

EUR 4500 e

EUROPEAN ATOMIC ENERGY COMMUNITY — EURATOM

**INDEXING RULES FOR THE
EURATOM
NUCLEAR DOCUMENTATION SYSTEM
(ENDS)**

by

C. VERNIMB

1969



Directorate-General for Dissemination of Information

Center for Information and Documentation — CID

LEGAL NOTICE

This document was prepared under the sponsorship of the Commission of the European Communities.

Neither the Commission of the European Communities, its contractors nor any person acting on their behalf:

make any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this document, or that the use of any information, apparatus, method, or process disclosed in this document may not infringe privately owned rights; or

assume any liability with respect to the use of, or for damages resulting from the use of any information, apparatus, method or process disclosed in this document.

This report is on sale at the addresses listed on cover page 4

| | | | | |
|------------------------|---------|---------|----------|----------|
| at the price of FF 6.— | FB 60.— | DM 4.80 | Lit. 750 | Fl. 4.30 |
|------------------------|---------|---------|----------|----------|

When ordering, please quote the EUR number and the title which are indicated on the cover of each report.

Printed by Van Muysewinkel
Brussels, August 1969

This document was reproduced on the basis of the best available copy.

EUR 4500 e

INDEXING RULES FOR THE EURATOM NUCLEAR DOCUMENTATION SYSTEM (ENDS) by C. VERNIMB

European Atomic Energy Community — EURATOM
Directorate-General for Dissemination of Information
Center for Information and Documentation — CID
Luxembourg, August 1969 — 40 Pages — 2 Figures — FB 60

The rules governing indexing for the Euratom Nuclear Documentation System (ENDS) are set out and explained.

Guidelines for interpreting the abstract serving as the raw material for ENDS according to the "Abstract Interpretation Rule" (which states that superfluous indications are to be ignored and hidden indications discovered), and for subdivision of the abstract before indexing according to the "Splitting Rule" to avoid "noise" in retrieval, are set out.

A description of the types of terms, the hierarchical and semantic relations between them as given in the computerized Dictionary (the Thesaurus), a

EUR 4500 e

INDEXING RULES FOR THE EURATOM NUCLEAR DOCUMENTATION SYSTEM (ENDS) by C. VERNIMB

European Atomic Energy Community — EURATOM
Directorate-General for Dissemination of Information
Center for Information and Documentation — CID
Luxembourg, August 1969 — 40 Pages — 2 Figures — FB 60

The rules governing indexing for the Euratom Nuclear Documentation System (ENDS) are set out and explained.

Guidelines for interpreting the abstract serving as the raw material for ENDS according to the "Abstract Interpretation Rule" (which states that superfluous indications are to be ignored and hidden indications discovered), and for subdivision of the abstract before indexing according to the "Splitting Rule" to avoid "noise" in retrieval, are set out.

A description of the types of terms, the hierarchical and semantic relations between them as given in the computerized Dictionary (the Thesaurus), a

keyword inventory of specific terms, general purpose keywords, names of isotopes, alloys and inorganic chemical compounds, follows. Finally, indexing rules are given for particular subject fields (e.g. chemical compounds, alloys, reactors, nuclear reactions) and for particular terms, together with instructions for filling in the indexing sheets. Twelve examples of indexing are appended.

keyword inventory of specific terms, general purpose keywords, names of isotopes, alloys and inorganic chemical compounds, follows. Finally, indexing rules are given for particular subject fields (e.g. chemical compounds, alloys, reactors, nuclear reactions) and for particular terms, together with instructions for filling in the indexing sheets. Twelve examples of indexing are appended.

EUR 4500 e

EUROPEAN ATOMIC ENERGY COMMUNITY — EURATOM

INDEXING RULES FOR THE
EURATOM
NUCLEAR DOCUMENTATION SYSTEM
(ENDS)

by

C. VERNIMB

1969



Directorate-General for Dissemination of Information

Center for Information and Documentation — CID

ABSTRACT

The rules governing indexing for the Euratom Nuclear Documentation System (ENDS) are set out and explained.

Guidelines for interpreting the abstract serving as the raw material for ENDS according to the "Abstract Interpretation Rule" (which states that superfluous indications are to be ignored and hidden indications discovered), and for subdivision of the abstract before indexing according to the "Splitting Rule" to avoid "noise" in retrieval, are set out.

A description of the types of terms, the hierarchical and semantic relations between them as given in the computerized Dictionary (the Thesaurus), a keyword inventory of specific terms, general purpose keywords, names of isotopes, alloys and inorganic chemical compounds, follows.

Finally, indexing rules are given for particular subject fields (e.g. chemical compounds, alloys, reactors, nuclear reactions) and for particular terms, together with instructions for filling in the indexing sheets.

Twelve examples of indexing are appended.

KEYWORDS

DOCUMENTATION
EURATOM

PREFACE

Euratom Report EUR 4500 e, "Indexing Rules for the Euratom Nuclear Documentation System (ENDS)" complements Euratom Report EUR 500 e (Second Edition), "Euratom Thesaurus, Indexing Terms used within ENDS, 1966" (Part I) and "Euratom Thesaurus, Terminology Charts used in ENDS, 1967" Part II). The present report sets out rules for using the terms contained in the Euratom Thesaurus.

For their valuable help in discussions on the indexing rules, I have to thank my colleagues L. Rolling, M. Detant, R. Colbach, R. Batti, L. Cavara, A. Cricchio, I. Laszlo-Rabo, M. Maurice, M. Merucci and G. Romerio (staff members of the Center for Information and Documentation (CID), Director: R. Brée).

TABLE OF CONTENTS

Page

1. Introduction

- a) Aim, scope and coverage of the Euratom Nuclear Documentation System (ENDS) - Selection of documents - Number of documents stored 7
- b) Indexing of abstracts - Processing of index terms by computer 7
- c) Query processing (retrieval) 7
- d) System performance (including SDI) 8
- e) Training in indexing 8

2. The Abstract Interpretation Rule

- a) Abstracts as basis - Information supplement possible from entire document 8
- b) Superfluous concepts 8
- c) Incomplete data 9
- d) Hidden concepts 9
- e) Importance of concepts 9

3. The Splitting Rule

- a) Multi-concept documents 10
- b) Prevention of "noise" in retrieval 10
- c) Example 10

4. Types of Terms

- a) Index terms: keywords + specific terms 11
- b) Reference structure; chain references 11
- c) Frequency of use of index terms 11
- d) Forbidden terms: synonyms, homonyms, too general terms 11

5. The Dictionary

- a) Distribution of types of terms in the Dictionary 12
- b) Computerized Dictionary (checking and posting of terms) 12
- c) Automatic correction of misspellings 12
- d) Inverted Dictionary 12
- e) Publication of updated versions of the Dictionaries 12

| | |
|---|-------|
| 6. <u>The Indexing Specificity Rule</u> | |
| a) Relevance and recall ratios depending on indexing specificity | 13 |
| b) Automatic posting of specific terms to keywords | 13 |
| c) Check list principle for indexing | 13 |
| d) Aids to indexing | 13 |
| e) Aid in indexing by the CID | 13 |
| 7. <u>The Proposal Rule</u> | |
| a) Procedure for proposing new index terms | 13 |
| b) Examples | 14 |
| 8. <u>The Keyword Inventory</u> | |
| a) Isotopes | 14 |
| b) Alloys | 14 |
| c) Inorganic chemical compounds | 15 |
| d) "General-purpose keywords" | 15 |
| 9. <u>The Keyword Definition Rule</u> | |
| a) Definition by "Terminology Chart" | 16 |
| b) Examples | 16 |
| 10. <u>Indexing Rules for Particular Subject Fields</u> | |
| a) Inorganic compounds | 17 |
| b) Organic compounds | 18 |
| c) Ions, isomers and allotropy | 19 |
| d) Alloys | 19 |
| e) Reactors | 20 |
| f) Nuclear reactions | 20 |
| g) Geographic designations | 20 |
| h) Computer codes | 20 |
| 11. <u>Indexing Rules for Particular Terms</u> | |
| "Definition" of 37 terms | 21-23 |
| 12. <u>The ENDS Indexing Sheet</u> | |
| a) Entering of reference number, most specific index terms and proposed new terms | 24 |
| b) Split indications | 24 |
| c) Total number of terms assigned | 24 |
| d) Indexer code | 24 |
| e) If one indexing sheet is insufficient | 24 |
| <u>Final Remark</u> | 25 |

Appendix: Twelve indexing examples

1. INTRODUCTION

The rules governing indexing are only one aspect of the Euratom Nuclear Documentation System (ENDS). For a better understanding of these rules a short description of the entire system is given.

- a) The Euratom Nuclear Documentation System was created with the intention of providing not only scientists and technicians in Euratom research laboratories but also those in the member countries of the Euratom Community with information in the field of nuclear science and technology**). By the beginning of 1969 more than 800,000 documents, i.e. publications, had been processed (with more than 110,000 being added every year). The selection, also called scanning, of these nuclear documents from 45 abstract journals which together publish more than one million abstracts every year, is carried out by qualified scientists. Of these, 220,000 can be regarded as of nuclear interest, but they refer to a total of 120,000 original documents only, since many are abstracted in more than one journal. To eliminate the 100,000 redundant abstracts, characteristic data taken from the bibliographic material are manually coded, put on punched cards and compared in the computer in the process of a "duplication" check. Of the 120,000 remaining abstracts roughly 50,000 are from "Nuclear Science Abstracts".
- b) The abstracts, not the originals (indexing of which would, firstly, have been too expensive for a small group such as the CID having limited funds only and, secondly, could have easily led to over-indexing) are taken as the basis for further processing. To characterize the contents of an abstract, a number of index terms are selected from a carefully compiled list, the Thesaurus, according to definite rules, by qualified and specially trained scientists. The procedure is known as "co-ordinate indexing". The index terms, totaling an average of 12 per abstract, are put on punched cards, stored on magnetic tape, checked for correct spelling and, if necessary, corrected automatically. In addition, the analysis, that is the aggregate of index terms per abstract, is automatically supplemented with index terms which have a particular relationship to the terms originally selected by the indexer. Index terms which are not accepted by the computer are printed out and corrected manually, or, after scrutiny, are selected for introduction into the Thesaurus.
- Terms thus processed and supplemented are encoded in the computer in such a way that they take up relatively little storage space - four magnetic tape reels for 800,000 analyses with ten million index terms.
- c) Customers' requests are accepted in the customer's own language and, when necessary, defined more accurately by consultation and then transposed into retrieval terms which, although identical to the index terms, are not simply co-ordinated like the latter but may be linked together by the logical operators "and", "or", "and not". Several questions formulated in this way are accumulated in batches, checked for correct formulation and then compared with the analyses stored in the computer.

*) Manuscript received on 18 July, 1969.

***) A detailed scope note is given in the "User's Guide", available from the CID, Centre Européen, Kirchberg, Luxembourg.

The abstract numbers of those analyses which fulfill the conditions of the requests are printed out for each request. The corresponding abstracts are taken from a card file and checked for relevance by qualified scientists, after which the abstracts which meet the requirements of the request are forwarded to the customer. Periodic searches for new documents on a particular subject are carried out, as well as state-of-the-art searches. Retrieval, i.e. the automatic checking of the formulation of questions, encoding, matching with the analyses and sorting and printing of several thousand abstract numbers, takes a total computer time of less than one hour for 20 requests, each of which is matched against the 800,000 analyses.

- d) The abstracts retrieved are checked for relevance. An increasing percentage (30% at the start, 45% now) is found to be relevant and is sent to the customer, who receives on average about 60 abstract copies as the result of a retrospective search. For the preparation of an SDI (Selective Dissemination of Information) profile for periodic searches, the customer is asked to send detailed comments on the relevance of each of the abstracts supplied. Evaluation of the feedback leads to the formulation of an SDI profile which yields on average 10 references per month, 75 % of which are relevant.

2. THE ABSTRACT INTERPRETATION RULE

Ignore superfluous indications and discover hidden indications in the abstract

(For retrieval : ignoring superfluous indications results in higher relevancy and discovering hidden indications results in higher recall)

- a) The aim of the Euratom Nuclear Documentation System (ENDS) is to **refer the customer to documents containing the desired information.** Whether or not the desired information is contained in a complete document is generally stated in its abstract. Therefore (and for the above-mentioned economic reason), the abstract is the raw material of the Euratom Nuclear Documentation System.

In our experience about 70% of the abstracts retrieved can be considered adequate for the representation of a document's content. However, some contain superfluous, and others incomplete, data, not to mention those which contain incomprehensible indications.

If the entire document is available it should be used, if necessary, to supplement the incomplete information found in a "poor" abstract, or to make it more comprehensible.

- b) Examples of superfluous data :

"This effect was discovered by a team of the ORNL."

"These irradiation experiments were conducted in the Materials Testing Reactor."

"The resonance capture was not examined."

"The physiological phenomena described are similar to processes in electronic computers."

These statements do not refer to facts which increase scientific knowledge. The effect referred to might equally well have been discovered by another team and the irradiation conducted in another reactor. Something which was not examined has no place in a good abstract (it would be a different matter had this example read : "No resonance capture was observed"). The last of the four examples does not refer to facts, but merely provides an aid to comprehension.

The name of the place where a conference was held is superfluous.

Quite superfluous are the possible applications of methods or materials which the indexer can quite well imagine for himself from the items in question.

More examples are given in the Appendix.

c) Examples of incomplete data :

"The fast neutron cross sections for some heavy nuclei were measured."

"The melting points of three uranium-containing alloys were investigated."

"The effect of various radiations on graphite was studied."

We are given no indication as to the individual nuclei, alloys or radiations. Due to poor abstracting, indexing here will be incomplete. Only perusal of the original document could bring to light more information.

d) Some abstracts contain information hidden between the lines.

"The reaction is enhanced by the presence of platinum" contains the concept CATALYSIS, and "passivation of the metal is deleted by heat treatment" contains the concept CORROSION. "The long-half-life carbon isotope" refers to CARBON 14, and "a computer code was developed" is a clumsy expression for PROGRAMMING. If an abstract mentions "photometric determination of zirconium with pyridylazonaphthol", then the concept ZIRCONIUM COMPLEX formation can be read into it.

e) The first task of the documentalist is thus to interpret the abstract correctly. Interpreting an abstract means ignoring superfluous, and discovering hidden, indications. The result of the interpretation is a collection of concepts referring to the important information items mentioned in the document.

An information item in a particular document can be considered important if it is judged that the document should be retrieved when a request relative to this information item is processed.

According to this definition, the reference to SODIUM IODIDES in the phrase "efficiency of large-scale sodium iodide scintillation counters" is important, while it is not so in the sentence "for liquid-level indication an NaI-scintillation counter was used". The documentalist must determine which data and facts are important according to the definition. When in doubt he should consider them as important and index them.

3. THE SPLITTING RULE

Split the abstract as far as possible into parts which could be considered as abstracts of independent publications

(For retrieval : splitting of abstracts results in higher relevancy)

- a) Most documents, and therefore most abstracts, contain several concepts, many of which require more than one index term for their characterization. If a concept is characterized by the co-ordination of index terms A and B, and a second concept by terms C and D, then index terms A, B, C, D co-occur in the analysis of the abstract. In this case the relationship between A and B (co-occurrence on account of co-ordination) is quite different from that between A and C (co-occurrence in spite of co-ordination). But an analysis containing the index terms A, B, C and D will be retrieved by a query for the two terms A and C as well as by a query for the terms A and B. In the latter case (A and B) retrieval is desired, in the former (A and C) it is not. Retrieved but undesirable analyses and their related documents or abstracts are called "noise".
- b) To avoid noise in retrieval, abstracts or analyses should be subdivided into partial abstracts or partial analyses called "splits". Splitting of the abstract must be done in such a way that concepts occurring in split 'A' are intelligible even without a knowledge of concepts occurring in split 'B'. This means that every split should still form an independent unit, and consequently the information contained in the split could be the subject of an independent publication.

The indexer will have to decide into how many independent publications the author could have divided up his actual publication and will accordingly establish as many splits.

Progress reports of laboratories working on various research projects are typical examples of the necessity for splitting. Other examples are publications containing information on various nuclear reactions, chemical reactions or alloy systems.

- c) Figure 1 gives an example of the splitting of an abstract into four parts. The keywords CHROMIUM ALLOYS, NICKEL ALLOYS and MOLYBDENUM ALLOYS are added to INOR-8 in split A according to the mechanized Dictionary (para. 5 b). In splits B and C the keyword RESEARCH REACTORS is automatically added to MSRE.

As a result of splitting, abstract No. 34050 from Nuclear Science Abstracts, Volume 18, will not be retrieved as a result of a query on phase diagrams of chromium-nickel alloys (PHASE DIAGRAMS, CHROMIUM ALLOYS, NICKEL ALLOYS) or a query on radiation-chemical studies of fluorides (RADIATION CHEMISTRY, FLUORIDES).

4. TYPES OF TERMS

- a) Concepts derived from abstracts according to the Abstract Interpretation Rule and separated according to the Splitting Rule, must be described by index terms. Appropriate index terms have been compiled into the Euratom Thesaurus ; they fall into two categories :

- A. Index terms with no references to other index terms : these are called keywords.
- B. Index terms with references to keywords or to other index terms : these are called specific terms. (These non-keyword index terms were formerly called Additional Terms.)

- b) As a consequence of A and B above, all specific terms are finally (sometimes via further specific terms) referred to keywords.

In chain references of the kind

I. A USE B
 + C

II. C USE D

(without further references for B and D), A and C are specific terms and B and D are keywords.

Example : MOLIÈRE THEORY USE CHARGED PARTICLES
 + MULTIPLE SCATTERING
 MULTIPLE SCATTERING USE SCATTERING

- c) The numbers preceding index terms in the Thesaurus show how often each term has been used in indexing.
- d) In addition to the index terms making up the Thesaurus, there are so-called "forbidden terms" which must never be used in indexing but which refer to appropriate index terms to be used in their place.

Forbidden terms are preceded by a minus sign.

There are three types of references for forbidden terms :

- A. **USE** references for synonyms (including abbreviations) or near-synonyms. Examples :

- COLUMBIUM USE NIOBIUM
- COLLIMATED NEUTRONS USE NEUTRON BEAMS
- ESR USE ELECTRON SPIN RESONANCE

- B. **SEE** references for homonyms. Examples :

- CONDUCTIVITY SEE ELECTRIC CONDUCTIVITY
 OR THERMAL CONDUCTIVITY
- FUSION SEE MELTING
 OR THERMONUCLEAR REACTIONS

- C. **USE** references for very general terms which occur frequently in abstracts but which are useless for retrieval. The sign "=" indicates that no other term is to be used in place of the forbidden term. Example :

- NUCLEAR PHYSICS USE =

5. THE DICTIONARY

- a) Keywords and specific terms (being both index terms) together form the Euratom Thesaurus. Index terms and forbidden terms together form the Euratom Dictionary.

Figure 2 shows graphically the present quantitative distribution of terms over the various categories of terms in the Dictionary. The number of keywords remains more or less constant, whereas the number of specific terms and forbidden terms increases continually.

- b) The Euratom Nuclear Documentation System is computerized, especially with respect to the Dictionary : all terms used by indexers are checked against the Dictionary; forbidden terms with USE references are replaced by the corresponding index terms; forbidden terms with SEE references are printed out for manual checking; USE references for index terms are implemented, all related index terms being added to the keywords at the end of the chain (see para. 4 b); index terms occurring more than once in an analysis are eliminated.
- c) Furthermore, the computer corrects all simple misspellings of index terms which have hitherto occurred (MEASUREMENTS is changed to MEASUREMENT, ELECTRICAL CONDUCTIVITY to ELECTRIC CONDUCTIVITY, ALUMINIUM to ALUMINUM, etc.), and all terms in which just one letter was misspelt, omitted, erroneously added, or in which two consecutive letters were interchanged. If the spelling is even more erroneous, the computer does not correct the term but prints it out for manual correction (the term "maesurements" would not be corrected though "maesurement" would be, as in this latter case there occurs only one of the misspellings mentioned above. Correct spelling is therefore still indispensable. Transposition of letters is usually due to misspunching, whereas the omission or addition of an "s" is mainly due to misspelling on the part of the indexer who might not have verified whether the index term was adopted in its singular or its plural form).
- d) In addition to the Dictionary, an Inverted Dictionary has been compiled in which the references are listed alphabetically, not by the more specific terms but by the more general terms to which the specific terms are referred. Thus it is possible to consult the Inverted Dictionary for a keyword and look up all the more specific terms which are referred to this keyword.
- e) The Dictionary is published as Euratom Report EUR 500 e, Second Edition, 1966 (Part I). Updated versions of this report are issued quarterly in the form of Xerox copies of computer-printed lists.

6. THE INDEXING SPECIFICITY RULE

Use the most specific appropriate index terms

- a) In general retrieval experience, the more specific the retrieval terms the higher is the relevancy of the documents retrieved. It is for this reason that the most specific terms should be used in indexing. On the other hand, in order to achieve high recall in retrieval, it has proved necessary to rely upon more generic retrieval terms.
- b) As stated in para. 4 b, specific index terms are referred to more generic terms and finally to keywords by means of USE references. According to para. 5 b, these USE references are implemented, resulting automatically in generic terms if the corresponding specific terms have been used in indexing.
- c) The list of index terms (that is the Thesaurus) must be considered as a check list, i.e. every term must, so to speak, be "checked off" against it to see whether it is relevant for indexing. It follows that frequently a single index term is not sufficient to describe a concept; for example, if a cobalt-60 radiation source is described, then GAMMA SOURCES must be indexed in addition to COBALT 60 - although cobalt-60 is by itself always a gamma source. For radioactive fallout of fission products both FALLOUT and FISSION PRODUCTS must be indexed - although fallout generally consists of fission products. Detection of beta particles with scintillation counters should not only be indexed by BETA PARTICLES and SCINTILLATION COUNTERS, but also by BETA DETECTION.
- d) To find the most specific appropriate index term the Inverted Dictionary (para. 5 d) and the Terminology Charts (para. 9 a) are of great help.
- e) If the indexer is in doubt as to how to index a given concept *) (e.g. a complicated chemical compound), he must inform the CID *) quoting the corresponding abstract number. The correct index terms can then be added at the CID.

7. THE PROPOSAL RULE

If no suitable index term exists, propose a new one

- a) When a concept occurs for the first time the Thesaurus will not contain a suitable index term. The indexer must then propose a new term to the CID on a special formsheet provided for this purpose, quoting the number of the abstract in which it appeared and suggesting USE references to already existing Thesaurus terms. These will then be approved, amended or rejected after thorough discussion by a group of specialists at the CID. The indexers are informed each month of modifications to the Dictionary.

*) Center for Information and Documentation (CID) which operates the Euratom Nuclear Documentation System (ENDS).

b) Examples of proposed new terms :

In abstract No. PA 62-31412 an indexer came across the concept JOST FUNCTION which was not represented in the Dictionary. In his opinion JOST FUNCTION was a useful retrieval term. He therefore proposed

PA 62-31412 JOST FUNCTION USE SCATTERING
+ SCHROEDINGER EQUATION

His proposal was accepted.

In another case an indexer proposed

XD 26/778 NEGATIVE IONS USE IONS
+ ELECTRIC CHARGES

This proposal was not accepted because negative ions can be indexed by the term ANIONS. The following line was therefore introduced into the Dictionary in place of the reference suggested

- NEGATIVE IONS USE ANIONS

It proved to be necessary to assign responsibility for modification to the Dictionary to one person only who is advised by a group of experts in the different subject fields.

8. THE KEYWORD INVENTORY

The keywords, being (according to para. 4a) A.) index terms without a cross-reference to other index terms, are the basic framework of the Thesaurus. They cover the field of nuclear energy as consistently as possible, and their number is small enough for the indexer to be able to bear them all in mind. They are grouped as follows :

a) 1,738 names of isotopes

A. Every combination of an element name with the term ISOTOPES or the existing mass numbers for the element in question is a keyword.

Example : URANIUM ISOTOPES
COBALT 60

B. The only exceptions to this rule are the first three hydrogen isotopes, keywords for which are :

HYDROGEN for Hydrogen 1
DEUTERIUM for Hydrogen 2
TRITIUM for Hydrogen 3

b) 71 names of alloys

Every combination of the name of a metallic element with the term ALLOYS is a keyword.

Example : LITHIUM ALLOYS

c) 1,831 names of inorganic chemical compounds

A. Every combination of an element name and one of the following 18 terms is a keyword :

| | |
|------------|------------|
| COMPOUNDS | HYDROXIDES |
| BORIDES | IODIDES |
| BROMIDES | NITRATES |
| CARBIDES | NITRIDES |
| CARBONATES | OXIDES |
| CHLORIDES | PHOSPHATES |
| COMPLEXES | SILICATES |
| FLUORIDES | SULFATES |
| HYDRIDES | SULFIDES |

BORON FLUORIDES is thus one keyword.

B. Exceptions to this rule which can easily be borne in mind are the following :

I. A few meaningless terms such as OXYGEN OXIDES. When there is doubt the Thesaurus gives information as to the existence or non-existence of a term for such a chemical compound.

II. A few seldom-used terms which have been replaced by more common ones; to this type belongs the keyword SULFURIC ACID, which replaces HYDROGEN SULFATES.

C. In addition to the keywords mentioned under A, there are a few important more specific keywords which, where appropriate, are to be preferred to the more general keywords :

URANIUM DIOXIDE
URANIUM TRIOXIDE
U₃O₈ (U₃O₈ = urano-uranic oxide)
URANIUM TETRAFLUORIDE
URANIUM HEXAFLUORIDE
URANIUM SILICIDES
URANYL COMPOUNDS
URANYL NITRATES
CARBON MONOXIDE
CARBON DIOXIDE
CARBON TETRACHLORIDE
HYDROGEN PEROXIDES
DEUTERIUM COMPOUNDS
TRITIUM COMPOUNDS
AMMONIUM COMPOUNDS

d) 1,208 other keywords or "general-purpose keywords".

Included among these are names of animals, such as MICE, organs, such as KIDNEYS, organic chemical compounds, such as ACETIC ACID, elements, such as ALUMINUM, elementary particles, such as ANTIPROTONS, continents, such as AFRICA, etc.

An alphabetical list of these general-purpose keywords is to be found in Euratom Report 500 e, Second Edition (Part II).

9. THE KEYWORD DEFINITION RULE

Use keywords only in the sense given by the graphic keyword definitions, and specific terms as defined by the USE references given in the Dictionary

- a) Insofar as the keywords refer to isotopes, alloys and inorganic chemical compounds, their meanings are clearly defined and differentiated. But for many of the 1,208 general-purpose keywords a definition has to be found. Terms used in natural language often have several meanings. For the purpose of indexing, only one meaning can be accepted. The general-purpose keywords have therefore been assembled in "Terminology Charts" in such a way that keywords with similar meanings are in close proximity to each other (Euratom Report 500 e, Second Edition (Part II)).

Moreover, semantically related specific and forbidden terms are grouped in clusters around the keywords which are particularly representative of the related non-keyword terms. The proximity of keyword and non-keyword terms corresponds to the USE and SEE references in the Dictionary. Thus the subject field of nuclear energy is divided into non-overlapping domains, each containing a term cluster. Every keyword is defined by the surrounding non-keyword terminology (within the domain) and the surrounding keywords (outside the domain). Its meaning is limited by the existence of its keyword neighbors. Thus adjacent keywords are similar in meaning but nevertheless well differentiated one from the other.

b) Examples :

- A. The sentences "The level of the solution in the vessel was determined by radiographic methods" and "The solution of the differential equation was derived by means of computer calculations" each contain the word "solution". But the keyword SOLUTIONS is relevant in the first sentence only. This may be seen from the fact that the neighboring, and therefore semantically related, keyword LIQUIDS is thoroughly meaningful in the first sentence but not in the second (cf. Chart 24).
- B. With the sentence "Leak detection in reactor coolant circuits", one might be tempted to assign CIRCUITS. But the neighboring keyword CAPACITORS, if assigned, would not make sense. COOLANT LOOPS on the other hand is appropriate, as also the neighboring keyword IN PILE LOOPS (cf. Charts 41 and 52).
- C. It will now be clear that CONDENSERS, adjacent to HEAT EXCHANGERS, could not be used for indexing "electric condensers", but that the appropriate keyword is CAPACITORS, adjacent to DIELECTRICS and CIRCUITS (cf. Charts 35 and 41).

By these graphically displayed "definitions" the following type of indexing error will be avoided : the use of TUBES instead of ELECTRON TUBES, EARTH instead of SOILS, PLASMA instead of BLOOD PLASMA, POISONING instead of TOXICITY, INTERACTIONS instead of CHEMICAL REACTIONS, etc.

D. At first glance it would seem reasonable to use the keyword LABELLED COMPOUNDS when indexing the sentence "Carbon 14-labelled compounds were used to study the metabolism in kidneys of rats", but the more appropriate index term is the neighboring keyword TRACER TECHNIQUES. Similarly, IRRADIATION could not be used for indexing its effects, RADIATION EFFECTS being the correct keyword.

E. According to the reference

PLUTO USE RESEARCH REACTORS

the term PLUTO could not be used for the planet PLUTO (for which the term PLUTO PLANET exists).

Similarly, by means of the reference

ORIGIN USE ASTROPHYSICS

the term ORIGIN is limited to the field of astrophysics.

10. INDEXING RULES FOR PARTICULAR SUBJECT FIELDS

a) Inorganic Compounds

Inorganic compounds which are not represented by keywords (para. 8 c) are indexed by a **coordination of several keywords**.

A. I. Of all the names for complex oxygen-containing compounds, BORATES and URANATES alone are keywords because of their frequent occurrence. Thus sodium borate must be indexed by SODIUM COMPOUNDS and BORATES, ammonium uranate by AMMONIUM COMPOUNDS and URANATES.

II. Other complex oxygen-containing compounds are considered to be mixed oxides and are indexed by the corresponding keywords. Thus iron aluminate ($\text{FeAlO}_3 \leftrightarrow \text{Fe}_2\text{O}_3 \times \text{Al}_2\text{O}_3$) otherwise called aluminum ferrate, must be indexed by ALUMINUM OXIDES and IRON OXIDES.

Here it must be noted that AMMONIUM OXIDES does not exist as a keyword; instead, AMMONIUM COMPOUNDS is used. Ammonium beryllates will therefore be indexed by AMMONIUM COMPOUNDS and BERYLLIUM OXIDES.

III. All remaining oxygen-containing compounds are indexed as compounds plus the name of the acid. Example : sodium perchlorates are indexed SODIUM COMPOUNDS and PERCHLORIC ACID.

B. Oxygen-free complex compounds are considered to be double salts. Thus lithium fluoroberyllate will be indexed by LITHIUM FLUORIDES and BERYLLIUM FLUORIDES, cobalt ferrocyanide by COBALT COMPOUNDS and FERROCYANIDES, to which the computer will add automatically IRON COMPOUNDS and CYANIDES.

b) Organic Compounds

A. A considerable number of names of organic compounds have been introduced into the Thesaurus. The indexer must therefore check their presence before decomposing their names according to the rules set out below.

Some organic compounds are represented by their common abbreviations, whereas their full names are listed as forbidden terms, e.g. :

| | | |
|---------------------------|-----|-------|
| - TRINITROTOLUENE | USE | TNT |
| - DIETHYLDITHIOCARBAMATES | USE | DEDTC |

B. CYANATES are salts of cyanic acid (HCNO or $\text{N}=\text{COH}$). Thiocyanates (also called rhodanides) are really sulfocyanides (CNS). They are indexed by the keyword CYANIDES.

C. The keyword ORGANIC NITROGEN COMPOUNDS must not be used for ($-\text{NO}_2$) groups; the correct term is NITRO COMPOUNDS. For ($-\text{NO}$) groups the correct term is NITROSYL RADICALS.

D. The keyword AROMATICS must be used for compounds of more than two condensed rings, e.g. CORONENE.

E. Organic compounds which are not represented by keywords are indexed by the basic compound and the functional and substitutional groups, e.g. :

| | | |
|---|----|---|
| DIFLUORETHANAL | by | ETHANE, ORGANIC FLUORINE COMPOUNDS and ALDEHYDES |
| BENZOYLACETONE | by | ACETONE and BENZOYL RADICALS |
| CHLOROACETIC ACID | by | ACETIC ACID and ORGANIC CHLORINE COMPOUNDS |
| SODIUM FORMATES | by | SODIUM COMPOUNDS and FORMIC ACID |
| POTASSIUM STEARATES | by | POTASSIUM COMPOUNDS and STEARIC ACID |
| PHENANTHRENE SULFONIC ACID | by | SULFONIC ACID and PHENANTHRENE |
| METHACRYLONITRILE | by | METHACRYLIC ACID and PHENANTHRENE |
| ISOPROPYLNITRATE (NITRIC ACID ISOPROPYL ESTER) | by | PROPYL RADICALS, ISOMERS and NITRO COMPOUNDS |
| DIMETHYLPENTYLANTHRACENE | by | ANTHRACENE, METHYL RADICALS and AMYL RADICALS |
| BORNYL CHLORIDE | by | HEPTANE, TERPENES, CYCLOALKANES and ORGANIC CHLORINE COMPOUNDS. |

c) Ions, Isomers and Allotropy

- A. Ions in solutions are considered to be compounds and indexed as such, and their type of charge is indexed in addition. Thus thorium ion will be indexed by THORIUM COMPOUNDS and CATIONS; fluorine ion by FLUORIDES and ANIONS; and Al^{+++} by ALUMINUM COMPOUNDS, CATIONS and VALENCE.
- B. Isomers and stereoisomers are indexed by the keyword ISOMERS. Thus isobutanol is indexed by BUTANOL and ISOMERS. Note that several isomers such as hydrogen-para, alanine-alpha and glucose-d are represented by specific terms.
- C. I. Allotropic modifications of pure elements are indexed by the keyword ALLOTROPY. Thus rhombic sulfur is indexed by SULFUR and ALLOTROPY. Note that several allotropic modifications such as plutonium-alpha are represented by specific terms.
- II. Phase transformations in compounds and mixtures are indexed by PHASE TRANSFORMATIONS.

d) Alloys

- A. Alloys are indexed by co-ordination of the keywords naming their most important components. The main component (more than 50%) in an alloy, if known, is indexed by (METAL) BASE ALLOY, e.g. ZIRCONIUM BASE ALLOYS. Thus brass will be indexed by COPPER BASE ALLOYS and ZINC ALLOYS. Note that many alloys are represented by specific terms.
- B. Small amounts of metals (less than 1%) added to alloys for metallurgical purposes such as killing, precipitation hardening and stabilization, must be indexed by (METAL) ADDITIONS, e.g. TITANIUM ADDITIONS.
- C. Non-metals in alloys are indexed by the name of the compound formed. Thus a cobalt-boron alloy is indexed by COBALT BASE ALLOYS and COBALT BORIDES and a manganese-nickel-silicon alloy by MANGANESE BASE ALLOYS, NICKEL ALLOYS and SILICIDES.
- D. Stoichiometric combinations are indexed by the keyword INTERMETALLIC COMPOUNDS. Thus gallium antimonide will be indexed by GALLIUM ALLOYS, ANTIMONY ALLOYS and INTERMETALLIC COMPOUNDS.

e) Reactors

- A. Individual reactors should be indexed by their proper names as given in the Dictionary; more general terms for reactor types are added by the computer. If individual reactor names cannot be identified from the abstract the nearest more generic index terms indicating the reactor type should be used (preference should be given to specific terms such as POOL TYPE REACTORS, MAGNOX TYPE REACTORS, etc., which are automatically posted to keywords such as WATER COOLED REACTORS, RESEARCH REACTORS, GRAPHITE MODERATED REACTORS, etc.). If a

reactor type cannot be identified the keyword REACTORS should be used (see the new version of Terminology Chart 50, "Reactor Types").

- B. The keyword POWER PLANTS is used for conventional power plants unless these are indexable by more specific terms such as HEAT EXCHANGERS or TURBINES, as well as for nuclear power plants in their entirety, whereas for the reactor itself the keyword POWER REACTORS is used.

f) Nuclear Reactions

- A. All nuclear reactions are indexed by the term NUCLEAR REACTIONS; if they are fissions the more specific keyword FISSION is used, and PHOTOFISSION when the fission is caused by gamma radiation.
- B. Incoming particles are indexed as BEAMS. For this the following keywords are available :

| | |
|----------------|---------------|
| ALPHA BEAMS | NEUTRON BEAMS |
| DEUTERON BEAMS | PHOTON BEAMS |
| ELECTRON BEAMS | PROTON BEAMS |
| ION BEAMS | |

If the incoming particles are gamma rays the keyword PHOTON BEAMS is used. More specific ion beams, e.g. HELIUM 3 BEAMS, LITHIUM 6 BEAMS, are represented by index terms. Such terms should be used if appropriate.

- C. Apart from incoming particles, target particles, reaction products and residue nuclei should also be indexed if known.

Thus $N^{14}(\alpha, p)O^{17}$ should be indexed by NUCLEAR REACTIONS, NITROGEN 14, ALPHA BEAMS, PROTONS and OXYGEN 17; and $\mu^- + He^3 \rightarrow H^3 + \nu$ by NUCLEAR REACTIONS, MUONS-MINUS, MUON BEAMS, HELIUM 3, TRITONS and NEUTRINOS.

g) Geographic Designations

Geographic designations are indexed by the names of the countries (or states for the USA) to which they belong. Thus Bombay is indexed by INDIA, and Chattanooga by TENNESSEE.

h) Computer Codes

Computer codes are indexed by means of a specific term (composed of the code designation and the word CODE connected by a hyphen, e.g. MUFT-CODE) plus the keyword PROGRAMMING.

To avoid the introduction of a multitude of infrequently used codes into the Dictionary, only their initial letters are employed (A-Codes, B-Codes, etc.). Transposition of the codes used by the indexer into these generic terms according to the above-mentioned rule is done exclusively by the CID at Euratom.

11. INDEXING RULES FOR PARTICULAR TERMS

- (1) ABUNDANCE is used to indicate the quantitative presence of at least one substance in another substance.
- (2) ANALYSIS has proved to be unusable for retrieval, in contrast to the more specific keywords ACTIVATION ANALYSIS, CHEMICAL ANALYSIS (point 5), DETERMINATION (point 11) and the specific term ANALYTIC FUNCTIONS. It should therefore no longer be used.
- (3) ANGULAR DISTRIBUTION may be used to indicate a single angle, e.g. in connection with particle paths and radiation directions.
- (4) BIBLIOGRAPHY can be used both for pure bibliographies and for review-type documents with numerous references.
- (5) CHEMICAL ANALYSIS can only be used for qualitative chemical analysis, or when it cannot be decided whether the analysis in question is qualitative or quantitative.
- (6) CONFIGURATION can only be used for shapes, and only when none of the more specific keywords CYLINDERS, TUBES, WIRES, FIBERS, RODS, PELLETS, SPHERES, LAYERS, THICKNESS, PLATES, SHEETS, FILMS, SPACERS, TORUS, BYPASS, OPENINGS is appropriate, and when it is necessary for the characterization of a really important concept (as is often the case with patents). It can not be used to indicate particle trajectories. Here the keyword BEAM OPTICS is the correct term. Neither should it be used for molecular configuration, where MOLECULAR STRUCTURE is appropriate.
- (7) COLLISIONS may be used only for particles of molecular size and above.
- (8) CONVERSION has the sole meaning "energy conversion".
- (9) DECAY can be used for the decay of elementary particles and the decay of nuclei, but only when it cannot be ascertained whether the form of decay concerned is ALPHA DECAY, BETA DECAY or gamma transition (which is indexed by GAMMA RADIATION, TRANSIENTS and ENERGY LEVELS).
- (10) DENSITY has the sole meaning "specific weight".
- (11) DETERMINATION is only used for quantitative chemical analysis.
- (12) ENRICHMENT is used only for processes resulting in a higher abundance of elements or chemical compounds in a mixture of those substances, whereas processes resulting in a higher abundance of certain isotopes in a mixture of isotopes is indexed by ISOTOPE SEPARATION.

For any matter with a higher than normal abundance of elements, compounds or isotopes, the specific term ENRICHED MATERIALS (USE ABUNDANCE) should be used. Note that for abundance of isotopes the appropriate specific term will often be ISOTOPE RATIO (USE ABUNDANCE).

- (13) EQUATIONS is only used to indicate really important new equations, and only when the keyword DIFFERENTIAL EQUATIONS is not appropriate.
- (14) FILTERS may be used in optics and electronics.
- (15) FUELS, and all keywords and specific terms composed with FUEL, refer (with the exception of the term FUEL CELLS) solely to nuclear fuels.
- (16) GAMMA RADIATION is used for outgoing gamma radiation in nuclear reactions and in particle decay, whereas for incoming gamma radiation initiating a nuclear reaction the keyword **PHOTON BEAMS is used.**
- (17) HOMOGENEOUS is no longer accepted as an index term. It is replaced by the more precise keywords HOMOGENEOUS REACTORS and HOMOGENEOUS MIXTURES plus the specific terms HOMOGENEOUS FIELDS (USE ELECTROMAGNETIC FIELDS), HOMOGENEOUS PLASMA (USE PLASMA) and INHOMOGENEOUS PLASMA (USE PLASMA).
- (18) INERT GASES refers to non-reacting gases and protective atmospheres. In addition to the RARE GASES they include such gases as nitrogen and carbon dioxide.
- (19) LEADING ABSTRACT is only used for bibliographic abstracts which are followed by a series of informative titles or abstracts referring to other parts of the same document. Only those parts of the leading abstract not covered by specific abstracts in the same issue of the abstract journal are indexed.
- (20) LECTURES may be used for documents the main purpose of which is education or training; it is not used for dissertations (theses).
- (21) LIFETIME is used in connection with elementary particles and energy states.
- (22) MEASUREMENT has proved to be of little use for retrieval. The indexer is therefore advised to use, as far as possible, more specific keywords (ALPHA DETECTION, BETA DETECTION, GAMMA DETECTION, NEUTRON DETECTION, AGE ESTIMATION) or keywords for the corresponding measuring instruments (PROPORTIONAL COUNTERS, MASS SPECTROMETERS, THERMOCOUPLES).
- (23) NO KEYWORD is used for poor abstracts for which no reasonable index term can be found (cf. also point 34 - TITLE).
- (24) NUMERICALS is only used to indicate the difficult and time-consuming calculations which are usually performed with the aid of a computer.
- (25) ORBITS is not limited to planets and satellites but may also be used for particle paths in accelerators (in conjunction with a keyword composed with BEAMS) and for particle models (in conjunction with one of the keywords ATOMIC MODELS, NUCLEAR MODELS or PARTICLE MODELS).

- (26) PARTICLES is only used for particles above molecule size.
- (27) PLASTICS is not to be used for indexing plastic scintillators - PHOSPHORS is the correct term.
- (28) PREVIOUS ABSTRACT is used (in addition to the usual indexing) when the abstract represents a supplement to a previously recorded abstract (e.g. errata, notification of a translation).
- (29) REACTION KINETICS may be used for both chemical and nuclear reactions, always co-ordinated with one of the keywords CHEMICAL REACTIONS or NUCLEAR REACTIONS.
- (30) REFLECTORS is restricted to neutron reflectors in nuclear reactors Other types of reflector are indexed by REFLECTION, MAGNETIC MIRRORS, etc.
- (31) SPACE is restricted to the space between celestial bodies. For space between terrestrial bodies OPENINGS or, better, a more specific term referred to OPENINGS, is used. For mathematical space a specific term such as PHASE SPACE, RIEMANN SPACE, SPACE-TIME or TOPOLOGY is used.
- (32) TEMPERATURE is not used for electron temperature. Unlike HIGH TEMPERATURE and LOW TEMPERATURE, which indicate temperature ranges, TEMPERATURE is used to indicate the influence of temperature conditions or variations on properties of materials or equipment.
- (33) TIME must not be used to indicate alterations of a physical magnitude as a function of time, nor to indicate dates.
- (34) TITLE must always be used when the indexer bases his indexing on nothing more than the title, i.e. when there is no abstract.
- (35) TRANSPORT is used for the real (or possible) transportation of materials, instruments, equipment, goods, etc., as well as for transportation media. It can not be used in place of terms like TRANSPORT THEORY, MASS TRANSFER, DIFFUSION, WAVE PROPAGATION, MOTION, MOBILITY, CURRENTS (charge transfer), LOADING, REMOTE HANDLING or METABOLISM, which are either more precise or relate to quite different concepts.
- (36) VARIATIONS is, as far as possible, used only to indicate alterations of a physical magnitude as a function of time, and not to indicate alterations in spatial distribution, density and mass ratio of substances, or to indicate a mathematical method (VARIATIONAL METHOD).
- (37) VIBRATIONS is only used for mechanical vibrations. In all other cases (e.g. for molecule oscillation spectra) the term OSCILLATIONS is used.

12. THE ENDS INDEXING SHEET

- a) The indexer enters the index terms in a legible manner on a sheet which serves as a punching prescript. The reference number of the abstract, most specific index terms and proposed new terms are entered under the corresponding headings. Note that proposed new terms must, in addition, be notified separately on the formsheets provided for this purpose (see para. 7a).
- b) If an abstract needs to be split (see para. 3), every split should be indicated by a letter (A, B, C, ... Z (skipping the letters I and O), resulting in 24 split indications) which is entered directly after the reference number on the indexing sheet (Fig. 2).

N.B. Terms common to all splits must be repeated in each split.

No "blank" split, i.e. no split without a link, is allowed. If an abstract needs to be split into more than 24 parts the link (the common symbol assigned to the terms in a split) starts again with A for part 25, B for part 26, etc. But for these additional splits the reference number is not entered, and the CID must be informed of such splits. The CID will then assign new reference numbers (in the 90 thousands) to such splits and will make cross references to the initial reference number.

- c) The number of terms assigned to all the splits, including the proposed new terms, is entered by the indexer under the heading "Total of Terms". This figure is punched and compared by the computer with the number of terms punched, in order to verify the completeness of the terms punched.
- d) Under the heading "Indexer Code" the indexer enters the personal code number which has been allotted to him. This code number is punched and serves to trace rejected terms back to the originating indexer.
- e) If the space available on an indexing sheet is insufficient to accommodate all the index terms, the indexer uses additional sheets which he gives the same abstract number (and split indication). The total number of terms is then entered only on the first sheet. The indexer's code number is entered on all the sheets, which are then fastened together.

F i n a l R e m a r k

Indexing of abstracts in the Euratom Nuclear Documentation System calls for detailed subject knowledge together with a knowledge of the index terms, their meanings and the rules governing their application.

Subject knowledge must be presumed.

The indexer must familiarize himself with the index terms and their meanings, especially by studying the "Terminology Charts" (see 9.a). He must also know the indexing rules. After indexing several hundred abstracts, with frequent thorough discussions of the errors which will have occurred during indexing, the indexer will possess the necessary know-how. Occasional spot controls and automatic control procedures are then sufficient to maintain the standard of quality.

| Reference Number | EURATOM - CID INDEXING SHEET | | Indexer Code | Puncher |
|---------------------------|------------------------------|--------------------|--------------|---------|
| NS 1834050 A | ← Link Number | Total of Terms → 4 | 52 | |
| Most Specific Index Terms | | 17 | | |
| 1 | INOR-8 | 18 | | |
| 2 | GRAPHITE | 19 | | |
| 3 | FUSED SALT FUEL | 20 | | |
| 4 | REACTORS | 21 | | |

| Reference Number | EURATOM - CID INDEXING SHEET | | Indexer Code | Puncher |
|---------------------------|------------------------------|--------------------|--------------|---------|
| NS 1834050 B | ← Link Number | Total of Terms → 3 | 52 | |
| Most Specific Index Terms | | 17 | | |
| 1 | MSRE | 18 | | |
| 2 | FUSED SALT FUEL | 19 | | |
| 3 | CONTROL ELEMENTS | 20 | | |

| Reference Number | EURATOM - CID INDEXING SHEET | | Indexer Code | Puncher |
|---------------------------|------------------------------|--------------------|--------------|---------|
| NS 1834050 C | ← Link Number | Total of Terms → 3 | 52 | |
| Most Specific Index Terms | | 17 | | |
| 1 | RADIATION CHEMISTRY | 18 | | |
| 2 | MSRE | 19 | | |
| 3 | FUSED SALT FUEL | 20 | | |

| Reference Number | EURATOM - CID INDEXING SHEET | | Indexer Code | Puncher |
|------------------|------------------------------|--------------------|--------------|---------|
| NS 1834050 D | ← Link Number | Total of Terms → 7 | 52 | |

| | | | | |
|---------------------------|-----------------|----------|--|--|
| Most Specific Index Terms | | 22 | | |
| 1 | PHASE DIAGRAMS | 23 | | |
| 2 | SOLUBILITY | 24 | | |
| 3 | CRYSTALLIZATION | 25 | | |
| 4 | DECOMPOSITION | 26 | | |
| 5 | FLUORIDES | 27 | | |
| 6 | CHLORIDES | 28 | | |
| 7 | FUSED SALTS | 29 | | |
| 8 | ..... | 30 | | |
| 9 | ..... | 31 | | |
| 10 | ..... | 32 | | |
| 11 | ..... | 33 | | |
| 12 | ..... |  |  |  |
| 13 | ..... |  |  |  |
| 14 | ..... |  |  |  |
| 15 | ..... |  |  |  |
| 16 | ..... |  |  |  |

NSA 18 34050 (ORNL-3626(p.59-164)) MATERIALS STUDIES.
(Oak Ridge National Lab., Tenn.)
Studies are presented of: evaluation of INOR-8 and various graphites for use in molten salt reactors; manufacture of MSRE control rod elements; radiation chemistry studies applicable to MSRE; and phase, solubility, crystallization, and stability studies on fluoride and chloride salt mixtures. (T.F.H.)



Figure 1

| | | | | |
|--------------------|-------|---------|--|--|
| Proposed New Terms | | 3 | | |
| 1 | ..... | 4 | | |
| 2 | ..... | 5 | | |

| | | |
|---|--|--|
| 3.903 Forbidden Terms (-A USE B or -A SEE B OR C) | | 16.473 |
| Specific Terms 7.793 (Non-Keyword Index Terms) (A USE B + C) | 12.570 Index Terms in the Euratom Thesaurus | Dictionary Terms in the Euratom Dictionary |
| 1.831 Keywords for Compounds and Alloys | | |
| 1.738 Keywords for Isotopes | | |
| 1.208 General Keywords | | |
| 4.777 Keywords | | |

Figure 2

Quantitative Distribution of Terms in the
Euratom Dictionary

(March 1969)

NS 22

10490 (WAPD-TM-386) SOME EXPERIMENTAL TECHNIQUES USED IN REACTOR HEAT TRANSFER AND FLUID FLOW RESEARCH. Green, S. J. (ed.) (Bettis Atomic Power Lab., Pittsburgh, Pa.). Nov. 1967. Contract AT(11-1)-Gen-14. 223p. Dep. CFSTI.



Experimental techniques used in obtaining heat transfer and fluid flow data are described. The principal objective of the experiments was to obtain information that describes rather than explains the particular phenomenon being investigated. Thus, a description of studies that are macroscopic rather than microscopic in nature are provided. (auth)

This is an example of poor abstracting. Three quite general terms only for indexing a report of 223 pages are not sufficient. An abstract indexed this way would practically be lost forever in the system.

In this particular case the indexer was able to derive another 15 terms from the original report.

| Reference Number | | | | | | | | | | EURATOM - CID INDEXING SHEET | | Indexer Code | Puncher | |
|---------------------------|---------------|---|---|---|---|---|---|---|--|------------------------------|-----------------|--------------|---------|--|
| N | S | 2 | 2 | 1 | 0 | 4 | 9 | 0 | | ← Link Number | Total of Terms→ | 3 | 52 | |
| Most Specific Index Terms | | | | | | | | | | | 17 | ..... |  |  |
| 1 | REACTORS | | | | | | | | | | 18 | ..... |  |  |
| 2 | HEAT TRANSFER | | | | | | | | | | 19 | ..... |  |  |
| 3 | FLUID FLOW | | | | | | | | | | 20 | ..... |  |  |
| 4 | ..... |  |  |  |  |  |  |  |  |  | 21 | ..... |  |  |
| 5 | ..... |  |  |  |  |  |  |  |  |  | 22 | ..... |  |  |
| 6 | ..... |  |  |  |  |  |  |  |  |  | 23 | ..... |  |  |
| 7 | ..... |  |  |  |  |  |  |  |  |  | 24 | ..... |  |  |
| 8 | ..... |  |  |  |  |  |  |  |  |  | 25 | ..... |  |  |
| 9 | ..... |  |  |  |  |  |  |  |  |  | 26 | ..... |  |  |
| 10 | ..... |  |  |  |  |  |  |  |  |  | 27 | ..... |  |  |
| 11 | ..... |  |  |  |  |  |  |  |  |  | 28 | ..... |  |  |
| 12 | ..... |  |  |  |  |  |  |  |  |  | 29 | ..... |  |  |
| 13 | ..... |  |  |  |  |  |  |  |  |  | 30 | ..... |  |  |
| 14 | ..... |  |  |  |  |  |  |  |  |  | 31 | ..... |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  |  | 32 | ..... |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  |  | 33 | ..... |  |  |
| Proposed New Terms | | | | | | | | | | | 3 | ..... |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  |  | 4 | ..... |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  |  | 5 | ..... |  |  |

EUR/OFF/285/67

11020 DEISTVIE IONIZIRUYUSHCHIKH IZLUCHENII NA METALLY I S'LAVY. (Ionizing Radiation Effects on Metals and Alloys). Konobeevskii, S. T. (ed.). Moscow, Atomizdat, 1967. 116p.

Effects of electron and γ radiation on metals and their crystal structure are discussed. A brief review is given of the physical properties, electric conductivity, Young's modulus, mechanical characteristics, magnetic and coercive forces of metals and alloys treated by ionizing radiation. The influence of ionizing radiation on the diffusion and ordering processes in metals and alloys is also discussed. (177 references) (R.V.J.)

Remark :

According to No 4, "Indexing Rules for Particular Terms", the keyword BIBLIOGRAPHY can be used both for pure bibliographies and also for review-type documents with numerous references.

| Reference Number | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher | |
|---------------------------|-----------------------|---|---|---|---|---|---|---------------|----------------|-----------------|--------------|---------|--|
| N | S | 2 | 2 | 1 | 1 | 0 | 2 | 0 | INDEXING SHEET | | | | |
| | | | | | | | | | ← Link Number | Total of Terms→ | 13 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | | | |
| 1 | RADIATION EFFECTS | | | | | | | 18 | ..... |  |  |  |  |
| 2 | METALS | | | | | | | 19 | ..... |  |  |  |  |
| 3 | ALLOYS | | | | | | | 20 | ..... |  |  |  |  |
| 4 | ELECTRON BEAMS | | | | | | | 21 | ..... |  |  |  |  |
| 5 | GAMMA RADIATION | | | | | | | 22 | ..... |  |  |  |  |
| 6 | LATTICES | | | | | | | 23 | ..... |  |  |  |  |
| 7 | ELECTRIC CONDUCTIVITY | | | | | | | 24 | ..... |  |  |  |  |
| 8 | YOUNG MODULUS | | | | | | | 25 | ..... |  |  |  |  |
| 9 | MECHANICAL PROPERTIES | | | | | | | 26 | ..... |  |  |  |  |
| 10 | MAGNETIC PROPERTIES | | | | | | | 27 | ..... |  |  |  |  |
| 11 | IONIZING RADIATIONS | | | | | | | 28 | ..... |  |  |  |  |
| 12 | DIFFUSION | | | | | | | 29 | ..... |  |  |  |  |
| 13 | BIBLIOGRAPHY | | | | | | | 30 | ..... |  |  |  |  |
| 14 | ..... |  |  |  |  |  |  | 31 | ..... |  |  |  |  |
| 15 | ..... |  |  |  |  |  |  | 32 | ..... |  |  |  |  |
| 16 | ..... |  |  |  |  |  |  | 33 | ..... |  |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | | | |
| 1 | ..... |  |  |  |  |  |  | 4 | ..... |  |  |  |  |
| 2 | ..... |  |  |  |  |  |  | 5 | ..... |  |  |  |  |

11119 COSMIC X-RAY SURVEY IN THE SOUTHERN HEMISPHERE. Cooke, B. A.; Pounds, K. A.; Stewardson, E. A.; Adams, D. J. (Univ. of Leicester, Eng.). Astrophys. J., 150: L189-91 (Dec. 1967).

An unstabilized skylark rocket (SL 118) was launched from Woomera at 20.20 local time on April 10, 1967. The rocket carried a large-area proportional counter to perform a high-sensitivity survey for cosmic x-ray sources in the southern sky. The flight was successful and a total of 50 scans across the sky were obtained. Strong sources were observed in Centaurus and Scorpius, and weaker sources were observed in Taurus and in the Ara-Scorpius region. No further discrete sources were positively identified. (W.D.M.)

Existing Dictionary References :

X-RAY SOURCES USE RADIATION SOURCES
+ X RADIATION

Hidden Indication :

DETECTION

| Reference Number | | | | | | | | | EURATOM - CID INDEXING SHEET | | | Indexer Code | Puncher |
|---------------------------|-----------------------|---|---|---|---|---|---|---|------------------------------|-----------------|-------|--------------|---------|
| N | S | 2 | 2 | 1 | 1 | 1 | 1 | 9 | ← Link Number | Total of Terms→ | 7 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | | | |
| 1 | COSMIC RADIATION | | | | | | | | 17 | ..... |  |  |  |
| 2 | X-RAY SOURCES | | | | | | | | 19 | ..... |  |  |  |
| 3 | ROCKETS | | | | | | | | 20 | ..... |  |  |  |
| 4 | AUSTRALIA | | | | | | | | 21 | ..... |  |  |  |
| 5 | PROPORTIONAL COUNTERS | | | | | | | | 22 | ..... |  |  |  |
| 6 | SENSITIVITY | | | | | | | | 23 | ..... |  |  |  |
| 7 | STARS | | | | | | | | 24 | ..... |  |  |  |
| 8 | DETECTION | | | | | | | | 25 | ..... |  |  |  |
| 9 | ..... |  |  |  |  |  |  |  | 26 | ..... |  |  |  |
| 10 | ..... |  |  |  |  |  |  |  | 27 | ..... |  |  |  |
| 11 | ..... |  |  |  |  |  |  |  | 28 | ..... |  |  |  |
| 12 | ..... |  |  |  |  |  |  |  | 29 | ..... |  |  |  |
| 13 | ..... |  |  |  |  |  |  |  | 30 | ..... |  |  |  |
| 14 | ..... |  |  |  |  |  |  |  | 31 | ..... |  |  |  |
| 15 | ..... |  |  |  |  |  |  |  | 32 | ..... |  |  |  |
| 16 | ..... |  |  |  |  |  |  |  | 33 | ..... |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | | | |
| 1 | ..... |  |  |  |  |  |  |  | 4 | ..... |  |  |  |
| 2 | ..... |  |  |  |  |  |  |  | 5 | ..... |  |  |  |

EUR/OFF/285/67

B A 46

106605. WILLS, PAMELA A. (Australian At. Energy Comm., Res. Estab., Lucas Heights, New S. Wales, Australia.) Use of gamma-radiation for quarantine control of imported edible beans. NATURE 207(4992): 100-101. 1965.

BA = Biological Abstracts

Existing Dictionary References :

BEANS USE VEGETABLES

Hidden Indications :

TITLE (see Indexing Rules for Particular Terms, point 34)

IRRADIATION

FOOD (from "edible")

PRESERVATION)

STERILIZATION) (from "quarantine control")

PARASITES)

| Reference Number | | | | | | | | | | EURATOM - CID INDEXING SHEET | | | Indexer Code | Puncher |
|---------------------------|-----------------|---|---|---|---|---|---|---|--|------------------------------|-----------------|---|--------------|---------|
| B | A | 4 | 6 | A | 6 | 6 | 0 | 5 | | ← Link Number | Total of Terms→ | 8 | 55 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ..... |  |  |  |
| 1 | GAMMA RADIATION | | | | | | | | | 18 | ..... |  |  |  |
| 2 | BEANS | | | | | | | | | 19 | ..... |  |  |  |
| 3 | TITLE | | | | | | | | | 20 | ..... |  |  |  |
| 4 | IRRADIATION | | | | | | | | | 21 | ..... |  |  |  |
| 5 | FOOD | | | | | | | | | 22 | ..... |  |  |  |
| 6 | PRESERVATION | | | | | | | | | 23 | ..... |  |  |  |
| 7 | STERILIZATION | | | | | | | | | 24 | ..... |  |  |  |
| 8 | PARASITES | | | | | | | | | 25 | ..... |  |  |  |
| 9 | ..... |  |  |  |  |  |  |  |  | 26 | ..... |  |  |  |
| 10 | ..... |  |  |  |  |  |  |  |  | 27 | ..... |  |  |  |
| 11 | ..... |  |  |  |  |  |  |  |  | 28 | ..... |  |  |  |
| 12 | ..... |  |  |  |  |  |  |  |  | 29 | ..... |  |  |  |
| 13 | ..... |  |  |  |  |  |  |  |  | 30 | ..... |  |  |  |
| 14 | ..... |  |  |  |  |  |  |  |  | 31 | ..... |  |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  | 32 | ..... |  |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  | 33 | ..... |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | ..... |  |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  | 4 | ..... |  |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  | 5 | ..... |  |  |  |

10480 METHOD OF AND APPARATUS FOR CUTTING GROOVES IN A WORKPIECE. Portal, Pierre; Rouchaud, Jacques (to Commissariat a l'Energie Atomique). British Patent 1,098,761. Jan. 10, 1968. Filed Apr. 22, 1966.

A method and equipment are described for cutting a series of grooves in a workpiece such as the flanges or fins spaced over the periphery of sheaths for fuel elements for nuclear reactors. Machine tools mounted on a number of parallel spindles cut a series of rectilinear grooves in each of the faces of a polygonal section to form flanges or fins. A linear divider is used to move the workpiece for new cutting operations in another face. The spindles are mounted on a carriage which is mounted on a vertical column and is controlled by a hydraulic system. (F.S.)

Existing Dictionary References :

CUTTING USE MACHINING
 GROOVES USE OPENINGS
 FLANGES USE JOINTS
 CUTTING TOOLS USE TOOLS
 (to be found in terminology chart No 29)
 SPINDLES USE MACHINE PARTS

Hidden Indication :

FUEL CANS (for sheaths of fuel elements)

Superfluous Indications :

FUEL ELEMENTS (completely taken care of by FUEL CANS)
 REACTORS
 MOTION
 OPERATION
 HYDRAULICS

| Reference Number | | | | | | | | EURATOM - CID INDEXING SHEET | | | Indexer Code | Puncher | |
|----------------------------------|----------------------|---|---|---|---|---|---|------------------------------|---------------|-----------------|--------------|---------|--|
| N | S | 2 | 2 | 1 | 0 | 4 | 8 | 0 | ← Link Number | Total of Terms→ | 8 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ..... |  |  |
| 1 | LABORATORY EQUIPMENT | | | | | | | 18 | ..... |  |  |  |  |
| 2 | CUTTING | | | | | | | 19 | ..... |  |  |  |  |
| 3 | GROOVES | | | | | | | 20 | ..... |  |  |  |  |
| 4 | FLANGES | | | | | | | 21 | ..... |  |  |  |  |
| 5 | FINS | | | | | | | 22 | ..... |  |  |  |  |
| 6 | FUEL CANS | | | | | | | 23 | ..... |  |  |  |  |
| 7 | CUTTING TOOLS | | | | | | | 24 | ..... |  |  |  |  |
| 8 | SPINDLES | | | | | | | 25 | ..... |  |  |  |  |
| 9 | ..... |  |  |  |  |  |  | 26 | ..... |  |  |  |  |
| 10 | ..... |  |  |  |  |  |  | 27 | ..... |  |  |  |  |
| 11 | ..... |  |  |  |  |  |  | 28 | ..... |  |  |  |  |
| 12 | ..... |  |  |  |  |  |  | 29 | ..... |  |  |  |  |
| 13 | ..... |  |  |  |  |  |  | 30 | ..... |  |  |  |  |
| 14 | ..... |  |  |  |  |  |  | 31 | ..... |  |  |  |  |
| 15 | ..... |  |  |  |  |  |  | 32 | ..... |  |  |  |  |
| 16 | ..... |  |  |  |  |  |  | 33 | ..... |  |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | ..... |  |  |
| 1 | ..... |  |  |  |  |  |  | 4 | ..... |  |  |  |  |
| 2 | ..... |  |  |  |  |  |  | 5 | ..... |  |  |  |  |

EUR/OFF/285/67

10239 IONIC REACTIONS OF UNSATURATED COMPOUNDS.
I. POLYMERIZATION OF ACETYLENE. Futrell, Jean H.;

Tiernan, Thomas O. (Aerospace Research Labs., Wright-Patterson AFB, Ohio). J. Phys. Chem., 72: 158-64(Jan. 15, 1968).

Ion-molecule reactions of acetylene were investigated in conventional, high pressure, and tandem mass spectrometers. Evidence was obtained from ionization efficiency curves and from charge-exchange experiments for the existence of an excited molecule ion, $C_2H_2^{+*}$, with an appearance potential of about 15.9 eV, which reacts differently from the ground vibronic state ion, $C_2H_2^+$. Reactions of the individual primary ions and selected secondary, tertiary, and subsequent ions were investigated, and C_2D_2 was examined in some experiments to clarify mechanistic details and to evaluate isotope effects. A highly branched chain reaction for the ionic polymerization of acetylene was deduced from these results. (auth)

Superfluous Indications :

- PRESSURE
- IONIZATION
- EFFICIENCY
- CHARGE EXCHANGE
- OSCILLATIONS

(VIBRATIONS could not at all be used according to "Indexing Rules for Particular Terms")

Remark :

According to the Indexing Specificity Rule ("Use the most specific appropriate index term") the indexer has to realize, that in this particular case the ion in question is a cation.

Existing Dictionary References :

- IONIC REACTIONS USE CHEMICAL REACTIONS + IONS
 - APPEARANCE POTENTIAL USE ENERGY LEVELS
 - CHAIN REACTIONS USE FISSION
- (cannot be used for polymerization)

| Reference Number | | | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher |
|---------------------------|----------------------|---|---|---|---|---|---|---|--|---------------|-----------------|----|--------------|---------|
| N | S | 2 | 2 | 1 | 0 | 2 | 3 | 9 | | | INDEXING SHEET | | | |
| | | | | | | | | | | ← Link Number | Total of Terms→ | 11 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ..... |  |  |  |
| 1 | CHEMICAL REACTIONS | | | | | | | | | 18 | ..... |  |  |  |
| 2 | CATIONS | | | | | | | | | 19 | ..... |  |  |  |
| 3 | POLYMERIZATION | | | | | | | | | 20 | ..... |  |  |  |
| 4 | ACETYLENES | | | | | | | | | 21 | ..... |  |  |  |
| 5 | MOLECULES | | | | | | | | | 22 | ..... |  |  |  |
| 6 | MASS SPECTROMETERS | | | | | | | | | 23 | ..... |  |  |  |
| 7 | EXCITATION | | | | | | | | | 24 | ..... |  |  |  |
| 8 | APPEARANCE POTENTIAL | | | | | | | | | 25 | ..... |  |  |  |
| 9 | REACTION KINETICS | | | | | | | | | 26 | ..... |  |  |  |
| 10 | DEUTERIUM COMPOUNDS | | | | | | | | | 27 | ..... |  |  |  |
| 11 | ISOTOPE EFFECTS | | | | | | | | | 28 | ..... |  |  |  |
| 12 | ..... |  |  |  |  |  |  |  |  | 29 | ..... |  |  |  |
| 13 | ..... |  |  |  |  |  |  |  |  | 30 | ..... |  |  |  |
| 14 | ..... |  |  |  |  |  |  |  |  | 31 | ..... |  |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  | 32 | ..... |  |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  | 33 | ..... |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | ..... |  |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  | 4 | ..... |  |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  | 5 | ..... |  |  |  |

NS 22

10494 FLOW OF COMPRESSIBLE TWO-PHASE MIXTURES THROUGH THROTTLING DEVICES. Chisholm, D. (National Engineering Lab., East Kilbride, Scotland). Chem. Process. Eng., 48: 73-8(Dec. 1967).

The mechanism of two-phase flow through nozzles and venturis is of growing interest to engineers working on general fluid-flow problems. Theoretical equations are developed for the flow of compressible gas/liquid mixtures through throttling devices, which are compared with data for flow through venturis, nozzles and sharp-edged orifices. (auth)

Existing Dictionary References :

TWO-PHASE FLOW

COMPRESSIBLE FLOW USE COMPRESSION
+ FLUID FLOW

(to be found in "terminology chart" No 34)

VENTURI TUBES USE FLOWMETERS
+ TUBES

ORIFICES USE OPENINGS

Superfluous Indications :

MIXTURES

(The terms TWO-PHASE FLOW, GASES and LIQUIDS take care of this concept)

Remark :

The indexer has of course to realize that "Theoretical equations for the flow of compressible gas/liquid mixtures" are differential equations.

| Reference Number | | | | | | | | | | EURATOM - CID | | Indexer Code | Puncher | |
|---------------------------|------------------------|---|---|---|---|---|---|---|--|----------------|-----------------|--------------|---------|--|
| | | | | | | | | | | INDEXING SHEET | | | | |
| N | S | 2 | 2 | 1 | 0 | 4 | 9 | 4 | | ← Link Number | Total of Terms→ | 8 | 52 | |
| Most Specific Index Terms | | | | | | | | | | | 17 | ..... |  |  |
| 1 | TWO-PHASE FLOW | | | | | | | | | | 18 | ..... |  |  |
| 2 | COMPRESSIBLE FLOW | | | | | | | | | | 19 | ..... |  |  |
| 3 | NOZZLES | | | | | | | | | | 20 | ..... |  |  |
| 4 | VENTURI TUBES | | | | | | | | | | 21 | ..... |  |  |
| 5 | DIFFERENTIAL EQUATIONS | | | | | | | | | | 22 | ..... |  |  |
| 6 | GASES | | | | | | | | | | 23 | ..... |  |  |
| 7 | LIQUIDS | | | | | | | | | | 24 | ..... |  |  |
| 8 | ORIFICES | | | | | | | | | | 25 | ..... |  |  |
| 9 | ..... |  |  |  |  |  |  |  |  |  | 26 | ..... |  |  |
| 10 | ..... |  |  |  |  |  |  |  |  |  | 27 | ..... |  |  |
| 11 | ..... |  |  |  |  |  |  |  |  |  | 28 | ..... |  |  |
| 12 | ..... |  |  |  |  |  |  |  |  |  | 29 | ..... |  |  |
| 13 | ..... |  |  |  |  |  |  |  |  |  | 30 | ..... |  |  |
| 14 | ..... |  |  |  |  |  |  |  |  |  | 31 | ..... |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  |  | 32 | ..... |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  |  | 33 | ..... |  |  |
| Proposed New Terms | | | | | | | | | | | 3 | ..... |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  |  | 4 | ..... |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  |  | 5 | ..... |  |  |

EUR/OFF/285/67

10555 PREPARATION OF LITHIUM-DRIFTED SILICON DETECTORS. Przyborski, Wincenty; Chwaszczewska, Janina; Czarnacki, Wieslaw (Inst. of Nuclear Research, Swierk, Poland). Nukleonika, 12: 993-1005(1967).

The results of a study of lithium mobility in boron and gallium doped silicon single crystals grown either by zone floating or Czochralski's methods are given. The influence of dislocations on the drift process, compensation quality and reverse current of Li-drifted diodes is outlined. A description of the Li-drifted detector preparation technique, involving some novelties, is presented. (auth)

Existing Dictionary References :

SEMICONDUCTOR COUNTERS USE SOLID-STATE COUNTERS
+ SEMICONDUCTORS

(to be found in terminology chart n° 54 "RADIATION DETECTORS")

SINGLE CRYSTALS USE MONOCRYSTALS

(enter terminology chart n° 24 for CRYSTALS and find the more specific keyword MONOCRYSTALS)

CRYSTAL GROWTH USE CRYSTALLIZATION

(to be found also in terminology chart n° 24, starting from CRYSTALS)

ZONE REFINING USE REFINING
+ ZONES

CZOCHRALSKI METHOD USE MONOCRYSTALS
+ PREPARATION

Superfluous Indications :

CURRENTS

| Reference Number | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher | |
|---------------------------|------------------------|---|---|---|---|---|---|----------------|-----------------|----|--------------|---------|--|
| N | S | 2 | 2 | 1 | 0 | 5 | 5 | INDEXING SHEET | | | | | |
| | | | | | | | | ← Link Number | Total of Terms→ | 12 | 52 | | |
| Most Specific Index Terms | | | | | | | | 17 | ..... |  |  |  |  |
| 1 | PREPARATION | | | | | | | 18 | ..... |  |  |  |  |
| 2 | SEMICONDUCTOR COUNTERS | | | | | | | 19 | ..... |  |  |  |  |
| 3 | SILICON | | | | | | | 20 | ..... |  |  |  |  |
| 4 | LITHIUM | | | | | | | 21 | ..... |  |  |  |  |
| 5 | MOBILITY | | | | | | | 22 | ..... |  |  |  |  |
| 6 | BORON | | | | | | | 23 | ..... |  |  |  |  |
| 7 | GALLIUM | | | | | | | 24 | ..... |  |  |  |  |
| 8 | MONOCRYSTALS | | | | | | | 25 | ..... |  |  |  |  |
| 9 | CRYSTAL GROWTH | | | | | | | 26 | ..... |  |  |  |  |
| 10 | ZONE REFINING | | | | | | | 27 | ..... |  |  |  |  |
| 11 | DISLOCATIONS | | | | | | | 28 | ..... |  |  |  |  |
| 12 | DIODES | | | | | | | 29 | ..... |  |  |  |  |
| 13 | | | | | | | | 30 | ..... |  |  |  |  |
| 14 | | | | | | | | 31 | ..... |  |  |  |  |
| 15 | | | | | | | | 32 | ..... |  |  |  |  |
| 16 | | | | | | | | 33 | ..... |  |  |  |  |
| Proposed New Terms | | | | | | | | 3 | ..... |  |  |  |  |
| 1 | | | | | | | | 4 | ..... |  |  |  |  |
| 2 | | | | | | | | 5 | ..... |  |  |  |  |

10199 DETERMINATION OF TRACE ELEMENTS BY CHEMICAL ANALYSIS AND NEUTRON ACTIVATION IN METEORITES OF THE COLLECTION OF THE VIENNESE MUSEUM OF NATURAL HISTORY. 2nd COMMUNICATION. Kiesel, W.; Seltner, H.; Kluger, F.; Hecht, F. (Univ., Vienna). Monatsh. Chem., 98: 972-92(June 1967).

Neutron activation and chemical separation techniques, used for analysis of six olivine-hypersthene chondrites, one pyroxene-plagioclase-achondrite, one medium and one coarse octahedrite, as well as an ataxite of high Ni content, are described. For activation, a flux of 10^{15} neutron $\text{cm}^{-2} \text{sec}^{-1}$ was used. The time of irradiation varied from 60 to 120 hr. After a cooling period of 1 day, weighed amounts of the meteorite samples were mixed with the corresponding carrier solutions (5 to 8 mg amounts of the elements) and transferred to a quartz distillation apparatus for hydrogen halide distillation. The following elements to be determined were found in the distillate: Se, As, Sb, Sn, Hg, and Re, while the residue contained, among others, the elements Zn, Co, Sc, Cr, Au, and Ir. Methods are outlined for separating and determining Se, as ^{76}Se , As, as ^{76}As , Sb, as ^{124}Sb , and then the elements in the distillation residue. For the wet-chemical determination of the main constituents a rapid method of analysis was developed which was found to be very suitable. For the final determination of the elements, methods based on chelatometric fluorescence titration in uv light were employed. For the trace elements a separation method was developed which allowed the analysis of 12 elements in one operation. This separation technique is applicable after neutron activation to isotopes with half-lives exceeding 24 hr. (BBB)

Superfluous indications :

- NEUTRON FLUX
- TIME
- IRRADIATION
- COOLING
- MIXING
- CARRIERS
- SOLUTIONS
- QUARTZ
- DISTILLATION
- HYDROGEN
- HALIDES
- ISOTOPES
- HALF-LIFE

Dictionary Introductions :

- HYPERSTHENE USE PYROXENES
- ATAXITES USE IRON METEORITES + NICKEL COMPOUNDS

| Reference Number | | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher |
|---------------------------|----------------------|---|---|---|---|---|---|---|----------------|-----------------------|----------|--------------|---------|
| N | S | 2 | 2 | 1 | 0 | 1 | 9 | 9 | INDEXING SHEET | | | | |
| | | | | | | | | | ← Link Number | Total of Terms→ | 33 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ANTIMONY | | |
| 1 | DETERMINATION | | | | | | | | 18 | TIN | | | |
| 2 | TRACE AMOUNTS | | | | | | | | 19 | MERCURY | | | |
| 3 | CHEMICAL ANALYSIS | | | | | | | | 20 | RHENIUM | | | |
| 4 | ACTIVATION ANALYSIS | | | | | | | | 21 | ZINC | | | |
| 5 | NEUTRON BEAMS | | | | | | | | 22 | COBALT | | | |
| 6 | METEORITES | | | | | | | | 23 | SCANDIUM | | | |
| 7 | SEPARATION PROCESSES | | | | | | | | 24 | CHROMIUM | | | |
| 8 | OLIVINE | | | | | | | | 25 | GOLD | | | |
| 9 | CHONDRITES | | | | | | | | 26 | IRIDIUM | | | |
| 10 | PYROXENES | | | | | | | | 27 | SELENIUM 75 | | | |
| 11 | PLAGIOCLASE | | | | | | | | 28 | ARSENIC 76 | | | |
| 12 | ACHONDRITES | | | | | | | | 29 | ANTIMONY 124 | | | |
| 13 | OCTAHEDRITES | | | | | | | | 30 | TITRATION | | | |
| 14 | THERMAL NEUTRONS | | | | | | | | 31 | FLUORESCENCE | | | |
| 15 | SELENIUM | | | | | | | | 32 | ULTRAVIOLET RADIATION | | | |
| 16 | ARSENIC | | | | | | | | 33 | | | | |
| Proposed New Terms | | | | | | | | | | 3 | | | |
| 1 | ATAXITES | | | | | | | | 4 | | | | |
| 2 | | | | | | | | | 5 | | | | |

EUR/OFF/285/67

10512 NEUTRON-IRRADIATION OF LUBRICANT ADDITIVES AND THEIR APPLICATION AS A TRACER. Iwasaki, Masao (Showa Oil Co., Ltd., Kanagawa, Japan); Yamaki, Naomichi, Junkatsu, 12: 207-12(1967). (In Japanese).

The preparation of radioactive lubricant additives by irradiation in a nuclear reactor is described. To investigate the possible decomposition of the additives during irradiation, 3 additives were heated at 150°C, the approximate temperature in the reactor. Changes in ir spectra and decreases in weight showed that dibenzyl disulfide (DBDS) and tricresyl phosphate (TCP) were not changed but Zn ethylhexyl dithiophosphate (ZEHDTP) was decomposed. Three additives were activated by neutron irradiation in a reactor. From the results even ZEHDTP was considered suitable for activation. After this preliminary feasibility study, the 3 additives were irradiated under a neutron flux of 2×10^{12} n/cm² sec for 107 hr. DBDS was used as a tracer since it was easily purified by recrystallization. TCP could not be purified chromatographically and the degree of degradation could not be determined. ZEHDTP had decomposed and could not be used. It was evident that additive changes observed in this irradiation were probably enhanced by the more severe conditions than those in the preliminary irradiation. Using DBDS-³⁵S as a tracer, the thickness of surface coating formed on a copper surface in 0.1 to 0.5% liquid paraffin solution at 80 to 210°C was measured. The thickness of the surface coating increased with longer immersion time, higher solution temperature, or higher additive concentration. The temperature at which a film began to be detected was higher at lower additive concentrations. Identification by x-ray diffraction and elemental analysis indicated that the surface coating consisted of Cu₂S. Some additives were multilabeled by neutron irradiation. In some cases, the nuclides can be distinguished by the difference of the penetrating power of radiation. The multilabeled additives can be used for tracing 2 or more elements simultaneously. (BBB)

Remark :

Zn ethylhexyl dithiophosphate has to be indexed

1. ZINC COMPLEXES
2. ORGANIC SULFUR COMPOUNDS
3. ORGANIC PHOSPHORUS COMPOUNDS
4. ALKYL RADICALS

(for ethylhexyl)

The second term was already derived from dibenzyl disulfide, the third will be added automatically to TCP.

Hidden Indications :

LABELLED COMPOUNDS

(enter terminology chart No 20 for TRACER TECHNIQUES to find the more appropriate term LABELLED COMPOUNDS)

ACTIVATION

Superfluous Indications :

REACTORS

TEMPERATURE

Existing Dictionary References :

- | | | |
|-----------------------|-----|------------------------------|
| LUBRICANTS | USE | LUBRICATION |
| DIBENZYL | USE | BENZYL RADICALS |
| - TRICRESYLPHOSPHATES | USE | TCP |
| TCP | USE | CRESYL RADICALS |
| | + | ORGANIC PHOSPHORUS COMPOUNDS |

| Reference Number | | | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher |
|---------------------------|--------------------------|---|---|---|---|---|---|---|---|----------------|-----------------|----|--------------|---------|
| N | S | 2 | 2 | 1 | 0 | 5 | 1 | 2 | A | INDEXING SHEET | | | | |
| | | | | | | | | | | ← Link Number | Total of Terms→ | 14 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ..... |  |  |  |
| 1 | NEUTRONS | | | | | | | | | 18 | ..... |  |  |  |
| 2 | IRRADIATION | | | | | | | | | 19 | ..... |  |  |  |
| 3 | ADDITIVES | | | | | | | | | 20 | ..... |  |  |  |
| 4 | LUBRICANTS | | | | | | | | | 21 | ..... |  |  |  |
| 5 | LABELLED COMPOUNDS | | | | | | | | | 22 | ..... |  |  |  |
| 6 | PREPARATION | | | | | | | | | 23 | ..... |  |  |  |
| 7 | ACTIVATION | | | | | | | | | 24 | ..... |  |  |  |
| 8 | DECOMPOSITION | | | | | | | | | 25 | ..... |  |  |  |
| 9 | HEATING | | | | | | | | | 26 | ..... |  |  |  |
| 10 | DIBENZYL | | | | | | | | | 27 | ..... |  |  |  |
| 11 | ORGANIC SULFUR COMPOUNDS | | | | | | | | | 28 | ..... |  |  |  |
| 12 | TCP | | | | | | | | | 29 | ..... |  |  |  |
| 13 | ZINC COMPLEXES | | | | | | | | | 30 | ..... |  |  |  |
| 14 | ALKYL RADICALS | | | | | | | | | 31 | ..... |  |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  | 32 | ..... |  |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  | 33 | ..... |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | ..... |  |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  | 4 | ..... |  |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  | 5 | ..... |  |  |  |

NS 22

10512 NEUTRON-IRRADIATION OF LUBRICANT ADDITIVES AND THEIR APPLICATION AS A TRACER. Iwasaki, Masao (Showa Oil Co., Ltd., Kanagawa, Japan); Yamaki, Naomi. Junkatsu, 12: 207-12(1967). (In Japanese).

A

The preparation of radioactive lubricant additives by irradiation in a nuclear reactor is described. To investigate the possible decomposition of the additives during irradiation, 3 additives were heated at 150°C, the approximate temperature in the reactor. Changes in ir spectra and decreases in weight showed that dibenzyl disulfide (DBDS) and tricresyl phosphate (TCP) were not changed but Zn ethylhexyl dithiophosphate (ZEHDTF) was decomposed. Three additives were activated by neutron irradiation in a reactor. From the results even ZEHDTF was considered suitable for activation. After this preliminary feasibility study, the 3 additives were irradiated under a neutron flux of 2×10^{12} n/cm² sec for 107 hr. DBDS was used as a tracer since it was easily purified by recrystallization. TCP could not be purified chromatographically and the degree of degradation could not be determined. ZEHDTF had decomposed and could not be used. It was evident that additive changes observed in this irradiation were probably enhanced by the more severe conditions than those in the preliminary irradiation. Using DBDS-³⁵S as a tracer, the thickness of surface coating formed on a copper surface in 0.1 to 0.5% liquid paraffin solution at 80 to 210°C was measured. The thickness of the surface coating increased with longer immersion time, higher solution temperature, or higher additive concentration. The temperature at which a film began to be detected was higher at lower additive concentrations. Identification by x-ray diffraction and elemental analysis indicated that the surface coating consisted of Cu₂S. Some additives were multilabeled by neutron irradiation. In some cases, the nuclides can be distinguished by the difference of the penetrating power of radiation. The multilabeled additives can be used for tracing 2 or more elements simultaneously. (BBB)

B

A

To avoid noise in retrieval the abstract has to be split into parts for preparation and application of the tracers. The last part of the abstract refers again to preparation (link-number A) but does not add index terms.

Superfluous Indications :
USES (for "Applications"; concept is covered by TRACER TECHNIQUES)

- LIQUIDS
- SOLUTIONS
- X RADIATION
- DIFFRACTION
- CHEMICAL ANALYSIS
- TEMPERATURE
- TIME
- CONCENTRATION

(cannot at all be used according to the reference USE ENRICHMENT)

| Reference Number | | | | | | | | | | EURATOM - CID | | | Indexer Code | Puncher |
|---------------------------|--------------------------|---|---|---|---|---|---|---|---|----------------|-----------------|----|--------------|---------|
| N | S | 2 | 2 | 1 | 0 | 5 | 1 | 2 | B | INDEXING SHEET | | | | |
| | | | | | | | | | | ← Link Number | Total of Terms→ | 13 | 52 | |
| Most Specific Index Terms | | | | | | | | | | 17 | ..... |  |  |  |
| 1 | TRACER TECHNIQUES | | | | | | | | | 18 | ..... |  |  |  |
| 2 | LUBRICANTS | | | | | | | | | 19 | ..... |  |  |  |
| 3 | ADDITIVES | | | | | | | | | 20 | ..... |  |  |  |
| 4 | DIBENZYL | | | | | | | | | 21 | ..... |  |  |  |
| 5 | ORGANIC SULFUR COMPOUNDS | | | | | | | | | 22 | ..... |  |  |  |
| 6 | SULFUR 35 | | | | | | | | | 23 | ..... |  |  |  |
| 7 | COPPER | | | | | | | | | 24 | ..... |  |  |  |
| 8 | SURFACES | | | | | | | | | 25 | ..... |  |  |  |
| 9 | COATING | | | | | | | | | 26 | ..... |  |  |  |
| 10 | THICKNESS | | | | | | | | | 27 | ..... |  |  |  |
| 11 | PARAFFIN | | | | | | | | | 28 | ..... |  |  |  |
| 12 | MEASUREMENT | | | | | | | | | 29 | ..... |  |  |  |
| 13 | COPPER SULFIDES | | | | | | | | | 30 | ..... |  |  |  |
| 14 | ..... |  |  |  |  |  |  |  |  | 31 | ..... |  |  |  |
| 15 | ..... |  |  |  |  |  |  |  |  | 32 | ..... |  |  |  |
| 16 | ..... |  |  |  |  |  |  |  |  | 33 | ..... |  |  |  |
| Proposed New Terms | | | | | | | | | | 3 | ..... |  |  |  |
| 1 | ..... |  |  |  |  |  |  |  |  | 4 | ..... |  |  |  |
| 2 | ..... |  |  |  |  |  |  |  |  | 5 | ..... |  |  |  |

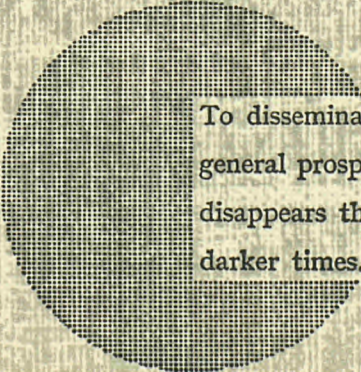
NOTICE TO THE READER

All Euratom reports are announced, as and when they are issued, in the monthly periodical **EURATOM INFORMATION**, edited by the Centre for Information and Documentation (CID). For subscription (1 year : US\$ 15, £ 6.5) or free specimen copies please write to :

Handelsblatt GmbH
"Euratom Information"
Postfach 1102
D-4 Düsseldorf (Germany)

or

Centrale de vente des publications
des Communautés européennes
37, rue Glesener
Luxembourg



To disseminate knowledge is to disseminate prosperity — I mean general prosperity and not individual riches — and with prosperity disappears the greater part of the evil which is our heritage from darker times.

Alfred Nobel

SALES OFFICES

All Euratom reports are on sale at the offices listed below, at the prices given on the back of the front cover (when ordering, specify clearly the EUR number and the title of the report, which are shown on the front cover).

CENTRALE DE VENTE DES PUBLICATIONS DES COMMUNAUTES EUROPEENNES

37, rue Glesener, Luxembourg (Compte chèque postal N° 191-90)

BELGIQUE — BELGIE

MONITEUR BELGE
40-42, rue de Louvain - Bruxelles
BELGISCH STAATSBAD
Leuvenseweg 40-42 - Brussel

LUXEMBOURG

CENTRALE DE VENTE
DES PUBLICATIONS DES
COMMUNAUTES EUROPEENNES
37, rue Glesener - Luxembourg

DEUTSCHLAND

BUNDESANZEIGER
Postfach - Köln 1

NEDERLAND

STAATSDRUKKERIJ
Christoffel Plantijnstraat - Den Haag

FRANCE

SERVICE DE VENTE EN FRANCE
DES PUBLICATIONS DES
COMMUNAUTES EUROPEENNES
26, rue Desaix - Paris 15°

ITALIA

LIBRERIA DELLO STATO
Piazza G. Verdi, 10 - Roma

UNITED KINGDOM

H. M. STATIONERY OFFICE
P.O. Box 569 - London S.E.1

EURATOM — C.I.D.
29, rue Aldringer
Luxembourg

CDNA04500ENC