



RARE-EARTH INFORMATION CENTER NEWS

AMES LABORATORY

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No. 1

EDITORIAL

In this our first official publication of the Rare-Earth Information Center (RIC for short) we would like to say hello and express the hope that many more of these Newsletters and other official publications will find their way to you. Many of our readers have responded to the news releases issued by the U. S. Atomic Energy Commission and the Ames Laboratory. We are gratified by the correspondence we have received since Jan. 14, 1966. For others this RIC Newsletter and the accompanying brochure may be the first you have heard of RIC. In the following paragraphs we will talk a little more about our operation, how we may be able to assist you and, perhaps, how you may be able to assist us. In other parts of the RIC Newsletter we discuss a number of recent items concerning the rare earths. We hope that some of this information may be useful to you. Your comments concerning RIC and this Newsletter will be appreciated.

* * *

As a matter of definition we are following the guide laid down by the Commission on Nomenclature of the International Union of Pure and Applied Chemistry, and we use the term "rare earths" to include scandium, yttrium and the elements whose atomic numbers are 57 through 71, and the word "lanthanides" to include the elements 57 through 71.

* * *

As one of its more important functions, RIC has been providing answers to inquiries about the rare earths. Some of these inquiries are concerned about the suppliers of rare earths, some about bibliographies, many about a specific subject, and a few about general topics.

About ten percent of the information inquiries we receive are just too vague to be answered (e.g. "We would like to know about the rare-earth metals"). Actually this type of question only reduces the effectiveness of RIC because we must write the requestor and ask him or her to be more specific before we can furnish the information he or she would like to have. This wastes our time because the inquiry is handled twice and there is a delay in getting the answer to the requestor. The solution to the problem is—be specific, it helps everyone.

We answer a specific question generally by informing the requestor about the latest and best reviews available on the subject, plus the latest original journal articles we know of. With this information the requestor should be able to find most of the pertinent literature on the subject by making use of the references cited in the various sources. If we cannot answer a particular question, we will refer the requestor to an expert on the subject.

Information inquiries will be answered as time permits, and especially during the next month or so until RIC reaches its authorized

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The Symbol: Alchemists Discover Rare Earths

No doubt you alchemy buffs may be wondering, "Is the history of the discovery of the rare earths, as recorded in our texts, wrong? Did the alchemists know about these 'unusual soils' centuries before Lt. Arrhenius' discovery in 1787?" No, we at RIC must confess we did not make a new find in the history of the discovery of the rare earths.

The truth is, we took poetic license and combined the alchemist's symbol for earth, "terra," (an inverted equilateral triangle with a cross bar) with the Latin word for rare (*rarus*) to generate the symbol we have incorporated into our letterhead and brochure.

Yes, We Have Some Information

The RIC brochure and this first issue of the RIC Newsletter are being rather widely distributed to nearly 500 identifiable rare-earth research scientists and more than 500 research and industrial organizations active in rare-earth research, our prospective customers, so to speak.

Our plan is to issue the RIC Newsletter to permanent subscribers about four times annually and other pertinent rare-earth information announcements as the need arises. To become a part of our select group of "permanent subscribers" will require a slight amount of effort on your part. You

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New Books

Chemical Behavior of the Rare-Earths Elements

A concise review of the chemistry of these elements is presented by Dr. N. E. Topp in his book, *The Chemistry of the Rare-Earth Elements*, (Elsevier Publishing Company, Amsterdam 1965), 164 pp. This book is divided into twelve chapters: an introduction; rare-earth minerals; separation techniques; salts; solution chemistry; unusual valence states; compounds formed with the Group I, III, IV and V semi- and non-metallic elements; oxides; other chalcogenides; analytical chemistry; the metals; and the applications of these elements. About 40 references are cited in each of the twelve chapters, with two chapters having 72 and 75 references listed. This book should introduce the reader to the literature in many of the areas covered in this book.

Refractory Rare-Earth Compounds

Another of the many books Dr. G. V. Samsonov has written has been translated from Russian into English. This book, *High-Temperature Compounds of Rare Earth Metals with Nonmetals*, (Consultants Bureau, New York, 1965), 280 pp, deals with the borides, carbides, nitrides, silicides and sulfides of the rare earths. It is doubtful that this book is worth \$17.50, even though it is probably the best and latest review of the half dozen Samsonov has written concerning these five groups of rare-earth refractory compounds.

Spectroscopy of Lanthanides

As many of the rare-earth scientists well know there has been much activity in the last five years concerned with the theoretical and basic experimental studies of the spectra of the lanthanides as well

as their more practical aspects as evidenced by the red europium phosphor in color TV and the various lanthanide lasers. Thus the book by Dr. Brian G. Wybourne, *Spectroscopic Properties of Rare Earths*, (Interscience Publishers, New York, 1965) 236 pp, is a welcome volume to those who are interested in the field of lanthanide spectra.

The 490 references listed at the end of this volume should prove valuable, especially to the scientist who has just started to work in this area or those who have a passing interest in these spectra. This book is divided into six chapters: an introduction to the spectra of the free neutral atoms and ions in the gaseous state; the energy levels of these atoms and ions; the intensities in the lanthanide spectra; the Zeeman effect; the hyperfine structure and isotope shift; and finally, the spectra of the lanthanides in salts and the effect of crystal fields.

Laymen's Booklet

The Atomic Energy Commission has published a 42-page booklet, *Rare Earths - The Fraternal Fifteen*, written by Karl A. Gschneidner, Jr., as part of its Understanding the Atom Series. This booklet, which is written at an elementary level for the layman who has had at least a high school science course or two, covers the history, atomic structure, chemistry and separation, physical properties and applications of these elements.

Although this booklet is non-technical and contains nothing new for the rare-earth scientist, a number of scientists who have copies commented that they found the booklet useful in explaining their work to their wives, relatives and layman friends. Free copies may be obtained from RIC or from U. S. Atomic Energy Commission, P. O. Box 62, Oak Ridge, Tenn. 37831.

Montana Reports Rare Earth Find

We received a letter from Mr. S. J. Chapman of the Montana State Planning Board informing us of some thorium and rare-earth deposits recently found in the Lemhi Pass area of Montana. According to Mr. Chapman, these deposits are believed to be probably the largest in the United States and perhaps the world. Some samples run as high as 12% thorium, 1.5% yttrium, plus corresponding amounts of other rare earths.

If you would like to have further information concerning these deposits, please write to Mr. Samuel J. Chapman, Director, Montana State Planning Board, Sam W. Mitchell Building, Helena, Montana 59601, or call Area Code 406 442-3260 in Helena.



NEW FIND—The map above locates the Lemhi Pass area where a new find of thorium and rare earths has been reported.

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Are Rare Earths a Health Hazard?

The question, "What do we know about the health hazards involved in working with the rare earths?", has been recently answered in the thorough review by Dr. Thomas J. Haley of the School of Medicine at the University of California in Los Angeles. Dr. Haley's article entitled *Pharmacology and Toxicology of the Rare-Earth Elements* appeared in the May 1965 issue of the *Journal of Pharmaceutical Sciences*, Vol. 54, pp. 663-670. The article discusses both the acute and chronic toxicity, biochemistry, metabolism, pharmacodynamic effects (including eyes, skin, muscle and heart), and clinical applications. The 96 references cited in the article should enable the reader to find more detailed information concerning various topics with a minimum of effort.

To answer the question we proposed, we would like to quote the conclusions from Dr. Haley's article: "The pharmacology, toxicology, and clinical application of the stable and radioactive rare earths have been reviewed. These elements have a low to moderate acute toxicity rating and cause very little change in animals when fed for several months. The most striking effects produced by these compounds are the induction of both skin and lung granulomas after local injection or inhalation. Further work should be undertaken to find antidotes. The fatty liver produced by intravenous or intraperitoneal injection, while serious, is a self-limiting condition which is reversible without therapy."

INFORMATION

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will need to send us a postcard or letter stating your intent.

Please be sure to type or print your name legibly (we read minds reasonably well, handwriting is more difficult), your address and, for United States requestors, PLEASE include your ZIP code.

Rare Earths In the News

Many of you, who are not members of the American Chemical Society, or who are not regular readers of *Chemical and Engineering News*, may be interested in the excellent review article *Rare Earths - The Lean and Hungry Industry* which appeared in the May 10, 1965 issue on pages 78-92. As the title implies, this article is primarily concerned with the producers of the rare earths, the commercial applications and the applied research programs being carried out by industry.

In addition the article briefly describes the fundamental studies being investigated in the U. S. universities and government laboratories.

The staff of *Chemical and Engineering News* are to be commended for their competent scientific journalism in preparing this state-of-the-art review of the rare-earth field in the United States. Copies of this article may be obtained for fifty cents a copy from the American Chemical Society, Reprint Department, ACS Publications, 1155 Sixteenth Street, N. W., Washington, D. C. 20036.

MEETINGS

Two Rare-Earth Meetings are Scheduled for September 1966

The British Institute of Physics and Physical Society have planned a three-day Rare-Earth Meeting to be held in Durham, England, September 5-7, 1966, according to an announcement by W. D. Corner, program chairman. A broad program on the physics and metallurgy of rare-earth metals, alloys, and

salts is planned. There will be seven invited papers and contributed papers are solicited. Although the meeting is primarily a domestic one, foreign participants will be welcome, Dr. Corner stated. Information concerning the forthcoming meeting may be obtained from D. W. Corner, Physics Department, The University, South Road, Durham City, England.

* * *

The Division of Inorganic Chemistry of the American Chemical Society has planned a three-session symposium on "The Chemistry of Lanthanide and Actinide Elements," for the New York Meeting of the American Chemical Society, Sept. 11-16, 1966. The program will consist largely of invited papers, but contributed papers are being solicited. Further information may be obtained from Dr. Therald Moeller (Department of Chemistry and Chemical Engineering, University of Illinois, Urbana, Illinois 61801), who is primarily concerned with the lanthanide aspect of the program, or Dr. Paul Fields (Argonne National Laboratory, Argonne, Illinois 60440), who is in charge of the actinide portion of the program.

Set Sixth Rare Earth Research Conference

The Sixth Rare Earth Research Conference will be held at the Mountain View Hotel, Gatlinburg, Tenn., May 3-6, 1967, according to Wallace C. Koehler, chairman. Prospective conferees can obtain more information about the conference from: Dr. Wallace C. Koehler, Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831. As of the time of publication of the Newsletter, no general mailing or solicitation of papers had been made.

The rare earth research conferences are becoming truly international in scope. The Fifth Rare Earth Research Conference attracted more than 200 rare-earth scientists representing 14 countries including the United States.

demii Nauk S.S.S.R., *Seriya Neorganicheskie Materially*), started early in 1965, appears to be a popular journal for publishing papers on rare-earth compounds by Russian inorganic chemists and material scientists. Between 10 and 25% of the papers published in the first three issues which have come to our attention were concerned with rare-earth materials such as sulfides, selenides, tellurides, silicides, germanides, the halides, mixed halide systems and mixed oxides (phosphates, silicates, borates, niobates, etc.).

The papers deal with the preparation, crystal structures, physical properties and phase relationships of these substances. Fortunately, this journal is being translated into English under the title *Inorganic Materials* by Consultants Bureau, but as with most Consultant Bureau translations, the publication of this journal appears to be about twelve months behind the original Russian version.



RARE EARTHERS — A new term, "rare earths," was coined for us in 1965 when the Holiday Inn, Ames, Ia. welcomed conferees to the Fifth Rare Earth Research Conference in the manner shown above.

showing an information inquiry. We simply do not have the manpower, machinery and finances available to carry out these tasks. RIC, as one of its functions, will compile bibliographies, but the subject matter will be that chosen by RIC. Of course, all RIC bibliographies will be announced in a Newsletter and made available free of charge to anyone who desires a copy.

* * *

We will be happy to include in future issues of the RIC Newsletter announcements concerning information or literature (such as compilations, bibliographies, reviews, films, etc.) that may be available from individuals, institutions or companies. Advertising, promotional literature, brochures, etc., and announcements concerning the same, however, will not be printed in the Newsletter.

* * *

In the above paragraphs we have discussed how we hope to be of assistance to you. And now we would like to tell you how you can help us. By sending us a reprint of each of your papers as they become available you will certainly aid us in our work. Furthermore, it will assure that we do not miss any of your publications as we scan the new issues of the journals.

It would be extremely helpful if the title of your article contained the name of the particular rare-earth element(s) or the words "rare earth" or "lanthanide" or "lanthanon". We are using a Selective Dissemination of Information (SDI) system, in which the titles of articles are received from various sources in tape form and are scanned by a computer for certain key words (a profile). Thus, if the title does not contain the name of a particular rare earth, or the words "rare earth", "lanthanide", etc., we may not obtain a notification of your article. Furthermore, we do not receive a notification if the chemical symbol is used as part of the symbol for a compound, e.g. we get a notification for "cerium trichloride" but not for " CeCl_3 ". In the future we hope to overcome this difficulty, but for the present we must depend upon your accurate titles to make our system work. If you would like to find out more about the Ames Laboratory SDI system, please write RIC or Mr. Charles Sage, Ames Laboratory, Iowa State University, Ames, Iowa 50010.

We would also appreciate receiving news releases concerning new developments involving the rare earths. We do, however, reserve the right to withhold publication of any news release which we believe is more of an advertising gimmick than a genuine news item.

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