

ORNL
OAK RIDGE NATIONAL LABORATORY
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UNION CARBIDE CORPORATION
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U. S. ATOMIC ENERGY COMMISSION



ORNL - TM - 295 *gcf*

COPY NO. - *1007*

DATE - July 30, 1962

OPERATION OF RESEARCH MATERIALS INFORMATION CENTER

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ABSTRACT

This report very briefly describes the purpose and operation of the ORNL Solid State Division's Research Materials Information Center, which will provide information on the methods of production, availability, need for, and characterization of high-purity solid-state research materials to both producers and users. Details of system automation and analysis for coding are not included.

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OPERATION OF RESEARCH MATERIALS INFORMATION CENTER

INTRODUCTION

Purpose

The purpose of the ORNL Solid State Division's Information Center is to provide information on methods of production, availability, need for, and characterization of high-purity solid-state research materials to both producers and users. This operation will involve two related but separable functions: (1) handling "availability" and "materials required" information, and (2) handling scientific reports containing background information on methods and results of assay and characterization, uses, and other significant new developments. These functions will be discussed separately.

Scope

Materials covered will be all high-purity solid-state research materials (e.g., metals, alloys, semiconductors, compounds, elements, solid-solution systems, laser and maser materials, and refractories). The only restriction is that they be research materials — as distinct, for example, from structural materials. Radioactive and stable isotopes (covered by the ORNL Isotopes Information Center) will not be included, although there will be some unavoidable overlap: pure charge materials for isotope-separation processes will be within the purview of the RMIC, as will be certain isotopically enriched pure materials. Material will be characterized according to all physical properties of interest (electrical, magnetic, thermophysical, etc.). An example of the difficulty of setting boundaries, of exactly defining the scope of the Center, is presented by the field of radiation effects. Some parts of this field will have to be included: radiation is used to probe the structure of many materials — to provide structural information

not otherwise available. Irradiation is also a method of chemical analysis (neutron activation) and of producing isotopically enriched materials. It might be argued that it would be desirable to accept the loss of some peripheral information in order to set an arbitrary boundary — to say, perhaps, that radiation effects will be included only when they are involved in the characterization or production of an ultrapure material. Such a boundary, however, is not quite as definite as it sounds: an important characteristic of a material might be how it stands up under irradiation, or an unforeseen future use of some material might be conditional upon its radiation response. Under these circumstances the limit of coverage must be defined by the list of materials itself; radiation effects on high-purity research materials becomes a necessary part of the collection. Again, the boundary line is at structural materials, which are dealt with by, among others, the Defense Materials Information Center of Battelle Memorial Institute.

Evaluation of Material

Research personnel, active in their fields, will be depended on for reference and evaluation of reports and papers. A list of reviewers, composed of individuals active in the research-materials field, is being prepared, and individuals selected from the group will be requested to evaluate preprints, papers, and data on available materials and to make recommendations concerning their inclusion in an automated information system. In view of the scientific information problem, this evaluation is a logical and necessary extension of the traditional journal-article reviewing system, an extension based on recognition of the fact that no scientific information system can be effective if the scientist disdains a part in it.

HANDLING "AVAILABILITY" AND "MATERIALS REQUIRED" INFORMATION

A data sheet (see Fig. 1) is being used for the listing of materials, noted as produced or requested. Copies of the sheet were sent out (the second week in July) with form letters announcing the establishment of the Center to about 400 commercial industries,

research laboratories, universities, government agencies, and other organizations. The response so far has been gratifying: expressions of willingness to cooperate, requests for from ten to a thousand data sheets, and requests for further information on (1)

Element Compound Alloy	RESEARCH MATERIALS INFORMATION CENTER Solid State Division Oak Ridge National Laboratory P. O. Box X, Oak Ridge, Tennessee	Metal Semiconductor Insulator
Material Form (single crystal, whisker, rod, etc.) Dimensions Orientation	Assay _____ % Impurity _____ ppm (dopant or isotopic enrichment)	
Starting Material (and purity)		
Method of Production (reference pertinent report or paper where possible)		
Method of Final Analysis		
Research Interest or Applications		
Special Characteristics (include handling precautions)		
Availability for External Distribution		
Name of Producer		
Installation	Source of Project Support	
Address		
TX-3309 (6-52)		

Fig. 1 Research Materials Data Sheet.

what is expected from participants in the program, (2) what participants can expect from the program, and (3) details of operation of the program.

This brief report is in answer to these requests.

Data Sheets and Reprints

We hope, first, that participants will accept the task of filling out the data sheets (for either produced or desired materials) as completely as possible, even if this involves a delay in response. Where the sheets cannot be filled out, the information will be welcome in any other form. References to pertinent reports or papers are urgently needed, whether they deal with methods of production, assay, tests of use, or evaluations obtained from studies of special physical characteristics. Reprints of such papers would be preferred (their analysis and coding by the RMIC will be discussed in the section on background material), but if they are unavailable the references will suffice.

Exchange of Information

Those desiring materials with special physical or chemical characteristics should of course describe their needs as fully as possible, with particular emphasis on the specific inadequacies of available

materials. This information will be transmitted to those groups in a position to produce the materials as a guide to the developing needs of their potential users. Person-to-person exchanges or loans of materials will be facilitated through the simple device of tabbed "inverted" files – one for requesters and their requirements and one for materials, their characteristics, and their producers. These files are now being prepared. Every material brought to the attention of the Center as being produced (commercially or in the course of research) or needed will be assigned a card (see Fig. 2). This card will be inserted in a visible file and the bottom (or visible) portion marked with a colored strip bearing the name of the requester for a special form of the material. Any time an improved or changed material (with its source) is added to a card so tabbed, the information will be checked against the tabbed name or names in the file of requests. If the added material fits the specifications noted in the request file, the requester will be notified of the source. No purchases, loans, or exchanges will be arranged by the Center.

Data sheets will be organized, indexed, and stored on 100-ft. reels of coded 16-mm microfilm. They will be retrievable through a microfilm viewer-printout combination in answer to specific requests or for inclusion in periodic bulletins.

HANDLING BACKGROUND MATERIAL

(Methods of production, methods and results of assay and characterization, significant new uses or developments)

Input

The background or peripheral material will be taken from several sources, the most important of which are expected to be (1) references and reprints provided with the data sheets and (2) references from program participants which concern significant new developments that come to their attention in their own fields (here again reviewers of papers from other sources can be of assistance). Literature searches will be continued routinely by the Center and special searches are being arranged through the cooperation of the AEC Division of Technical Information Extension at Oak Ridge; ORNL prepublication abstracts are being examined. All such material will be evaluated – sometimes merely by considering its source, and, where this is not defin-

itive, by requesting the review described above. When such a review is requested the reviewer will be asked, if in his opinion the work is not sufficiently novel, to inform the Center of work that supersedes it.

Coding and Filming

Evaluated reports will be coded according to a key-term (coordinate-index) system and microfilmed by a special film-encoding camera. They will be retrieved by a code-interpreting viewer-printer by the conventional method of appropriate combinations of assigned numerical equivalents of the key terms.

These terms will be controlled by a thesaurus and limited to items of interest to the program. A tentative list of terms, which is growing, is now at

Source	Purity %	Form	Dimensions	Special Characteristics
<div style="display: flex; justify-content: space-between;"> Al_2O_3 TX-3311 (7-62) </div>				

Fig. 2. Materials-List Visible File Card.

about 400, excluding the names of materials and classes of materials. According to the rate of growth of the list so far and the scope of the Center as now envisioned, the list of terms should not exceed 600. The materials list is now at about 350, and no predictions can be made about its eventual size.

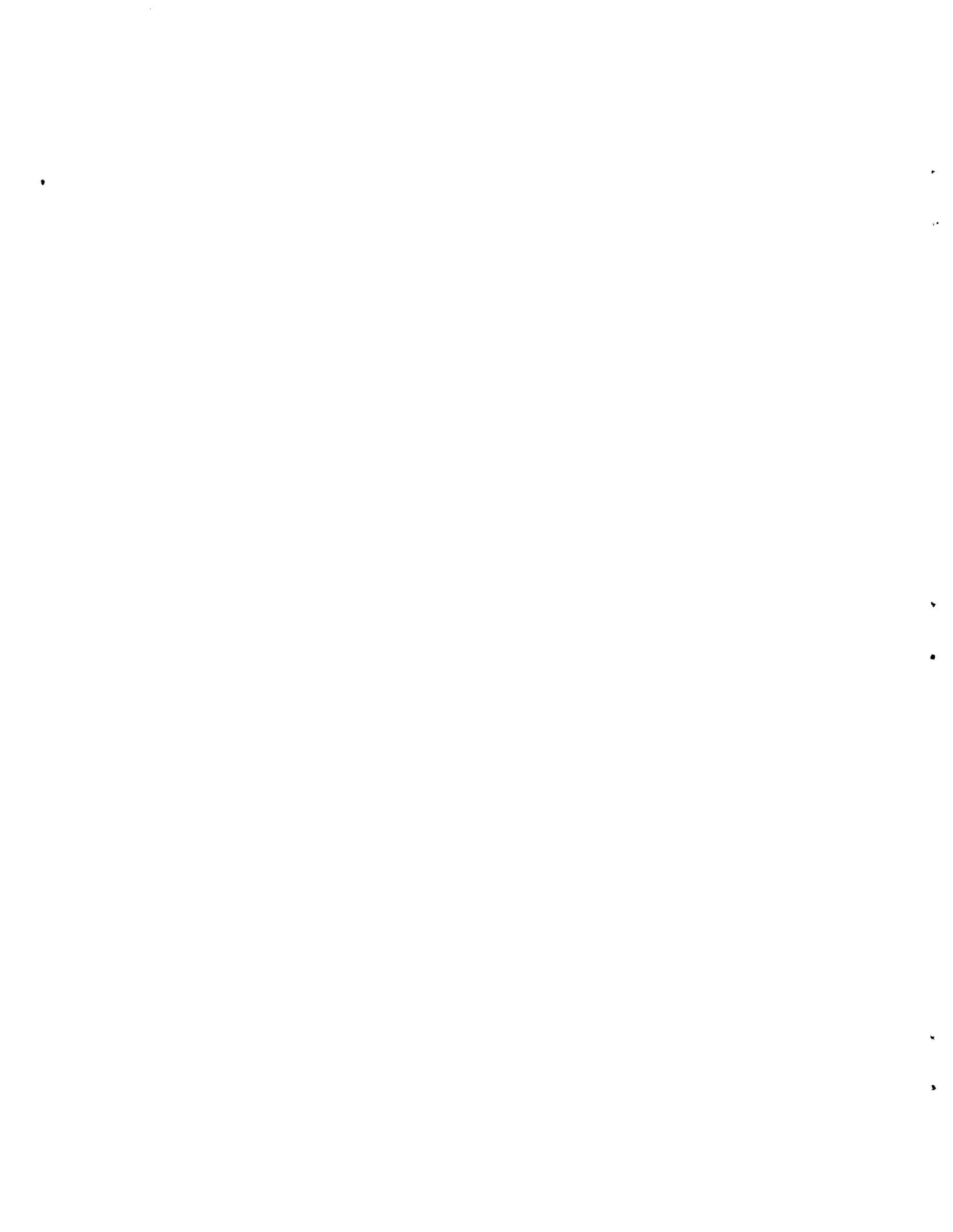
Each paper to be filmed will be analyzed for its key terms, and it is the numerical code equivalent of its set of terms that will appear as coding marks on the film. The film storage and retrieval method may be regarded as a photoelectrically interpreted analog of conventional punched-card systems, with the important difference that repeated sorts of the collection are not necessary to establish a "match" between question and answers. A typical question so answered would be a survey of the latest preparative procedures for a certain material or class of materials. Answers to questions will be in the form of complete reprints, abstracts, or references—reproduced as photoprints by an attachment to the automated film scanner. Review articles (as op-

posed to bulletins) are not planned; however, bibliographies produced by the machine should be good source material for such reviews. When bibliographies are used for this purpose, the user will be asked to provide copies of the review articles for reproduction and dissemination (at cost) to interested program participants.

PRESENT STATUS

The Center is at its second stage, that of collecting and organizing a mass of information from a wide variety of sources. By October of this year it should be possible to begin the feedback process of transmitting "availability" and "materials required" information between producers and users on a routine basis — with some scattered items on production methods.

Collection of documents and references that will form the store of background information for the preparation of surveys and bibliographies has already begun, but this material will not be organized, coded, and microfilmed until Spring of 1963.



Distribution

- 1-2. Central Research Library
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