others. This brings the number of sponsors to 68 and breaks our record of 47 set in fiscal 1983.

The 16 companies sending us their support during the fourth quarter are listed below with the number of years they have been sponsors listed in parantheses.

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Lasers

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and is one of the world's most powerful lasers. He believes, however, that the same technique will work with smaller lasers and that other targets can be used. In fact, most of their test shots have been made with selenium targets.

Matthews and his coworkers reported on their studies at the Boston meeting of the American Physics Society's Division of Plasma Physics last October. For further details see D. L. Matthews, et al., *Phys. Rev. Lett.*, 54, 110 (1985).

An Open Letter to the Rare Earth Community

Rare earth research, while still a specialized area, covers many diverse fields such as biology, chemistry (solution and solid state), geology, metallurgy, materials science, medicine, nuclear science, physics (magnetism, superconductivity), and many branches of spectroscopy. The rare earth research conferences have tried to bring together, as a single community, academic and industrial workers involved in different trends in rare earth research. Such research has in common many basic concepts, both theoretical and experimental. Applications of the rare earths in industry are closely related to research results, are expanding rapidly, and cover many fields from catalysis to specialized phosphors. Broad scope rare earth meetings, where fundamental scientists and industrialists can meet and exchange information and where new trends in research or applications are presented, are a necessity for both research and industry.

In the last few years, there have been a number of initiatives from several countries to convene rare earth meetings. It seems that it is desirable to have some degree of cooperation in order to avoid overlapping meetings too closely spaced in time. The rare earth community is still small, and if the number of meetings becomes too large, dispersion of interest and poor attendance will result, and this will be detrimental to the efficiency of these necessary gatherings. As members of the Board of Directors of Rare Earth Research Conferences Inc., USA, which

(Continued in next column)

organizes the North American-based meetings, and as members of the Steering Committee of the International Rare Earth Conference organized in Europe, we would like to call the attention of the rare earth community to the necessity of rational planning of international rare earth meetings. We should adopt procedures similar to those used for scheduling the International Coordination Chemistry Conferences, the International Conference on Magnetism and similar meetings.

Consequently, we call on our colleagues all over the world and invite them to cooperate in organized planning of rare earth meetings. We believe that one broad scope rare earth meeting a year would make for a reasonable time interval. Of course, we do not intend by this to exclude specialized workshops or symposia that may be necessary to hold from time to time. Perhaps these could be coordinated as satellite meetings of the broad-based conferences to the benefit of both.

We have established an ad hoc Executive Committee for the International Rare Earth Conferences and we invite comments and specific suggestions from scientists and colleagues who share our interest in this effort to achieve international cooperation to ensure more fruitful meetings in the future. Please send responses to Professor Karl Gschneidner, Jr., c/o Rare-earth Information Center.

J.-C. Bunzli, Switzerland, P. Caro, France (Chairman), G. R. Choppin, USA, R. D. Fischer, West Germany, J. E. Greedan, Canada, K. A. Gschneidner, Jr., USA, E. Kaldis, Switzerland, L. Niinistö, Finland, H. B. Silber, USA, and G. Vicentini, Brazil.

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