



RARE-EARTH INFORMATION CENTER NEWS

INSTITUTE FOR PHYSICAL RESEARCH AND TECHNOLOGY
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GMELIN HANDBOOK

Volume A6a of system 39 of the *Gmelin Handbook of Inorganic Chemistry* deals with lithosphere geochemistry, specifically the sedimentary and metamorphic cycles. Published after A6b [RIC News, XXIII, [3] 4 (1988)] this volume brings to nine the volumes devoted to the abundance, occurrence, and behavior of the rare earths in the universe and our earth.

In the chapter "Sedimentary Cycle," the behavior of yttrium and the lanthanides (Ln) during weathering under both marine and terrestrial conditions is discussed. Included is a short compilation of the migration and precipitation of Y and Ln in surficial weathering and oxidation zones. The main part of the chapter treats, in addition to mode of occurrence, the distribution of Y and Ln in the various types of sedimentary rocks in relation to the genetic processes which produced them. A concluding section describes the mobilization, migration, and precipitation of Y and Ln during the diagenetic transformation of sediments.

In the chapter "Metamorphic Cycle," the main emphasis is on examples of mode of occurrence and behavior of Y and Ln during both the contact metamorphic and prograde and retrograde regional metamorphic processes affecting sedimentary and igneous source rocks. Briefly described is the behavior of Y and Ln during ultrametamorphism of the metamorphic rocks and during metamorphic processes in connection with special types of geological events. These events include the subduction of crustal material into the earth's mantle due to plate drift and cosmic body impact deformation including partial or total melting.

The 424-page book was published in 1988 by Springer-Verlag and costs DM 1903 (~U.S.\$1065.00). It may be

(Continued in next column)

Gd₂O₃S Scintillator

As a result of the appearance of Magnetic Resonance Imaging (MRI), demands for the improvement of the quality of computed tomography (CT) images are increasing. Especially for accurate diagnoses of diseases in the abdomen and head, improvement in low contrast detectability is desirable. Since the conventional xenon ionization detectors are not readily improvable, the development of new detectors is indispensable.

A Japanese team has developed a solid state detector utilizing Gd₂O₃S doped with Ce, Pr, and F. The powder is used as a x-ray phosphor and Y. Ito, H. Yamada, M. Yoshida, F. Fujii, G. Toda, H. Takeuchi, and Y. Tsukuda [*Jpn J. Appl. Phys.*, 27, L1371-3 (1988)] describe the method they developed for making a translucent scintillator with good x-ray absorption and light output. They used 0.1 wt percent Li₂GeF₆ as a sintering aid and hot isostatic pressing at 1300°C and 100 atm.

The same authors, except for G. Toda, joined M. Nakagawa, F. Kawaguchi, and T. Hayakawa to develop a solid state detector suitable for use in CT [*Jpn J. Appl. Phys.*, 27, L1572-5 (1988)]. The Gd₂O₃S ceramic scintillator, doped with Ce, Pr, and F, is coupled with silicon photodiodes in a workable x-ray solid state detector. The detector's sensitivity is one and a half times that of the xenon ionization detector and twice that of the solid state detector using CdWO₄ scintillators. The new detector increases low contrast detectability in CT images by 30 percent or for equal contrast quality one can reduce x-ray dose by 30 (abdomen) to 40 (head) percent.

ordered from Springer-Verlag, 4005-Marketing Gmelin, Heidelberger Platz 3, D-1000 Berlin 33, West Germany.

18th RERC

The 18th Rare Earth Research Conference (RERC) was held September 12-16, 1988, in Lake Geneva, Wisconsin. General Conference Chair Bill Carnall and Program Chair Lance DeLong deserve plaudits for the successful conference. Thanks should also go to Miriam Holden for the smooth manner in which the conference details were handled. The proceedings are to be published in Volumes 148 and 149 of *The Journal of Less-Common Metals*, which is scheduled to appear in print in February or March of 1989.

One could not help but recognize the international aspect of the conference as over one-third of the attendees were from other countries. Among the highlights of the conference were the following.

Brian R. Judd was presented the Frank H. Spedding Award Tuesday evening by John Greedan, chair of the selection committee, and Peter Falconnet of Rhône Poulenc, sponsor of the award. Dr. Judd then presented an entertaining acceptance speech. One aspect of his speech was devoted to how a now obvious error in a publication can be carried along and affect the thinking of many researchers.

Dale Partin discussed his work at the General Motors Research Laboratories in Warren, Michigan, with lead chalcogenides doped with rare

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season's
greetings

Business News

Rhône-Poulenc—Research Chemicals

In an agreement finalized November 21, 1988, Rhône-Poulenc acquired Research Chemicals from the Nucor Corporation. The purchase will allow Rhône-Poulenc to provide better service to the rare-earth metal and magnet markets, according to Peter Neff, president and chief operating officer of Rhône Poulenc. Rhône-Poulenc's expertise is in chemical processing and the acquisition obtains an excellent technology in a field where they have not had a great deal of experience. Rhône-Poulenc will now have plants in Phoenix, Arizona and Freeport, Texas in the U.S.A., as well as in La Rochelle, France and Niihama, Japan.

S. X. Holdings

S. X. Holdings Limited has announced plans to build a new plant for treating rare earths in Port Pirie, South Australia. The project would involve a minimum of \$35A million over a five-year period and would create up to 70 jobs according to Mr. Norton Jackson, chair of S. X. Holdings.

Initially, the feedstock and some of the technology for the first stage of the project will come from China. After the plant is established, Australian feedstock also will be utilized. Eventually, a monazite processing plant will be constructed as part of the project. Subject to satisfactory tests, the company will also use material from the Port Pirie tailings dam.

S. X. Holdings also announced plans to recover 4 tons of scandium by a in-situ leach and to finish the material as the market develops. They hope this will lead to a stable and reasonable price for scandium and lead to an increase in research and finally utilization.

S. X. Holdings is a joint venture of Muswellbrook Energy and Minerals Limited (51 percent) and Lanthanide Technology Pty. Limited (49 percent).

American Superconductor

A new technology for making superconducting wire is the subject of an exclusive licensing agreement signed by the Department of Energy's Argonne National Laboratory and American Superconductor Corporation, Cambridge, Massachusetts. The agreement is the

(Continued in next column)

Cu Phase Diagrams

The RIC has received a few extra copies of the August 1988 issue of the *Bulletin of Alloy Phase Diagrams*, which is devoted exclusively to rare earth-copper systems with special sections on all the rare earths with the exception of lanthanum and yttrium. La-Cu and Y-Cu systems are included in a six-page general description of R-Cu systems.

This journal is published bi-monthly by ASM International as part of the ASM International/National Bureau of Standards data program for alloy phase diagrams.

The RIC will distribute these extra copies on a first-come, first-serve basis.

(Continued from previous column)

first to license superconducting technology from a government laboratory to private interest. The technology, developed by Dieter Gruen, involves coating a wire with yttrium, barium, and copper in the right proportions, then heating the wire in the presence of oxygen to oxidize the coating. The process still needs more work before a practical superconducting wire results.

American Superconductor was formed in 1987 to develop and market commercial products that use the new high T_c oxide superconductors. It has also licensed technology from the Massachusetts Institute of Technology. The firm operates a 7,500 sq. ft. development and pilot plant facility.

NUCLEMON

Mr. A. E. deCarvalho Loureiro, commercial director of NUCLEMON-Nuclebrás de Monazita e Associados Ltda., announced that NUCLEMON, with the commercial assistance of Nissho Iwai Corporation of Osaka, Japan, will start building a plant in São Paulo for the separation of rare earths. The plant is scheduled to start operations during the second half of 1989. Technological support will be furnished by Santoku Metal Industry Company of Kobe, Japan.

Hecla Mining

W. Glen Zinn, vice president and assistant to the chair for Hecla Mining Company, is now in charge of the company's exploration program. Zinn succeeds Gene K. Ealy who retired after seven years as Hecla's vice president for exploration. Zinn will retain his responsibilities in the area of corporate development and planning.

Luminescence Centers

Volume 175 and Volume 175 (supplement) of the Proceedings of the Lebedev Physics Institute of the Academy of Sciences of the USSR, *Luminescence Centers of Rare Earth Ions in Crystal Phosphors and Luminescence and Anisotropy of Zinc Sulfide Crystals*, respectively, were published in an English version by Nova Science Publishers in 1988. The original Russian language versions were published by Nauka Publishing House in 1986 and 1985. Edited by M. D. Galanin, the 161- and 170-page English versions can be ordered from Nova Science Publishers, 283 Commack Road, Suite 300, Commack, NY 11725. The cost is U.S.\$71.00 and U.S.\$73.00, respectively.

Rare earth activated luminophors may be divided into two types, classical crystal phosphors with recombination luminescence mechanisms and anti-Stokes luminophors with cooperative mechanisms. Although the flow of physical processes occurring in them between the absorption of an excitation photon and the emission of a luminescence photon differ substantially, the kinetics of this luminescence has certain common features. Chief among these is dependence of the rate of the energy conversion process on the pumping intensity, which is reflected in the nonlinearity of the corresponding component in the kinetic equations.

The first and largest article, in Volume 175 (72 pages), is devoted to the study of the luminescence kinetics of cooperative luminophors. A. K. Kazaryan, Yu. P. Timofeyev, and M. V. Fok examine the limits in principle on cooperative luminescence efficiency in connection with the existence of interactions between the forward and back electronic transitions and the role of the co-activator in luminescence. Also examined is the effect of the interaction between excited rare earth ions and base vibrations on the quantum yield.

The remaining three articles in Volume 175, and the first two articles in Volume 175 (supplement), are devoted to studying luminescence centers in single crystals of zinc sulfide activated by rare earth elements and the properties that are linked to the special properties of the activators. The second article, in Volume 175, written by N. N. Grigor'yev, M. V. Fok, and L. Yastrabik, interprets the

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RE HANDBOOK #11

Volume 11 of the *Handbook on the Physics and Chemistry of Rare Earths—Two Hundred-Year Impact of Rare Earths on Science* was published in 1988 by North-Holland Physics Publishing, a division of Elsevier Science Publishers B.V. The dedication reads "To Professor Frank H. Spedding whose more than fifty years of published research into rare earth science has benefited everyone who works in the field." In the prologue, Harry J. Svec, a close friend, discusses Dr. Spedding's personal life and career. A listing of the patents and publications of Dr. Spedding and his awards are part of the prologue.

The seven chapters that comprise the balance of the handbook discuss the history and significance of various aspects of the rare earth elements. F. Szabadváry, in "The History of the Discovery and Separation of the Rare Earths," sets the tone of the volume by shedding light on some of the dark corners in the history of these elements.

The second chapter is "Atomic Theory and Optical Spectroscopy," by B. R. Judd, winner of the Frank H. Spedding Award at the 18th Rare Earth Research Conference. Judd provides a definitive and perceptive account of the use of atomic spectroscopy during the past 60 years to clarify the electronic configurations and energy levels of the rare earths.

In "Influence of Rare Earths on Chemical Understanding and Classification," C. K. Jørgensen records his own special insights into the idiosyncratic chemical behavior of these 17 elements. Discussions range from their primordial formation in the stars to the chemical basis of their classification and integration into the fabric of science.

Two chapters emphasize the unique role played by the rare earths in understanding magnetic interactions. J. J. Rhyne, in "Highlights from the Exotic Phenomena of Lanthanide Magnetism," covers the general field of magnetism from moments and spin structure to Kondo lattices and heavy fermions. B. Bleaney, in "Magnetic Resonance Spectroscopy and Hyperfine Interactions," treats EPR, ENDOR, and NMR as well as spin-spin interactions and the Jahn-Teller effect.

K. A. Gschneidner, Jr. and A. H.

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Hydrogen in Intermetallic Compounds

Volume 63 of Topics in Applied Physics, *Hydrogen in Intermetallic Compounds, I. Electronic, Thermodynamic, and Crystallographic Properties and Preparation*, is a logical extension of Volumes 28 and 29, *Hydrogen in Metals*, Vols. I and II. It, and a companion volume to come later, extend to intermetallic compounds the treatment given metals in the earlier volumes.

The 350-page book is edited by Louis Schlapbach, published by Springer-Verlag, and costs U.S.\$69.50. It may be ordered from Springer-Verlag, Department S800, 175 Fifth Avenue, New York, NY 10010, U.S.A. or from Springer-Verlag, Postfach 105280, Neuenheimer Landstrasse 28-30, D-6900 Heidelberg 1, West Germany.

The title and authors of the seven chapters are: (1) "Introduction," by L. Schlapbach; (2) "Preparation of Intermetallics and Hydrides," by A. Percheron-Guégan and J.-M. Welter; (3) "Thermodynamics of Intermetallic Compound-Hydrogen Systems," by T. B. Flanagan and W. A. Oates; (4) "Crystal and Magnetic Structures of Ternary Metal Hydrides: A Comprehensive Review," by K. Yvon and P. Fischer; (5) "Electronic Properties," by M. Gupta and L. Schlapbach; (6) "Heat of Formation Models," by R. Griessen and T. Riesterer; and (7) "Magnetic Properties, Mössbauer Effect and Superconductivity," by G. Wiesinger and G. Hilscher.

Many systems not involving rare earths are included but each chapter deals with rare earth systems to some extent. Each chapter contains an extensive bibliography.

Metallic Glasses

Y. He, S. J. Poon, and G. J. Shiflet [*Science*, **241**, 1640-2 (1988)] report on the synthesis and properties of rare earth containing metallic aluminum-rich glasses. They report some unusual findings. The glasses are formed up to 90 at.% Al. In most $A_{100-x}B_x$ systems, glasses form only when $85 > x > 5$. The new glasses can be bent double while other studies report amorphous aluminum glasses containing 70 to 80 at.% Al are brittle. The tensile strengths of the various alloys tested ranged from equal

Magnetic Superconductors A Review

The discovery of superconductivity in some rare earth ternary compounds and in Y_3Co , has provided a unique opportunity to study the interplay between superconductivity and magnetism in the same system. The interaction between the magnetic moments of f -electrons and superconducting electrons (mainly $3d$, $4d$, and $5d$) and the interaction between these same d -electrons in these systems give rise to various unusual properties.

The ternary compounds $ErRh_2B_4$ and $HoMo_2S_8$ exhibit reentrant superconductivity. Experimental results indicate that superconductivity and long-range ferromagnetic order coexist in a very narrow range of temperature in these two compounds. Superconductivity and antiferromagnetic order coexist in several rare earth ternary compounds. The most important result is the anomalous behavior of the upper critical field in the vicinity of the Néel temperature. $NdRh_2B_4$ displays two antiferromagnetic transitions below the superconducting transition. The pseudoternary series $Eu_{1-x}Sn_xMo_2S_8$ containing small amounts of Br or Se exhibits the novel phenomenon of magnetic field-induced superconductivity. The compound Y_3Co exhibits a weak itinerant ferromagnetic superconductivity. Several cerium- and uranium-based intermetallic compounds exhibit heavy-fermion superconductivity, characterized by a specific heat at low temperature that is two or three orders of magnitude larger than in ordinary transition metals.

This review contains two main sections in addition to a short introduction and conclusion. The two main sections are entitled, "Survey of Experimental Results" and "Theoretical Survey." The review, written by S. L. Kakani and U. N. Upadhyaya appeared in *J. Low Temp. Phys.* **70**, 5-82 (1988). It contains a bibliography with 221 entries.

(Continued from previous column) to nearly double that of the strongest commercial aluminum alloys. The best was $Al_{90}Fe_8Ce_2$, with a tensile strength of 940 MPa and a Young's modulus of 66 GPa. One drawback is their low crystallization temperatures ranging from 250 to 310°C. The glasses have potential as high-strength, low-density materials.

CONFERENCE CALENDAR

*NdFeB Magnet Markets
Monterey, California, U.S.A.
February 26-28, 1989
This issue

TMS-AIME Rare Earth Symposium
Las Vegas, Nevada, U.S.A.
February 27-March 3, 1989
RIC News, XXII, [2] 2 (1987)

International Symposium on Magnetoelasticity and Electron Structure of Transition Metals, Alloys and Films (ISOMES '89)

Duisburg, West Germany
March 20-22, 1989
RIC News, XXIII, [2] 2 (1988)

*10th International Workshop on Rare-Earth Magnets and Their Applications
Kyoto, Japan
May 17-19, 1989
This issue

*International Conference on Materials and Mechanisms of Superconductivity and High-Temperature Superconductors M²S-HTSC
Stanford, California, U.S.A.
July 23-28, 1989
This issue

2nd International Symposium on Rare Earth Spectroscopy (RES-89)
Changchun, Jilin, China
September 9-14, 1989
RIC News, XXIII, [3] 2 (1988)

*International Conference on the Physics of Highly Correlated Electron Systems (ICPHCES)
Santa Fe, New Mexico, U.S.A.
September 11-15, 1989
This issue

*XI Simposia Latino Americano Fisica del Estado Solido (XI SLAFES)
Caracas, Venezuela
October 23-27, 1989
This issue

*1st International Conference on *f*-Elements (ICFE)
Leuven, Belgium
September 17-21, 1990
This issue

*New Listing

Actinide Conf.	Tashkent, U.S.S.R.	1989
19th RERC	Lexington, Ky.	1991
	Japan	1992
20th RERC	California, U.S.A.	1993
2nd ICFE	Finland	1994
	Asia ?	1995

Other conferences approved at a meeting of the Board of Directors of the International Steering Committee for Conferences on *f*-Elements, held at the 18th Rare Earth Research Conference are as follows:

MEETINGS ICFE

The ICFE merges the International Conference on Lanthanides and Actinides (ICLA) and the International Rare Earth Conferences (IREC) into a single conference named *International Conference on *f*-Elements* (ICFE). It will be held September 17-21, 1990, in Leuven, Belgium. The eight sections of the conference are coordination chemistry; organometallic and bio-inorganic chemistry; theory and spectroscopy; reactivity and catalysis; solid state chemistry and physics; metallurgy, ceramics, and new rare earth compounds and alloys; analytical and environmental chemistry; and industrial applications and new developments. Most papers on the lanthanides or actinides should fit into one of these categories.

To get on the mailing list for the first circular concerning this conference contact Professor C. Görller-Walrand, Department of Chemistry, Celestijnenlaan 200F, B-3030 Leuven-Heverlee, Belgium.

ICPHCES

An International Conference on the Physics of Highly Correlated Electron Systems (ICPHCES) will be held September 11-15, 1989 in Santa Fe, New Mexico, U.S.A. Among the topics to be covered are anomalous *f*- and *d*-electron systems, heavy fermion phenomena, magnetic ordering and correlations, fluctuating valences, electron hybridization effects, crystal fields, and mechanisms in high T_c and heavy fermion superconductors.

For further information contact Joe D. Thompson or Jeffrey O. Willis, Local Chairmen-ICPHCES, Group P-10, Mail Stop K764, Los Alamos National Laboratory, Los Alamos, NM 87545, U.S.A.

10th RE Magnet Workshop

The 10th International Workshop on Rare-Earth Magnets and Their Applications will take place May 17-19, 1989, at the International Conference Hall in Kyoto, Japan. It will deal with all aspects of the rare-earth permanent magnets in three days of invited reviews, contributed papers, tutorials, and discussions.

The tentative titles of workshop sessions are: "Rare-Earth Re-

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sources," "Refining and Metallurgy"; "Magnet Processing Technology"; "Materials for Rare-Earth Magnets"; "Applications of Rare-Earth Magnets"; "Physical and Chemical Properties of Rare Earth-Transition Metal Alloys"; and "Other New Materials and Applications." There will be an industrial product exhibit and printed proceedings will be available at the workshop. The international community of "rare-earth magneticians" considers this workshop its major forum for discussing progress and prospects.

For further information contact Mr. T. Kurino, c/o The Society of Non-Traditional Technology, Toranomon Kotohira Kaikan Bldg. 3F, 1-2-8 Toranomon, Minato-ku, Tokyo 105, Japan. In the U.S.A. contact Professor Karl Strnat, KL-365, University of Dayton, Dayton, OH 45469.

XI SLAFES

The XI Simposio Latino Americano Fisica del Estado Solido will be held October 23-27, 1989, in Caracas, Venezuela. The symposium is being organized by the science faculty of the Central University of Venezuela. Sections planned include disordered systems, superconductivity, phase transitions, magnetism, semiconductors, transport phenomena, and heavy fermions. Abstract deadline is April 30 and paper deadline is August 31, 1989. For more information contact Dr. Felix Marin, XI SLAFES, A.P. 47586, Los Chaguaramos, 1041-A Caracas, Venezuela.

M²S-HTSC

The international conference on Materials and Mechanisms of Superconductivity and High-Temperature Superconductors (M²S-HTSC) will be held at Stanford University in Stanford, California, U.S.A. The dates are July 23-28, 1989. During the same week, the International Cryogenic Materials Conference (ICMC) and the Cryogenic Engineering Conference (CEC) will hold a joint meeting in Los Angeles, California. Joint symposia may be arranged between ICMC/CEC and M²S-HTSC. Convenient flights are available to allow participation in both conferences.

M²S-HTSC will welcome experimental or theoretical papers on high-T_c oxide, organic, heavy fermion, disordered, and low-electron density superconductors. Manuscripts should

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Luminescence Centers

(Continued from page 2)

luminescence spectra of ZnS:Tm crystals, which at 4.2 K breaks down into some 200 lines, as well as the ways in which the excitation energy reaches the thulium ions. In the third article, in Volume 175, N. N. Grigor'yev, A. V. Ovchinnikov, and M. V. Fok study the kinetics of luminescence polarization in ZnS:Eu and ZnS:Tm crystals in connection with the fact the trivalent ions are displaced relative to the center of the sulfur tetrahedron due to the Jahn-Teller effect.

G. Ye. Arkhangel'skiy, Ye. Ye. Bukke, T. I. Voznesenskaya, N. N. Grigor'yev, and M. V. Fok describe in the last article in Volume 175, a method for doping activators into ZnS crystals under action of an electric field. The method is many times faster than the diffusion method because the rare earth elements, due to their large ionic radius, do not diffuse readily, but under the influence of the electrical field their mobilities are increased.

In the supplemental volume the first article, by A. N. Botoev, E. Yu. L'vova, and M. V. Fok, deals with copper doped ZnS doped with either samarium, europium, or thulium. Volumetric, electro- and photo-luminescence under various conditions are described. In the second article, G. Ye. Arkhangel'skiy, N. N. Grigor'yev, M. V. Fok, and N. A. Yakunina report on the influence of plastic deformation by uniaxial compression on the luminescence and EPR spectra of europium doped ZnS.

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Meetings

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contain original work which will be refereed and published soon after the conference in the archival literature.

For more information, contact co-chairmen T. H. Geballe or M. R. Beasley at *International Conference, M²S-HTSC*, Stanford University, Department of Applied Physics, Stanford, CA 94305-4090, U.S.A.

NdFeB Magnet Markets

The Gorham Advanced Materials Institute is organizing a conference on the marketing aspects of NdFeB magnets. Areas of interest include raw materials, costs and methods of production, applications, and future prospects. It will be held February 26-28, 1989, in Monterey, California, U.S.A. For more information contact Ms. Carolyn M. Davidson, NdFeB Conference Coordinator, Gorham Advanced Materials Institute, P.O. Box 250, Gorham, ME 04038, U.S.A.

18th RERC

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earths, especially divalent Eu and Yb. One potential application for PbEuSeTe/PbTe lasers is determining a person's state of health by monitoring certain processes going on in one's body. For example, one can tell if a person is diabetic by measuring the rate the body utilizes sugar, which has been tagged with ¹³C, by measuring ¹³C¹⁶O in the breath. These lasers can be tuned to the absorption frequency of molecules with specific isotopes and thus measure their traces in various media. ¹³C¹⁶O is naturally present in the breath at 1 to 10 parts per billion and these lasers can measure small differences. Other clinical tests possible are for fat malabsorption, ileal dysfunction, small intestine bacterial overgrowth, alcoholic cirrhosis and liver function, lung function, and nutritional evaluation.

Members of the International Steering Committee for Conferences on f-Elements [RIC News, XXIII [1] 3 (1988)] meeting at the 18th RERC gave their approval to the following conferences: an Actinide Conference in 1989 in Tashkent, USSR; an ICFE Conference to be held September 17-21, 1990, in Leuven, Belgium; the 19th RERC Conference to be held in the U.S.A. in 1991, possibly in Kentucky; an international conference to be held in Japan in 1992;

(Continued in next column)

High T_c Superconductors Processing and Applications

This book contains 26 of the papers presented at a meeting with the same title, *Processing and Applications of High T_c Superconductors*, held at Rutgers University, Piscataway, New Jersey, on May 9-11, 1988. The meeting, the annual Northeast Regional Meeting of The Metallurgical Society (TMS), was sponsored by the New Jersey TMS Chapter.

The conference focused on the issues related to the processing and potential applications of high T_c superconductors in both bulk and thin film forms. Of particular interest were innovative methods for processing these materials into forms suitable for commercial exploitation, such as wires, ribbons, composites, and thin films. Also included are papers dealing with the effects of processing methods on the reliability and stability of these materials.

The 258-page book was edited by W. E. Mayo and costs U.S.\$90.00 (TMS members-\$45.00, students-\$33.00). Published in 1988 the book may be ordered from the publisher, The Metallurgical Society, 420 Commonwealth Drive, Warrendale, PA 15086, U.S.A.

High T_c Materials

The North Carolina Section of the American Chemical Society organized a symposium held in Chapel Hill, North Carolina in September 1987. The proceedings of this symposium, *High-Temperature Superconducting Materials: Preparation, Properties, and Processing*, were published in April of 1988 by Marcel Dekker, Inc. It gives a unified, comprehensive treatment of the subject with background and historical papers for beginners, as well as papers presenting pioneering research for advanced specialists. Edited by W. E. Hatfield and J. H. Miller, Jr., the 408-page book costs US\$99.75 (U.S.A. and Canada) and U.S.\$119.50 elsewhere. The book may be ordered from Marcel Dekker, Inc. at 270 Madison Avenue, New York, NY 10016, U.S.A. or Hutgasse 4, Postfach 812, CH-4001 Basel, Switzerland.

the 20th RERC Conference to be held in the U.S.A. in 1993, probably in California; an ICFE Conference to be held in Finland in 1994; and a possible 1995 conference to be held somewhere in Asia.

SPONSORS

The second quarter of fiscal 1989 has been a rewarding one. Fourteen new sponsors have joined our family of benefactors and with 16 renewals brings to 64 the sponsors for the first half of the year. The 29 sponsors wishing to be listed, with the number of years they have been sponsors in parentheses, are listed below.

Albright & Wilson Americas, U.S.A. (1)
 Amatek Limited, Australia (1)
 Baotou Research Institute of Rare Earth, People's Republic of China (4)
 Central States Metals ZOE, TN, Incorporated, U.S.A. (1)
 Cookson Group plc, England (1)
 Ferro Corporation, U.S.A. (13)
 Gesellschaft für Elektrometallurgie, West Germany (4)
 Hazen Research Incorporated, U.S.A. (3)
 Hecla Mining Company, U.S.A. (2)
 Indian Rare Earths Limited, India (20)
 KOMSCO (Korea Mining & Smelting Company, Limited), Korea (1)
 Martin Marietta Energy Systems Incorporated, U.S.A. (1)
 Mitsubishi Kasei Corporation (formerly Mitsubishi Chemical Industries Limited), Japan (15)
 NASA-Ames Research Center, U.S.A. (1)
 Nikko Trading Corporation, U.S.A. (1)
 North-Holland Physics Publishing (a Department of Elsevier Science Publishers), The Netherlands (1)
 NUCLEMON-Nuclebrás de Monazita e Associados Ltda., Brazil (15)
 Rhone-Roulenc Chimie Minerale Fine, France (19)
 Sassoon Metals & Chemicals Incorporated, U.S.A. (4)
 Sausville Chemical Company, Incorporated, U.S.A. (1)
 Sherritt Gordon Mines Limited, Canada (5)
 Shin-Etsu Chemical Company, Limited, Japan (19)
 Sumitomo Light Metal Industries, Incorporated, Japan (5)
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 Treibacher Chemische Werke AG, Austria (17)
 State University of New York, Stony Brook, Department of

(Continued in next column)

Materials Science, U.S.A. (1)
 Vacuumschmelze GmbH, West Germany (5)
 Wimmera Industrial Minerals Pty. Limited, Australia (1)
 Yue Long Chemical Plant, People's Republic of China (8)

Ganjia Rare Earths

Ganjia Rare Earths Company Limited was formed as a joint venture by Metallurgical Industry Company of Ganzhou district, China and Canada-Pacific Rare Earths of Canada. Mr. Kang Zhiqiang and Mr. Anthony Tam are chair and vice-chair of the board, respectively. [*China Rare Earth Information*, No. 10, 4 (August 1988)]

RE Handbook

(Continued from page 3)

Daane, in "Physical Metallurgy," have sections on preparation and purification; physical, magnetic, thermal, chemical, elastic, and mechanical properties; alloys and intermetallic compounds; systematics of some properties of the elements; and bonding.

S. R. Taylor and S. M. McLennan, in "Significance of the Rare Earths in Geochemistry and Cosmochemistry," show how the progressive change of chemical and physical properties of the series, with the useful discontinuous exceptions, are used to reveal the processes present in the formation of many of earth's features and similar ones of the heavenly bodies.

Edited by K. A. Gschneidner, Jr. and L. Eyring, the 594-page book costs Dfl. 350 (~U.S.\$175.00) and may be ordered from Elsevier Science Publishers B.V., P.O. Box 103, 1000 AC Amsterdam, The Netherlands, or from Elsevier Science Publishing Company, Inc., 52 Vanderbilt Avenue, New York, NY 10017, U.S.A. Subscription price is Dfl. 300 (~U.S.\$150.00)

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JOSEPH REMEIKA

The well-known crystal grower, Joseph P. Remeika, died on June 17, 1988, at the age of 64. He was born in Newark, New Jersey, and was a member of the Technical Staff at AT&T Bell Laboratories in Murray Hill, New Jersey, for almost 40 years. The careers of many scientists were based on the materials he produced and invented, and the crystals he grew.

Joe was entirely self-taught and his breadth of knowledge in synthesis and properties and his predictive ability were truly amazing. He truly had a "green thumb" for the preparation of materials. Among the rare-earth crystals he was involved with were orthoferrites, aluminates, manganites, and especially garnets. He recently became interested in various superconducting stannides and the heavy fermion CeCu_2Si_2 .

Wood Preservation

Peter S. Gradeff and John F. Davison have received a patent (U.S. Patent 4,743,473) on a "Method of Preserving Wood with Lanthanide Derivatives." Issued May 10, 1988, the patent has been assigned to Rhone-Poulenc Incorporated of Monmouth Junction, N.J.

The invention is a method for pressure treatment of wood using aqueous solutions of one or more lanthanides, preferably cerium, lanthanum, praseodymium, neodymium, or a mixture thereof. The lanthanide cation can be associated with any inorganic or organic ligand soluble in water.

It is believed the reaction that takes place involves crosslinking of cellulose fibers with the lanthanide ion. Crosslinking takes place at approximately neutral or lower pH and under hydrostatic pressure. The big advantage of this method is its safety as compared to creosote or pentachlorophenol solutions.