

Part III Information Research in Natural Science
-Other Types of Resources



1 Research Information Other Than Books or Journals

Materials other than books or journals will give you much information in the fields of natural sciences. The following chapters are dealing with how you get the following unique documents.

- Dissertations
- Technical reports
- Proceedings
- Patents
- Standards

When you look for a certain document, it is important to know which type of material it is. A description like a kind of abbreviated words sometimes suggests you its sort. Ask the library staff when you find difficulties in specifying the material's type.

Document Type	Description in references	e.g.
Dissertations	“Thesis” (pl. “Theses”) “Dissertation” (abbr. “Diss.”)	M.D. Thesis Ph.D. Diss.
Technical reports	A few alphabets and document numbers	ORNL-TM1501
Proceedings	“Proceedings” (abbr. “Proc.”) “Conference” (abbr. “Conf.”) “Symposium” (abbr. “Symp.”)	Proc. 12 th Int. Conf. Cryst. Growth
Patents	“Standard” (abbr. “Pat”) Country code (JP, EP, US etc.) “特許公開” (abbr. “特開”)	US Pat.5,625,035 JP11001729 特開平 10-123456
Standards	“Standard” (abbr. “Stand.”) abbr. “JIS”, “ISO”, “EN”, “ANSI”, “ASTM” etc.	ASTM Stand. D 2487 ISO 9000

2 Dissertations

Both M.D. and Ph.D. theses are types of dissertation. When we use “dissertations” here, it will usually mean a Ph.D. thesis.

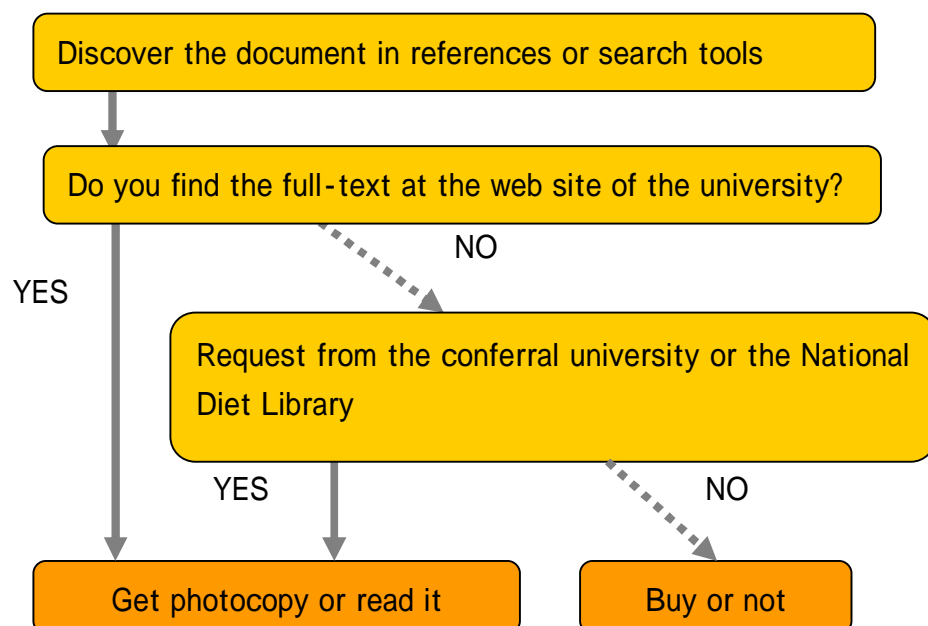
2.1 Features and Outline

(1) Features

Dissertations sometimes give you more detailed information about the theme compared with journal articles and are valuable to refer to. But unlike a journal article, a dissertation is often difficult to get.

(2) How to Get

When you want to read a dissertation, generally you can get it in following way. If you encounter difficulties, ask the library staff.



2.2 Searching for Japanese Dissertations

For example, Japanese dissertations are shown as follows in references. The order of each item differs slightly between references. When you search for a dissertation, you need know its author, the university which conferred it and in what year it was conferred.

沼田雅行. ACNU 感受性 CHO 細胞の DNA 修復欠損. 博士論文. 東北大学, 1993.
Author Title Kind of degree University Year

In Japan, all doctoral dissertations are collected by the National Diet Library. So you can search them by NDL-OPAC. But Master's dissertations are not collected and if you want to read them, you have to ask each university.

- NDL-OPAC National Diet Library (http://opac.ndl.go.jp/index_e.html)
You can retrieve Japanese dissertations after 1974 and some foreign ones mainly in the fields of science and technology.

The screenshot shows the NDL-OPAC search interface in Microsoft Internet Explorer. The browser title is "National Diet Library NDL-OPAC(Search, General Materials(Advanced))". The page content includes a search form titled "Search for General Materials (Advanced)".

Annotations on the screenshot:

- A red circle highlights the search criteria checkboxes, with a callout box pointing to it that says "Select here".
- A red circle highlights the "Publisher" and "Year of Publication" fields, with a callout box pointing to it that says "In case of Japanese author, use Kanji or Kana".

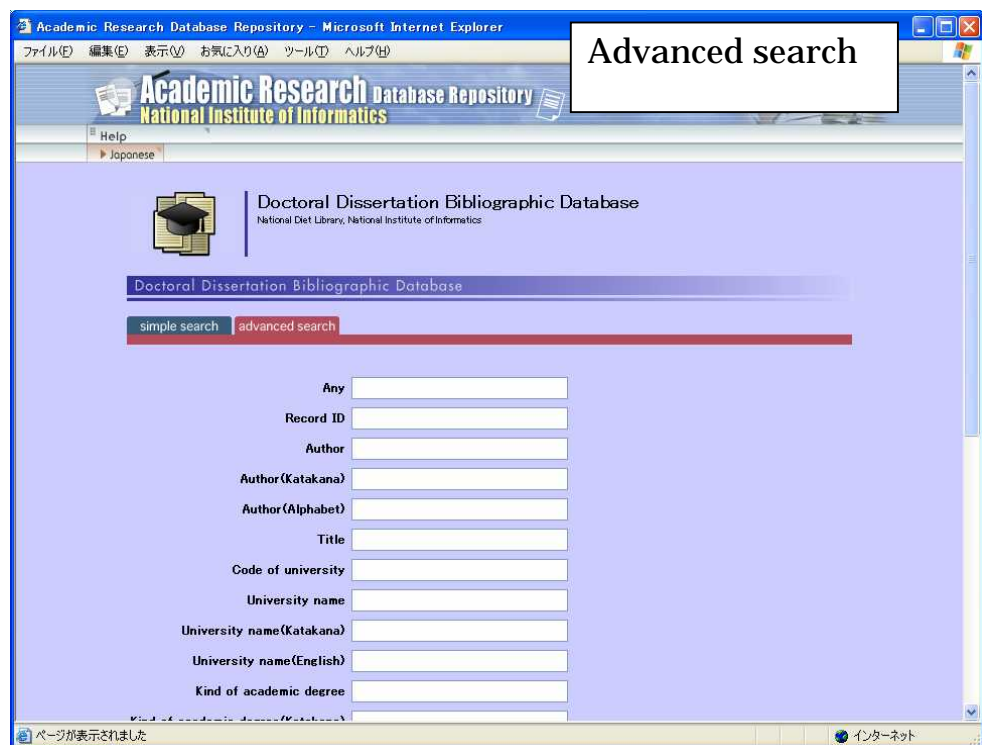
The search form includes the following fields and options:

- Search for General Materials (Advanced)
- Checkboxes: Books (Jpn.), Books (Foreign), Periodicals (Jpn.), Periodicals (Foreign), Electronic Resources, Japanese & Chinese Old Materials, Doctoral Dissertations, Maps, Audiovisual Materials, Ashihara Collection
- Buttons: Detailed Setting, Select a library, All, Clear, Search
- Fields: Title, Author / Editor, Publisher, Year of Publication, Subject Heading, Classification No., Standard Number, Bibliographic No., Call No., Codes, Text Language
- Buttons: Expand, Add Box, Select from List, AND, Clear, Search
- Footer: Sort by Title in Ascending Order Books (Jpn.) comes first / Records per page 20

- Doctoral Dissertation Bibliographic Database (Academic Research Database Repository)

National Institute of Informatics (<http://dbr.nii.ac.jp/>)

This covers Japanese dissertations after 1960 and some foreign ones (mainly in the fields of science and technology).



When you need or search Japanese dissertations before 1960, please ask the library staff.

Recently many universities are making their conferring dissertations available on the website in bibliographic information or abstracts or full-text.

- TOUR (Tohoku University Repository) Tohoku University
(<http://ir.library.tohoku.ac.jp/re/?locale=en>)
- 内容の要旨および審査の結果要旨(Dissertation abstracts of Tohoku University)
Tohoku University 1958- : Main library et al.

2.3 Searching for Foreign Dissertations

For example, foreign dissertations are shown as follows in references. As with Japanese ones, you need to know its author, university and year of conferral to locate a foreign dissertation.

McCall, C.R. Selective dissolution Ph.D. thesis. Arizona St. Univ., 2002.

Author **Title** **Kind of degree** **University** **Year**

Degree	Description
Master	“M.D. Thesis (Theses)” (M.D. ; abbr. “Master’s Degree”) “Master’s Thesis (Theses)”
Doctor	“Ph.D. Thesis (Theses)” (Ph.D. ; abbr. “Doctor of Philosophy”) “Doctoral Thesis (Theses)” “Dissertation (Diss.)” “Ph.D. Dissertation” “Doctoral Dissertation”

To search dissertations from America, you can search from the earliest year using ProQuest database services.

- Yushodo Dissertation Service Center 1990-2004
 (<http://www.dissertation-yushodo.jp/>)
 Yushodo is an agency of ProQuest in Japan and you can buy a dissertation from the earliest year at this store, though you can retrieve dissertations only from 1990 to 2004 online.

- Dissertation express
 ProQuest 1861- (<http://www.lib.umi.com/dxweb/>)
 You can search with title and author. Search results are shown up to 40 hits.

- Dissertation Abstracts International. Section B. The Sciences and Engineering

ProQuest 1938- : Main library

The abstracts are divided into subject categories. Section B is natural science and Section C contains dissertations in Europe.

- American Doctoral Dissertations
ProQuest 1976-1998 : Main library
- Comprehensive Dissertation Index
ProQuest 1861- : Main library

British dissertations are searchable online in the British Library Integrated Catalogue.

- British Library Integrated Catalogue
British Library (<http://catalogue.bl.uk/>)
Dissertations can be retrieved as a book. When you limit to dissertation, open the "Advanced Search" display and enter a phrase "thesis or theses or dissertation?" in the "Any word" box. Then enter your search terms in the box specified. You can order a photocopy..

To search for Asian dissertations, the following website is useful and you had better see each university's website.

- AsiaLinks
National Diet Library
(<http://www.ndl.go.jp/jp/service/kansai/asia/link/theme/dissertation/index.html>)
- Networked Digital Library of Theses and Dissertations(NDLTD)
(<http://www.ndltd.org/index.en.html>)
This is a project to digitalize dissertations around the world. About 80 institutions have joined this program. Some dissertations are available online in full-text.
- Foreign Doctoral Dissertations
Center for Research Libraries

(<http://www.crl.edu/content.asp?l1=5&l2=23&l3=44&l4=25>)

Dissertations collected by Center for Research Libraries but only from America and Canada can be retrieved by this.

The National Diet Library holds many foreign dissertations mainly in the fields of science and technology.

- NDL-OPAC

National Diet Library (http://opac.ndl.go.jp/index_e.html)

You had better check not only “Doctoral Dissertations” but also “Books (Foreign)”. Some early dissertations cannot be retrieved on this OPAC and please ask at the counter.

2.4 How to Get

All works have copyright. When you request a photocopy of dissertation, you could be required permission of author to reproduce all of the document.

(1) Dissertations of Tohoku University

Both of master's and doctoral dissertations are in charge of each faculty and sometimes restricted using. Please ask the library staff.

(2) Other Japanese Dissertations

A procedure in requesting dissertations varies with the university. If it is forbidden to reproduce the dissertation, you can request it from the National Diet Library.

(3) Foreign Dissertations held in Japan

You can request a photocopy of foreign dissertation the same as books if another university in Japan or the National Diet Library is holding it.

(4) Foreign Dissertations not held in Japan

Dissertations in England are available from the British Library. To read ones from other countries, you may buy the photocopy from the store dealing in dissertations. The costs are variable and stores dealing in dissertations are as follows.

- Yushodo (<http://www.dissertation-yushodo.jp/>)
- SUNMEDIA (<http://www.sunmedia.co.jp/modules/>)

If you could not get the dissertation you want in the above way, you can try to search articles written on the same theme by the same author in place of it.

3 Technical Reports

A technical report is sometimes called progress report, research report, or paper and so on. Because their content and publishing are variable and irregular in many cases, they are difficult to get sometimes.

3.1 Features and Outline

(1) Features

A lot of technical reports are published by governments, academic institutions, academic associations and companies making the fruits of their research public.

Generally, technical reports share the following features:

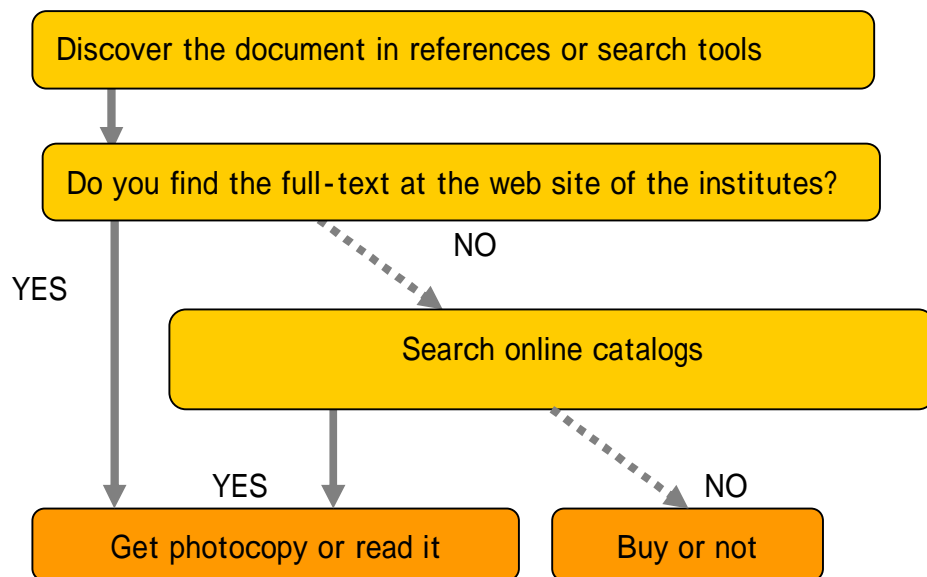
- Each report has its own number. (Sometimes plural numbers)
- Many of them are published irregularly.
- In many cases, one volume consists of one article.
- They can inform people of a new discovery promptly.
- Many of them are lengthy and describe their findings in much detail.
- Many of them are handed out only for the researcher's colleagues or related institutions.
- Because many of them are not peer-reviewed, some are very important and others are not.

Whether a paper which you locate has its own number could help you to find it a technical report or not. Usually the number consists of a few letters (which suggest who published) and some numerals (which are given in order of publication).

(2) How to Get

In recent years, as more reports are available in full-text on the website of the institutions free of charge, you had better look for them there first. If you cannot find them there, you should confirm the its bibliographical details again and consult the library online catalog.

The basic steps to obtain technical reports are as follows. If you encounter difficulties, please ask the library staff.



When you look for a technical report, you have to see its report number to confirm which institution published it. Sometimes a search engine may help your search.

Dunigan, T. PVM and IP multicast. ORNL/TM-13030, 1996

Author	Title	Report number	Year
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In the case above, the report number is "ORNL/TM-13030". Using search tools(see Part III 3.3), you can find that the report is published by Oak Ridge National Laboratory (ORNL) and is a kind of "Technical Memo". Then you can get the full-text of this report free on the web site of ORNL.

3.2 Searching for Japanese Technical Reports

In Japan, many kinds of reports are published by the government and academic organization. Most of them are not put on the market and are usually distributed among a few researchers, so it is difficult for general researchers to obtain them.

As for Japan, not many institutions make their reports available on the website in full-text, so you should search for databases to find the report you need and search by online catalog to find which library has it. (See Part III 3.5)

Well-known tools which can search Japanese technical reports are as follows:

- JDreamII
Japan Science and Technology Agency (JST) (<http://pr.jst.go.jp/jdream2/>)

- Directory of Japanese Scientific Periodicals (Japanese only)
National Diet Library
(http://refsys.ndl.go.jp/E001_EP01.nsf/Public?OpenFrameset)
Bibliographies are not included, however you can browse by subjects which journals or reports are published in Japan.

- KAKEN : Database of Grants-in-Aid for Scientific Research
National Institute of Informatics
(<http://seika.nii.ac.jp/>)
Research fruits attained with the grants from the government can be retrieved and their abstracts are available.

The following table shows well-known technical reports in Japan. Some of them are available online.

Symbol	Institution	Type of report	Website
JAEA (JAERI)	Japan Atomic Energy Agency	Tech, Research, Conf, Data/Code, Review	<ul style="list-style-type: none"> ■ JAEA Research Results (2005-) (1998-2004:Japanese site only.) (http://jolissrch-inter.tokai-sc.jaea.go.jp/common/eindex.html)
KEK	High Energy Accelerator Research Organization	Progress Report, Proceedings, Report, Preprint	<ul style="list-style-type: none"> ■ KEK Publication List (1971-) (http://www-lib.kek.jp/lists/publistall-e.html)
KURRI	Kyoto University Research Reactor Institute	KR, TR	<ul style="list-style-type: none"> ■ KURRI Publications (List only) (http://www.rrri.kyoto-u.ac.jp/en/PUB/index.html)
NAL	Japan Aerospace Exploration Agency	TR, TM, SP, N	<ul style="list-style-type: none"> ■ Search Engine for NAL Database (http://send.nal.go.jp/send/eng/index.php3)
NIFS	National Institute for Fusion Science	Series, Proc, Tech, Data, Memo	<ul style="list-style-type: none"> ■ NIFS Research Report (1989-) (http://www.nifs.ac.jp/report/)
信学技報	The institute of Electronics, Information and Communication Engineering	66 subjects (http://www.ieice.org/jpn/kenzenmon1.html)	<ul style="list-style-type: none"> ■ Database (1988-) (Abstracts only) (http://db.ieice.org/gakkai/) ■ GeNii (1993-) (Abstracts only) (http://ge.nii.ac.jp/genii/jsp/index-e.jsp)

3.3 Searching for American Technical Reports

In America, there is an organization aiming to collect and distribute these reports. Especially for reports which the government supports, you are offered a more systematical way to obtain these reports than in Japan.

The following table shows well-known technical reports.

Kind of report	Contents
AD report	Reports by Department of Defense (DOD). AD is an abbreviation of ASTIA (Armed Services Technical Information Agency) Document.
DOE report	Reports by Department of Energy (DOE). The organization' s name changes, AEC ERDA DOE.
NASA report	Reports by National Aeronautics and Space Administration (NASA). The organization' s name changes, NACA NAA NASA.
PB report	Reports by the government except DOD, DOE, NASA. National Technical Information Service (NTIS) collects and distributes.

Report numbers are given by the publisher, by the institute that is charged with the research work and by the collecting organization, so one report sometimes has plural numbers.

As many more reports are available online recently, try to search websites and don't give up easily!

(1) Cross Search Tools

NTIS distributes copies of AD, DOE and NASA reports besides PB reports. You can retrieve them exhaustively with the following tools.

- NTIS Search 1964-

(<http://www.ntis.gov/search/index.aspx>)

A report in the search result is available at some cost, which you might see in full-text free on its making institute's website.

- Government Reports Announcements & Index 1979-1996 : Engineering Library

Abstracts are available and you can see the report numbers which could help you to search with other tools.

There are other websites with which you can cross-search.

- GrayLIT Network : A Science Portal of Technical Reports

WorldWideScience.org (developed by the U.S. Department of Energy's Office of Scientific and Technical Information)

(<http://www.science.gov/>)

Technical reports by the U.S. government are available to search, and some of them are available in full-text.

(2) Cross Search tools in each discipline

If you cannot find the reports you want using the above tools, you might find them using the following tools. And sometimes you can get more detailed information or get the full-text itself.

- Public STINET (Scientific & Technical Information Network)

Defense Technical Information Center (DTIC) 1965 -

(<http://stinet.dtic.mil/>)

You can find the reports not only in defense research but also in the basic sciences. Some of them are available in full-text.

- Energy Citations Database
The U.S. Department of Energy's Office of Scientific and Technical Information(OSTI) 1948- (<http://www.osti.gov/energycitations/>)
- NTRS : NASA Technical Reports Server
NASA (<http://ntrs.nasa.gov/>)
- INIS Database
International Atomic Energy Agency
(<http://inisdb.iaea.org/inis/php/index.php>)
The INIS database includes not only reports made in America but also reports made in other countries.

There are bibliographic databases by which you can search for technical reports besides journal articles.(See Part II 4)

- SciFinder Scholar
- Biological Abstracts/ RRM
- INSPEC

Recently you can get the reports on the websites of each institution.

- The Virtual Technical Reports Center
University of Maryland library
(<http://www.lib.umd.edu/ENGIN/TechReports/Virtual-TechReports.html>)
This provides links to institutions who make up their technical reports.

If you cannot obtain the reports on the websites, you should search the library catalogs.

3.4 Searching for Other Country's Technical Reports

A meeting paper is an important resource for researchers, too. This is a document which consists of one article and is made up before a meeting. Because a meeting paper is published earlier than proceedings which take some time or are never published, this is useful particularly as detailed technical information. Each paper has its own report number, too. This is available on its society's web site, but usually it costs something to get a full-text version.

Symbol	Publisher	Tools
AIAA	American Institute of Aeronautics and Astronautics	<ul style="list-style-type: none"> ■ AIAA paper 1966- : Engineering library ■ Electronic Library 1963- (http://www.aiaa.org/content.cfm?pageid=413&reseta=1&versionid=533)
ASME	American Society of Mechanical Engineers	<ul style="list-style-type: none"> ■ ASME digital store 2002- (http://store.asme.org/search_cp.asp) Use “Advanced Search-Conference Papers”
SAE	Society of Automotive Engineers	<ul style="list-style-type: none"> ■ Advanced Search about 1906- (http://www.sae.org/jsp/jsps/advancesearch.jsp) Search by “Paper”
SME	Society of Manufacturing Engineers	<ul style="list-style-type: none"> ■ Online Store (http://www.sme.org/cgi-bin/storehtml.pl/)

In Japan, the Tokyo Institute of Technology, National Diet Library and Japan Science and Technology Agency (JST) have a lot of meeting papers. The Tokyo Institute of Technology provides an online catalog for them.

- Tokyo Institute of Technology Digital Library Journal Thesis Search
(http://tdl.libra.titech.ac.jp/z3950/journal/maindsp_e.html)
Meeting papers collected by the institute, for example AIAA, ASME, SAE SME and so on, can be searched.

3.5 How to Get

Technical reports which are available online free are now available in increasing numbers, and some unavailable ones can be searched with online catalogs served by the university libraries, National Diet Library or some technical institutes.

When you use the library online catalogs, you should search with the report name. If you find it held in some libraries, you can borrow it or get a photocopy.(See Part I 2)

- Online Catalog

Tohoku University Library

(http://www.library.tohoku.ac.jp/opac/expert_query_e?mode=2&key=)

You also can search the collections of other university libraries in Japan with Advanced Search.(See Part II 2.4)

The National Diet Library holds a lot of foreign technical reports, especially those which NTIS are distributing. If you cannot find which institution in Japan holds the report you want, please ask the library staff.

- NDL-OPAC

National Diet Library (http://opac.ndl.go.jp/index_e.html)

- JST 資料所蔵目録 Web 検索

Japanese Science and Technology Agency (<http://opac.jst.go.jp/>)

You can purchase American technical reports not held in Japan for about 10,000-30,000 yen.

- NTIS shop list

G-Search (http://database.g-search.or.jp/service/ntis/reseller_list.html)

Because some works published in technical reports have appeared in journals too, it may be useful to search journal articles by author or theme.

4 Proceedings

Proceedings are records and collected articles published after a certain academic conference (symposium, workshop, meeting, congress) held by research groups or societies. Especially in the fields of natural sciences, proceedings are valuable resources because they are prompt reports of each theme, and are often cited by journal articles. An academic conference brings various materials, programs, abstracts, proceedings and so on. In such kinds of materials, here we will mention a proceeding.

4.1 Features and Outline

(1) Features

Because proceedings are published in various ways, it is difficult to obtain. Proceedings have the following shared features:

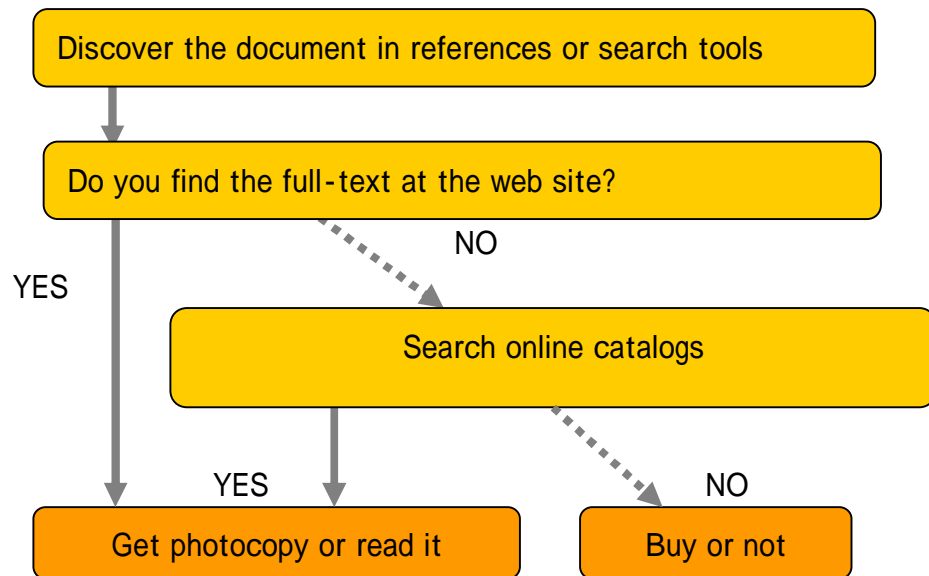
- Ordinarily proceedings take about a year to be published, but they may be a quicker way of announcing research findings than journal publication.
- In many cases, they are published without peer-reviewing.
- They are not only distributed to the researcher's colleagues and other people concerned.
- They are published not only as a book but also as a special issue or supplement of a journal, especially in the case of international one.

(2) How to Get

To search proceedings, you need to retrieve both the book database and article database. You may enter the conference name in the search box, then you should consider its form, abbreviated or not, "2nd" or "second" and so on, which is not necessarily the same form between each reference list.

If you cannot find what you are looking for using the general tools, you had better to use search engine. If you get some information about the meeting on the author's homepage or researcher's web site who cited from it, with this you can try to search the databases again.

The basic steps to obtain technical reports are as follows. If you encounter difficulties, please ask the library staff.



4.2 Searching for Japanese Proceedings

Japanese academic conferences are held mainly by the academic societies. These proceedings are named “Ronbun-syu(論 文 集)”, “Gaiyo-syu(概要集)”, “Yoko-syu(予稿集)”, “Kogai-syu(梗概集)”, “Yoshi-syu(要旨集)” and so on, which are distributed or sold to the people who attend the meeting.

Japanese proceedings are described in reference as follows. “Year” sometimes means year of publication.

e.g. 島田良幸. 平成 13 年度秋季大会粉体粉末冶金協会講演概要集, 1-11B, (2001)

Author	Conference name	Presentation No.	Year
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(1) Library catalog

When you search a proceeding, you should enter its academic society name and proceeding name for example “予稿集” in the search box of online catalog, at first. And it is better not to use “year” or number of held times (e.g. “第 2 回”, “平成 14 年度”) because these are described variously. And you have to search it both as a book and as a journal. In the above example, you should use “粉体粉末冶金協会” as a society name and “概要集” as a proceeding name.

Japanese proceedings are collected not only by the university libraries but also by National Diet Library or Japanese Science and Technology Agency (JST).

■ Online Catalog

Tohoku University Library

(http://www.library.tohoku.ac.jp/opac/expert_query_e?mode=1)

You can retrieve materials collected by other university libraries in “Advanced Search”.

■ NDL-OPAC

National Diet Library (http://opac.ndl.go.jp/index_e.html)

■ JST 資料所蔵目録 Web 検索

Japanese Science and Technology Agency (JST) (<http://opac.jst.go.jp/>)

(2) Search Tools for Proceedings

A few academic societies open their proceedings free on their websites. The following databases provide a search option to retrieve by author and article title.

- J-STAGE

Japanese Science and Technology Agency (JST)
(<http://www.jstage.jst.go.jp/browse/>)

- CiNii

National Institute of Informatics
(<http://ci.nii.ac.jp/en?TZ=20071028205018399>)

Medical societies display serving their conference information on the following site.

- IMIC 学会情報システム

International Medical Information Center
(<http://www3.imic.or.jp/gakkai/gakkai.htm>)

The following is not a tool specifically for proceedings, but you can retrieve articles included proceedings.

- NDL-OPAC Search for Japanese Periodicals Index

National Diet Library
(http://opac.ndl.go.jp/index_e.html)

(3) Web site of the academic societies

You may get information about the meeting on its sponsor's web site. This is a link site to the academic societies. A program and a date of the meeting are announced there.

- Academic Society Home Village

National Institute of Informatics (<http://wwwsoc.nii.ac.jp/index-e.html>)

4.3 Searching for Foreign Proceedings

Especially in the fields of natural sciences, academic research is going international and many conferences are held around the world every year.

Proceedings are described as follows in references. In the case of proceedings, the place and year of the meeting are shown, sometimes abbreviated.

e.g. L. Brey, Quantum Hall Effect ..., Proc. 25th Int. Conf. Phys. Semicond.,
Author Article title Proceedings title
Osaka, Japan, 2000, 29 (2001)
Place and year Page Published year

When the conference are sponsored by academic societies, they sometimes make up the meeting papers in advance. See Part III 3.4

(1) Library catalog

You can search for a proceeding using a library online catalog. Here are some tools to search for proceedings.

- Online Catalog

Tohoku University Library

(http://www.library.tohoku.ac.jp/opac/expert_query_e?mode=1)

Some proceedings are stored by the title of special issue of the journal. You can also retrieve materials collected by other university libraries with the “Advanced Search”.

- NDL-OPAC

National Diet Library (http://opac.ndl.go.jp/index_e.html)

This institute holds a lot of international proceedings in the fields of science and technology. If you want to find an international one held in Japan, we advise you to retrieve it as a book.

- 科学技術関係欧文会議録目録

National Diet Library 1948-1996 : Main library, Engineering library et al.

You can browse the list of proceedings collected by the institute.

- JST 資料所蔵目録 Web 検索
Japanese Science and Technology Agency (JST)
(<http://opac.jst.go.jp/>)

- British Library Integrated Catalogue
British Library (<http://catalogue.bl.uk/>)
This library has a huge collection of proceedings.

- Tokyo Institute of Technology Digital Library Journal Thesis Search
(http://tdl.libra.titech.ac.jp/z3950/journal/maindsp_e.html)
This institute has many engineering proceedings series (e.g. Proceedings of SPIE), and some of them can be retrieved by an article title.

(2) Search tools for proceedings

There are a few tools to search for proceedings only.

- Directory of Published Proceedings. Ser.SEMT
InterDok (<http://interdok.com/>)
This is publishing information database covering the area of Science, Engineering, Medicine and Technology (SEMT). Generally this is called “InterDok”

- AIAA meeting papers
American Institute of Aeronautics and Astronautics (AIAA) 1963-
(<http://www.aiaa.org/content.cfm?pageid=413&reseta=1&versionid=533>)
This serves a search tool for books, journal articles and meeting papers covering the fields of aeronautics and astronautics. Recently few years’ of meeting papers are available in full-text.

- Lecture Notes in Computer Science
Springer Verlag 1973-
(<http://www.springer.com/east/home/computer/Incs?SGWID=5-164-0-0-0>)
This consists of mainly proceedings and all documents are available in full-text.

- Index to Scientific & Technical Proceedings (ISTP)

ISI 1978-1990 : Main library 1987-1992 : Medical library

This is a monthly index of proceedings in the fields of science and technology. It is also published in a cumulative edition once a year. You can retrieve proceedings by conference name, author and title.

(3) Other search tools

There are bibliographic databases including articles in proceedings besides in journals (See Part II 4).

If you can not find your target in the databases because it is too old or you can not use the database services for some reason, you should try to consult the abstracts index in print edition which is the original of each database service.

- SciFinder Scholar (See Part II 4.2)

This database service covers a field of chemistry. This original print edition is “Chemical Abstracts”.

- Biological Abstracts/ RRM (See Part II 4.4)

This database service covers life science fields. The original print editions are “Biological Abstracts” and “Biological Abstracts RRM”.

- Ei Compendex Site Enhanced (CD-ROM) 1993-2006 : Engineering library

This database service covers the field of engineering. The original print edition is “Engineering Index”.

- IEEE Xplore Conference Proceedings

IEEE (<http://ieeexplore.ieee.org/xpl/conferences.jsp>)

This database covers the field of electricity and includes journal articles and conference proceedings. All articles from the earliest are available in full-text.

- INSPEC

IEE 1969-

(To use this service, see <http://www.library.tohoku.ac.jp/dbsi/inspec/>)

This database covers the fields of physics, electricity, computer science and so on. This original print edition is "Science Abstracts".

4.4 How to Get

(1) Search the libraries

You can get the photocopy from the library which holds the materials. If you find difficult to see which library has it, please ask the library staff.

(2) Ask the person concerned

You can ask the author or researcher who cited the article or the person who attended the meeting.

(3) Others

If it is a recent Japanese proceeding, you could order it from the academic society library. If you find the proceeding using "SciFinder Scholar", you can order a copy from the Japan Association for International Chemical Information (JAICI).

Because some works published in proceedings have appeared also in journals, it may be useful to search journal articles by author or theme.

5 Patents

A patent is a form of intellectual property right and is designed to help progress in industry. There is a so-called Industrial Property Right System based on four main aspects of rights, Patents, Utility models, Designs and Trademarks which gives exclusive property rights to creative ideas and inventions and protects them in certain terms.

Here we will explain how to obtain the specifications of Patents, concrete technological information about inventions. Patents are useful resources in the research activity of chemistry, pharmaceutical science, life science, engineering and so on. The universities in Japan try to push forward in obtaining intellectual property to make full use of the effects of their research.

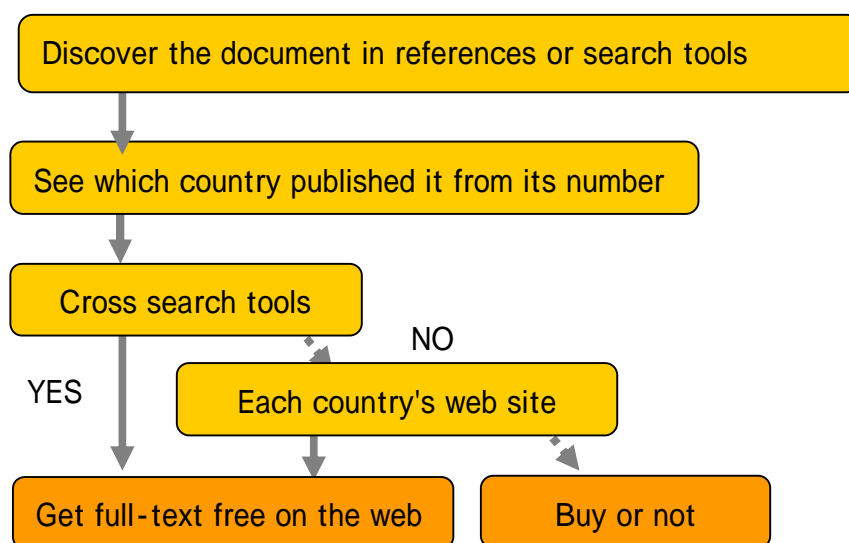
5.1 Features and Outline

(1) Features

A patent is a material which not only claims an exclusive property right over an intellectual invention but also suggesting directions for future research. Each document contains concrete technical information.

(2) How to Get

General steps to get specification of Patents are as follows. If you encounter difficulties, please ask the library staff.



Generally, compared with other resources, patent system offers us a more regular way to get full-text materials.

The first step is finding the correct country code. A country is represented by a two letter code as follows.

Code	County	Code	Country
WO	World Intellectual Property Organization (WIPO)	FR	France
		GB	United Kingdom
EP	European Patent Office (EPO)	KR	Republic of Korea
AU	Australia	IT	Italy
CA	Canada	JP	Japan
CN	China	RU	Russian Federation
DE	Germany	US	United States of America

e.g. AU731740 (=Patent of Australia)

(See also http://www.jpo.go.jp/tetuzuki/t_tokkyo/kokusai/kokusai2.htm)

5.2 Searching for Japanese Patents

You can read the contents of Japanese patents as a specification. There are two kinds of specifications. One is a “published patent application” which has only applied and is not yet called a “patent”, and the other is an approved “patent”.

Japanese patents are described in references as follows. Sometimes the applicant or inventor is omitted.

e.g. 1 東北大学長. 坂田昌弘ほか. 水素製造方法. 特開平 10-251001
 Applicant Inventor Title of invention Publication number

e.g. 2 Nakayama Seiji. Hanger made of paper. JP2000-000152A
 Inventor Title of invention Document Number

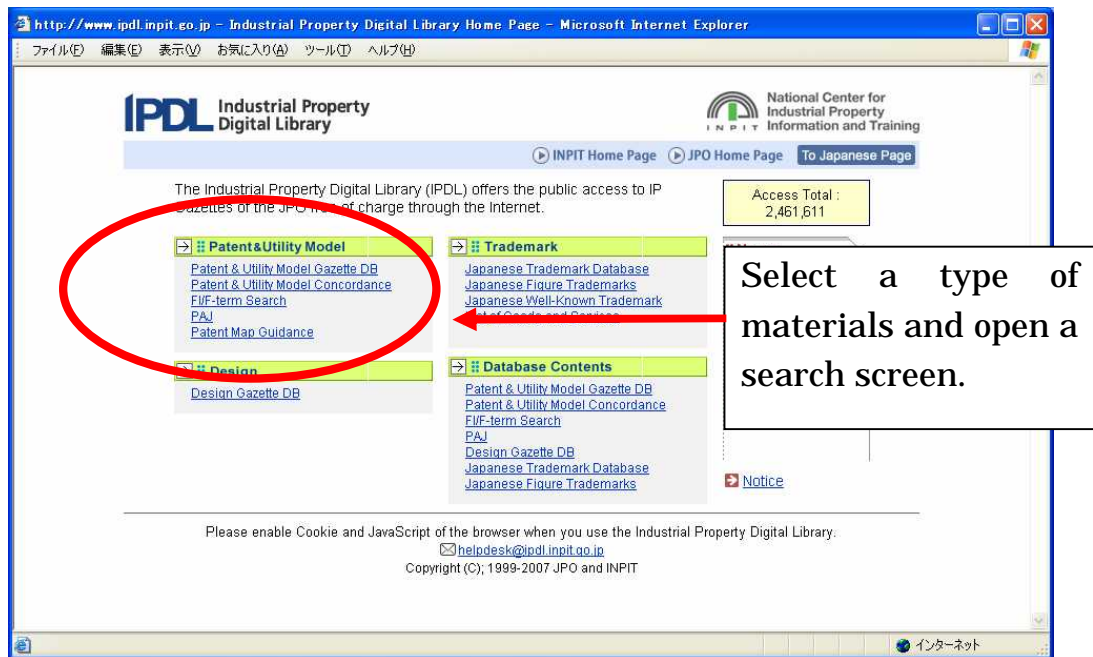
The publication number of a Japanese patent consists of several elements: year, number and kind code. For example, “特開平 10-251001” means that this is a published patent application and is published in Heisei(“平成”) 9 (=1997 AD) and no.251001. Until 1999 Japanese era was used for description of the year, but after 2000 Christian era has been used. Each patent application is given its own number in order at every step in the approval process, and is at last given a “patent number”.

Approval level	Kind code	e.g.
Application	特開(A)	特開平 10-251001 特開 2000-311329 2000-000252A
Registration	特許(B)	特許第 3328692 号 JP3328692B

Take notice of the difference between “applicant” and “inventor”. “Applicant” is the one who has a right over the property and in many cases is an institute or company to which inventor belongs. As for Tohoku University, ordinarily the applicant is a president of the university and the inventor is the researcher who made the invention.

When searching for Japanese patents, a search tool and full-texts are available online.

- Industrial Property Digital Library (IPDL)
National Center for Industrial Property Information and Training 1885-
(http://www.ipdl.inpit.go.jp/homepg_e.ipdl)
This database provides with search forms for each term.



If you know the application number or patents number, you can find it using “Patent & Utility Model Gazette DB”.

The kind code is common in all countries and shows its approval level.

Model Gazette DB - Microsoft Internet Explorer

ヘルプ(H)

Patent & Utility Model Gazette DB

HOME NEWS HELP

Kind code & Document Number
(If you would like to know the form below to your search criteria, please click on HELP.)

Kind code	A: (Published patent application, Japanese translation of PCT international application), U: (Published utility model application)	B: (Examined patent application publication), U: (Japanese translation of PCT international application (utility model)), UI: (Unexamined utility model specification), Y: (Examined utility model application publication)	A1: (Domestic re-publication of PCT international application)	NI: (Journal of technical disclosure)	B: (Patent), C: (Patent specification), H: (Corrected patent specification), I: (Corrected utility model specification), U: (Registered utility model), Y: (Examined utility model registration), Z: (Examined utility model specification)
Number (e.g.)	H09-123456 HT2-123456 or 2000-123456	S46-123456	005-123456 or 2005-123456	098-12345	2500001

Kind code	Number	Kind code	Number	Kind code	Number	Kind code	Number
1. <input type="text"/>	<input type="text"/>	2. <input type="text"/>	<input type="text"/>	3. <input type="text"/>	<input type="text"/>	4. <input type="text"/>	<input type="text"/>
5. <input type="text"/>	<input type="text"/>	6. <input type="text"/>	<input type="text"/>	7. <input type="text"/>	<input type="text"/>	8. <input type="text"/>	<input type="text"/>
9. <input type="text"/>	<input type="text"/>	10. <input type="text"/>	<input type="text"/>	11. <input type="text"/>	<input type="text"/>	12. <input type="text"/>	<input type="text"/>

Display Type:

http://www4.ipdl.inpit.so.jp - Patent & Utility Model Gazette DB - Microsoft Internet Explorer

DOCUMENT 1/1
DOCUMENT NUMBER
@: unavailable

JP.10-251001.A(1998)

JAPANESE [JP,10-251001,A]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF DRAWINGS DRAWINGS

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] How to manufacture hydrogen by the thermochemistry decomposition reaction of the water and carbon which use cerium oxide as a reaction medium.
[Claim 2] The approach according to claim 1 of being what makes the reduction type cerium oxide (CeO₂-X) generated at the reaction of cerium oxide (CeO₂) and carbon react with a steam, and generates hydrogen.
[Claim 3] The approach according to claim 1 or 2 characterized by being operated at the temperature of 600-650 degrees C.
[Claim 4] How to manufacture hydrogen by the thermochemistry decomposition reaction of the water and carbon which use alkali as a reaction medium.
[Claim 5] The approach according to claim 4 alkali is a sodium hydroxide.
[Claim 6] The approach according to claim 1 or 2 characterized by being operated at the temperature of 600-650 degrees C.
[Claim 7] The approach according to claim 1 or 2 characterized by using a low grade fossil fuel as a carbon source.
[Claim 8] How to change into a carbon monoxide the carbon dioxide which is produced at the thermochemistry decomposition reaction of the water and carbon which use cerium oxide as a reaction medium.

Drawing selection: Representative drawing

Reaction rate (mol/g·min) vs Time (min)

Legend: CO (filled square), CO₂ (open circle), CH₄ (open square), H₂ (open triangle)

Document number

Specification

Drawing

Besides the Industrial Property Digital Library, there are some other organizations providing patent information.

- National Center for Industrial Property Information and Training
(<http://www.inpit.go.jp/english/index.html>)
You can read patents and consult about the application. This also allows the Patent Licensing Database to make use of them.

- Japan Institute of Invention and Innovation(JIII)
(<http://www.jiii.or.jp/english/e.htm>)
This institute holds a training course and sells publications about patents. This has a Sendai branch and can be used to order the photocopies of patents.

- Japan Patent Information Organization(JAPIO)
(<http://www.japio.or.jp/english/index.html>)
You can request patent application sheets and so on.

5.3 Searching for Foreign Patents

Foreign patents are described in references as follows. Sometimes applicant or inventor is omitted.

e.g. A. Inoue, E. Makabe, Process and apparatus..., US pat. 6,427,753, 1999

Applicant	Title of invention	Country	Number	Year
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When there is “Patent” or “pat.” or code for example “US”, “WO”, “JP” in references, this shows that this document is a patent. Patent numbers are given by each country and sometimes contain its year. A patent for an invention is other applied for in several different countries, so inventions sometimes have plural numbers.

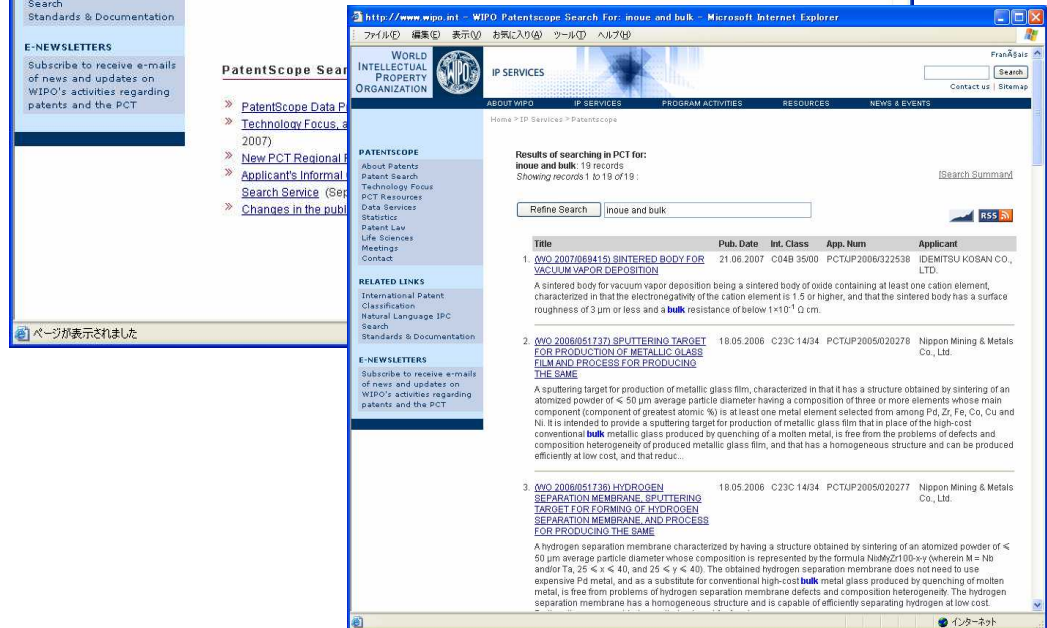
The PCT application system is to give an invention a world-wide patent. (PCT : Patent Cooperation Treaty)

This system was set up by an international treaty and over a hundred countries are participating in the system now. With this, applicants can go through the procedure to some countries all at once. WIPO, one of the organizations of United Nations, is the main office of this system and WIPO also serves its search system online. A patent which number begins from the code “WO” means that it was applied through WIPO. (WIPO: World Intellectual Property Organization)

As for patents, there are cross-search database sites like the European Patent Office (EPO). You can search some countries' patents all at once. We advise you to search at WIPO or EPO at first. If you cannot find it there, you may use each country's patent search system secondarily. Then take notice that the search rules of the systems differ by country.

■ Intellectual Property Digital Library(IPDL) WIPO 1997-
(http://www.wipo.int/ipdl/)

PCT patents are searchable. Advance search form can be opened by clicking the “PCT (Patents)” link. Full-texts are available.



■ esp@cenet

European Patent Office(EPO) (<http://ep.espacenet.com/>)

This is a search tool provided by the European Patent Office and here you can search the patents across the world. Many full-texts are available.

The screenshot shows the esp@cenet document view for patent WO9856523. The page is titled "PROCESS AND APPARATUS FOR PRODUCING METALLIC GLASS". The "Bibliographic data" tab is selected, showing the following information:

- Publication number:** WO9856523
- Publication date:** 1998-12-17
- Inventor:** INOUE AKIHISA (JP); MAKABE EIICHI (JP)
- Applicant:** KABUSHIKI-KAISHA MAKABE GIKEN (JP); INOUE AKIHISA (JP); MAKABE EIICHI (JP)
- Classification:**
 - international:** B22D18/02; B22D23/06; B22D27/00; B22D27/04; C22C1/00; C22C7/00; B22D18/00; B22D23/00; B22D27/00; B22D27/04; C22C1/00; C22C45/00; (IPC1-7): B22D27/00; B22D11/06; C22C45/00; C22C45/08
 - European:** B22D18/02; B22D23/06; B22D27/00; B22D27/04
- Application number:** WO1998JP02547 19980609
- Priority number(s):** JP19970168108 19970610

Red circles highlight the "Original document" tab, the "Also published as:" section (listing EP0921088, US6427753, US2002100, JP11001729, EP0921880), the "Cited documents:" section (listing EP0577056, GB2272451, DE3215263), and the "View INPADOC patent family" link. A callout box labeled "Get full-text" points to the "Original document" tab. Another callout box labeled "Application numbers in each country." points to the "Also published as:" section. A third callout box labeled "Citing and cited references." points to the "Cited documents:" section.

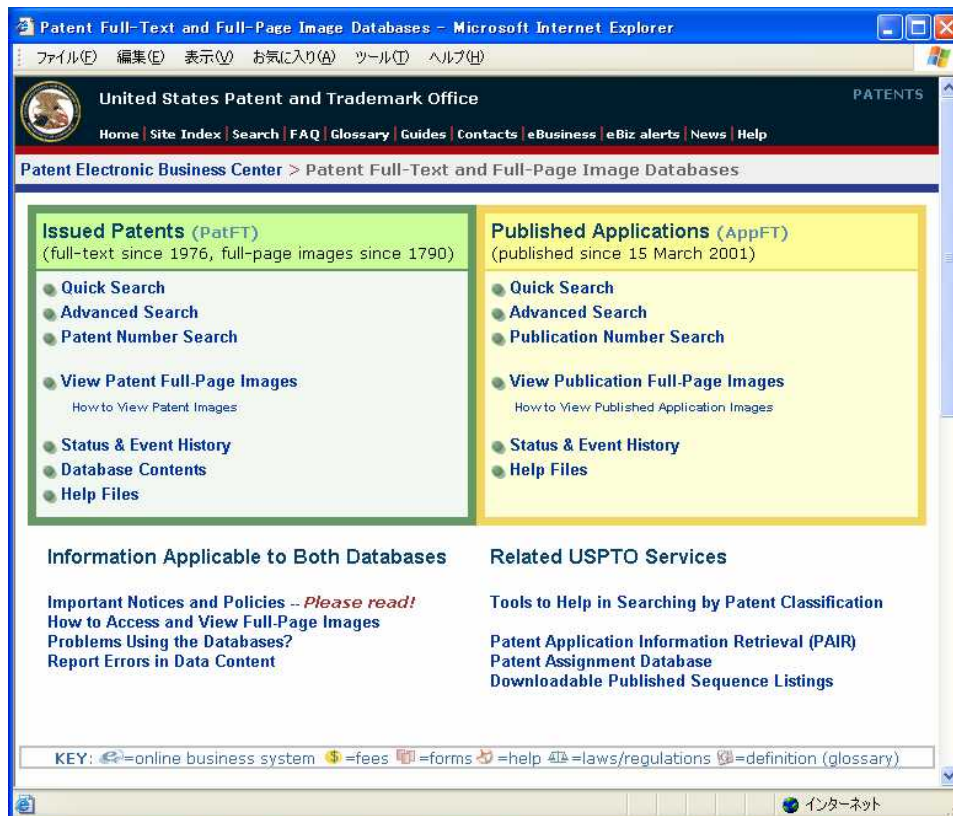
The abstract of WO9856523 describes a process and an apparatus for producing metallic glass which are capable of producing a bulk amorphous alloy of desired shape, in particular, a bulk amorphous alloy of desired final shape are provided. In the present invention, the molten metal at a temperature above the melting point is selectively cooled at a rate higher than the critical cooling rate, and the product comprises single amorphous phase which is free from the crystalline phase formed by the development of crystal nuclei through nonuniform nucleation. The present invention is capable of producing the bulk amorphous alloy which is free from casting defects such as cold shuts and which has excellent strength properties in a simple process at a high reproducibility. Accordingly, a bulk metallic glass of desired shape is produced by filling a metal material in a hearth; melting the metal material by using a

The schematic diagram shows a cross-section of the apparatus for producing metallic glass. It includes a cooling water supplier (18), an arc power source (24), a metal material (10), a hearth (16), a molten metal (14), a casting die (17), a mold (13), a metal material (23), a metal material (26), a metal material (30), a metal material (32), and an argon gas inlet (Ar). The diagram is labeled with numbers 10 through 32.

■ Patent Full-Text and Full-Page Image Databases

United States Patent and Trademark Office (USPTO) 1790 -
(<http://www.uspto.gov/patft/>)

This is a search tool for the United States Patent and Trademark Office.



Patents in the field of chemistry are searchable using SciFinder Scholar, the search results of which provide the full-texts link of EPO and USPTO. (See Part II 4.2)

■ Foreign patent office links

Japan Patent Office (<http://www.jpo.go.jp/kanren/others.htm>)

This is a home page link of patent offices in the world.

5.4 How to Get

Patent documents are available online in full-text format more easily than other types of resources. Even if you can not get the full-text, you can order the photocopy from some institutions.

(1) Japanese Patents

Patent documents published in Japan are collected by the National Diet Library. At the Sendai branch of the National Center for Industrial Property Information and Training, you can read them in a CD-ROM edition.

(2) Foreign Patents

As for foreign patents, you can read some of them at the National Center for Industrial Property Information and Training (Tokyo office), and can order them from the National Diet Library or Japan Association for International Chemical Information (JAICI). Please ask the library staff.

- National Center for Industrial Property Information and Training
(<http://www.inpit.go.jp/english/index.html>)
You can read patents and consult about patent application using this site. This also allows Patent Licensing Database to make use of patents.

- Japan Association for International Chemical Information(JAICI)
(<http://www.jaici.or.jp/english/>)

6 Standards

A standard is an agreement on terms, unit, size, quality or methods so that knowledge about products and techniques will come into wider use. Here we will mention the industrial standards.

6.1 Features and Outline

(1) Features

Industrial standards are established built by many people who have an interest. Because of that, on one hand they must be regarded as fair and trust worthy, on the other hand they usually take much time to be fixed. Standards are established, abolished and revised frequently as technologies develop.

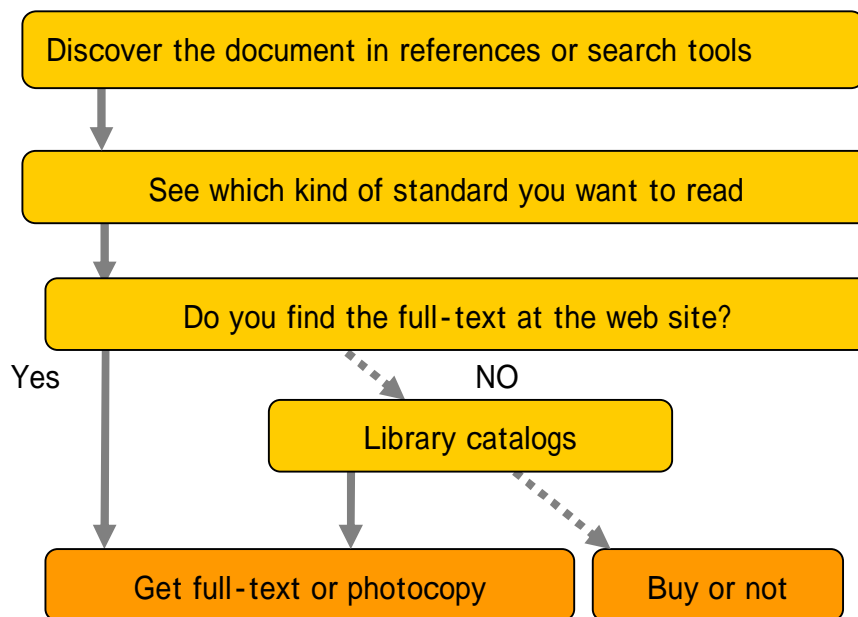
Standards are classified into international, regional, national, group and company standards, according to the range of their adoption. Of all of these, an international standard is applied most widely. A country which accepts the international standard has to build its own national standards within the limits of the international standard.

	Acronym	Country or organization
International standard	ISO	International Organization for Standardization
	IEC	International Electrotechnical Commission
	ITU	International Telecommunication Union
Regional standard	EN	European Norma
National standard	ANSI	United States of America
	BS	United Kingdom
	CAN	Canada
	DIN	Germany
	GB	China
	IS	India
	JIS	Japan
	KS	Korea
	NF	France

Group standard	ASTM	American Society for Testing and Materials
	ASME	American Society of Mechanical Engineers
	IEEE	Institute of Electrical and Electronics Engineers
	JEM	Japan Electrical Manufacturers' Association
	JEC	Japanese Electrotechnical Committee
	SAE	Society of Automobile Engineers

(2) How to Get

The general steps to obtain standards are as follows. If you encounter difficulties, please ask the library staff.



Generally standards are things that must be bought and there are few cases where they are available online free. So the first step you have to do is confirm which country or group is managing the standard. Once you find that out, the second step is to search library catalogs or to buy it. Then you should take notice of whether they are valid or not at that time because they are changed frequently.

6.2 Searching for Japanese Standards

(1) JIS standard

There are two national standards in Japan: JIS for engineering and JAS for agriculture, forest and foods. Here we will mention JIS (Japan Industrial Standards) which are managed by the Japanese Industrial Standards Committee. Every standard must be revised every five years and is recommended to be based on the international standards.

Documents of JIS standards are described in references as follows:

e.g. JIS Q 9001 : 2000 品質マネジメントシステム - 要求事項
 Division Numbers Year Title

A symbol placed before numbers shows its division. It is made up of alphabets from A to Z.

Symbol	Division	Symbol	Division
A	Civil engineering and architecture	M	Mining
B	Mechanical engineering	P	Pulp and paper
C	Electronic and electrical engineering	Q	Management system
D	Automotive engineering	R	Ceramics
E	Railway engineering	S	Domestic wares
F	Shipbuilding	T	Medical equipment and safety appliances
G	Ferrous materials and metallurgy	W	Aircraft and aviation
H	nonferrous materials and metallurgy	X	Information processing
K	Chemical engineering	Z	Miscellaneous
L	Textile engineering		

JIS documents can be searched for on the web and also be searched for across some international standards, ISO and IEC.

- Japanese Industrial Standards Committee (JISC)

(<http://www.jisc.go.jp/eng/index.html>)

This is an organization which manages the JIS standards. At “JIS search” you can read the full-texts but cannot print them out.

- Japanese Standards Association (JSA)

(http://www.jsa.or.jp/default_english.asp)

This sells the JIS standards and main foreign standards. This provides an integrated search tool for JIS, ISO and IEC.

- JIS 総目録 Japanese Standards Association 1996- : Engineering Library

This is a catalog of JIS standards with which you can see abolished standards. This contains a table of correspondence between JIS and international standards (ISO, IEC) and carries a list of the organizations making up the standards.

(2) Group standard

Group standard is made up of several engineering parties and societies. In Japan there are following kind of standards, for example:

- ONLINE STORE

The Japan Electrical Manufacturers' Association (JEM)

(https://www.jema-net.or.jp/cgi-bin/jem_mok.cgi)

- Japanese Electrotechnical Committee

The Institute of Electrical Engineers of Japan

(<http://www.iee.or.jp/honbu/jec/jec.htm>)

6.3 Searching for Foreign Standards

(1) ISO standards

ISO standard is the most important one. (ISO : International Organization for Standardization)

ISO plays the important role of removing technological obstructions in foreign trade. In recent years, qualification for ISO9001 about quality management or ISO14001 about ecological management brings advantages in world trade. As a result, observing international standards has become more and more important for countries because it will help in increasing international trust and competence.

Each standard is discussed in the Technical Committee (TC) and it in process is published as Technical Report (TR). Every standard is classified according to International Classification for Standards (ICS).

- ISO Catalogue

International Organization for Standardization(ISO)

(<http://www.iso.ch/iso/en/CatalogueListPage.CatalogueList>)

This is a web site selling standards. You can also search for them using ICS. Abstracts are available.

(2) IEC and ITU standards

IEC and ITU are international standards about electricity and telecommunication. (IEC : International Electrotechnical Commission
ITU : International Telecommunication Union)

- International Electrotechnical Commission (IEC)

(<http://www.iec.ch/>)

Each standard is searchable at Web Store.

- International Telecommunication Union (ITU)

(<http://www.itu.int/ITU-T/publications/recs.html>)

Recommendations are searchable using Standardization Sector and available free as full-texts.

(3) EN

EN is a famous regional standard applied widely to the world. (EN : Europe Norma)

EN standards are built by CEN (Comite Europeen de Normalisation) in charge of all fields except electricity and CENELEC (Comite Europeen de Normalisation Electrotechnique).

- On-line Catalogue of European Standards
Comite Europeen de Normalisation (CEN)
(<http://www.cenorm.be/catweb/>)

- CENELEC
Comite Europeen de Normalisation Electrotechnique (CENELEC)
(<http://www.cenelec.org/>)

(4) Other national standards

Like JIS in Japan, many countries have set up their own standards. In America, there is a search tool which also makes other country's standards searchable all at once. If you know the country whose standard you want to obtain, it might be better to search each country's website at the beginning.

- NSSN : A National Resource for Global Standards
America National Standards Institute (ANSI) (<http://www.nssn.org/>)
At this web site, not only American standards (ANSI) but also more than six hundreds of standards in the world, JIS, EN, DIN and so on, are able to be searched across. In America, every standard discussed and built by each industrial group or the government must be approved finally as ANS (America National Standards).

- Beuth
Deutsches Institut für Normung (DIN) (http://www.beuth.de/index_en.php)
DIN, German standards, are searchable across some otehr famous standards and ISO, but you need to register for an advance search.

- British Standards Online
HIS (<http://uk.ihs.com/products/standards/british-standards-online.htm>)
BS, British standards, are searchable on this site.
- Standards Store
Information Handling Services (HIS) (<http://global.ihs.com/>)
More than 450 standards are searchable all at once.

(5) Group standards

Most of foreign standards are searchable on the above ANSI or HIS web sites. When you search for the standards of a particular country, we advise you to search their “Online Store” or “Catalog” sites.

- ASTM Search Standards
ASTM International (<http://www.astm.org/STORE/standardsearch.shtml>)
With this, not only valid standards but also abolished ones are searchable.
- IEEE Xplore: Standards
IEEE (<http://ieeexplore.ieee.org/xpl/standards.jsp>)
Standards in the field of electricity, IEEE, ANSI/IEEE are searchable and available in full-texts.
- Standard Wire
Knowledge Wire (<http://shop.kwire.co.jp/stwire/>)
Many standards, mainly those of America, are searchable and purchasable with yen.

6.4 How to Get

In Tohoku University, the Engineering library holds JIS standards and handbook. The library has some other standards which can be searched for using the online catalog.

You can read them at the Tohoku branch of Japanese Standards Association free of charge and at its Tokyo library you can read ISO, IEC, EN, ANSI, BS, DIN, NF and so on. The JIS hand book is held by Sendai public library, too.

If no library nearby has the materials you need, you have to order a photocopy from other library. National Diet Library has the standards below, some of which can be searched by NDL-OPAC (<http://opac.ndl.go.jp>).

- International standard : ISO, IEC
- National standard : JIS, CAN, ANSI (1970), BS (1992), DIN (1974)
- Group standard : JEC, JEM, ASTM, SAE (Handbook only)
ASME (Boiler and pressure container only)

If the other libraries have the standard which you want, please ask the library staff. Even if you could not obtain it from any libraries, you may order it from the Japanese Standards Association.

- JSA Web Store
(<http://www.webstore.jsa.or.jp/webstore/top/index.jsp>)
You can order foreign standards from this site.

7 Other Types of Materials

Reference books like handbooks, which are not exactly search tools are very useful. They will give you the basic knowledge needed in your major or factual data such as an experimental value or a formula.

Here we will introduce you to some of them.

(1) Factual data

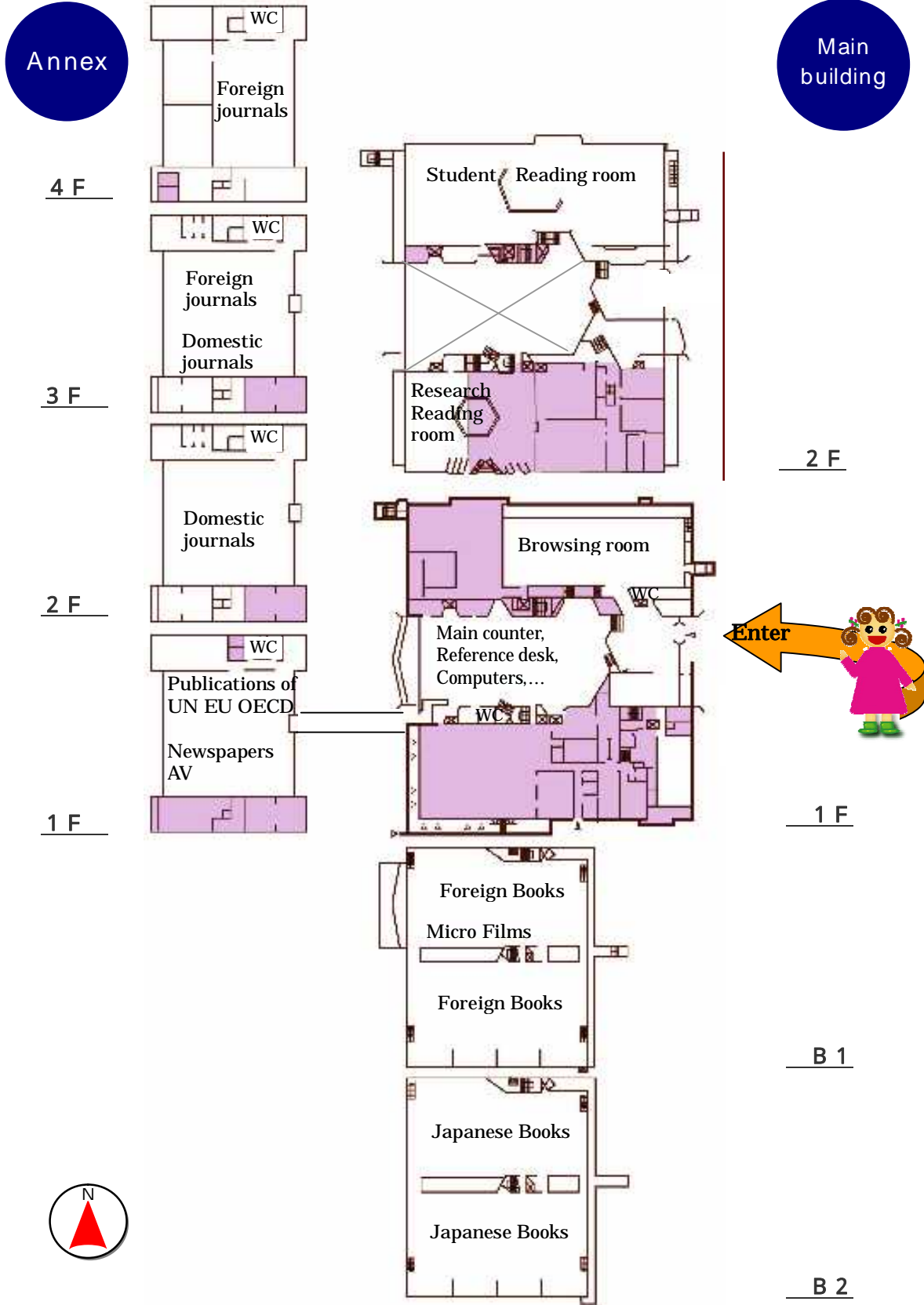
- Landort-Börnstein / Springer
Group 1-6 : Kita Aobayama Library et al.
- The Aldrich Library of NMR Spectra Vol.1-10 Aldrich Chemical
- Powder Diffraction File / International Centre for Diffraction Data
1960(Organic)/1974(Inorganic) -
- 天気図 (Weather report) 1958-

(2) Handbooks and Encyclopedias

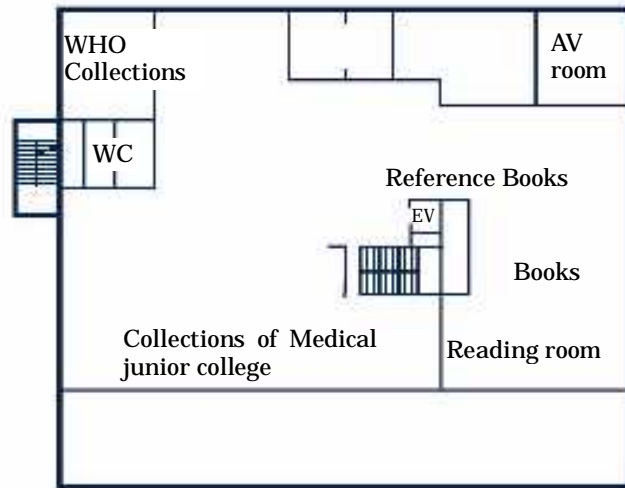
- World Health Organization Classification of Tumors / WHO 2000-
- Merck Index / Merck Research 2001
- CRC Handbook of Chemistry and Physics / CRC Press 2003
- ASM Handbook / the Materials Information Society 1992-
- Binary Alloy Phase Diagrams / The Materials Information Society 1990
- Nature Encyclopedia of the Human Genome Volume 1-5 / Nature 2003
- Encyclopedia of Nanoscience and Nanotechnology Volume 1-10 /
American Scientific 2004

Appendix 1 Floor Map

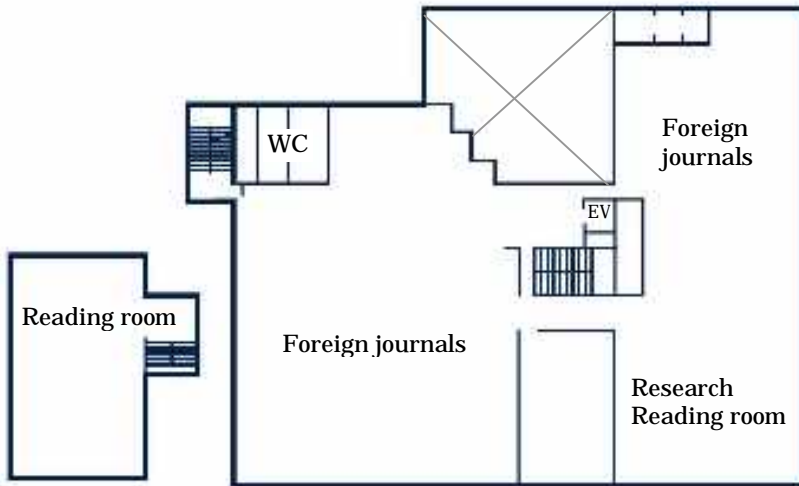
1) Main Library



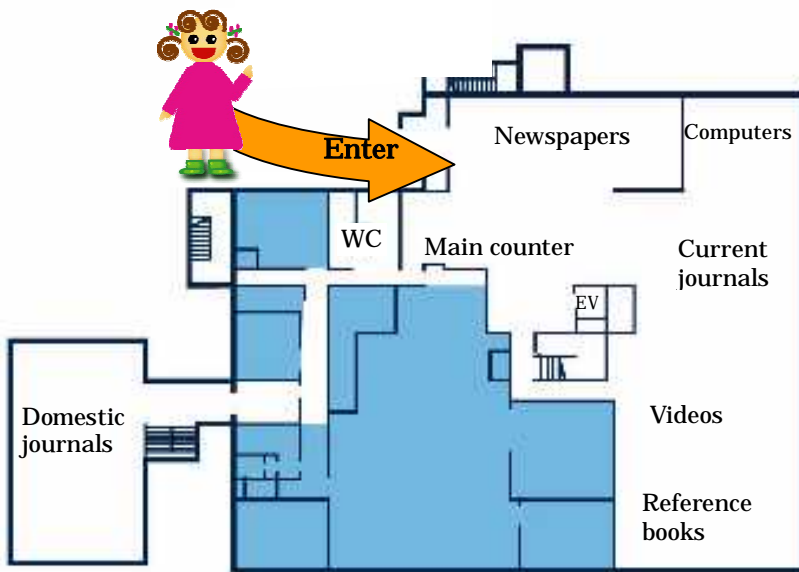
2) Medical Library



3 F

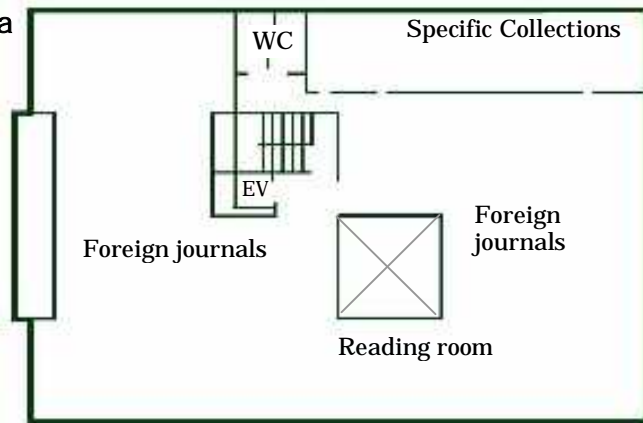


2 F

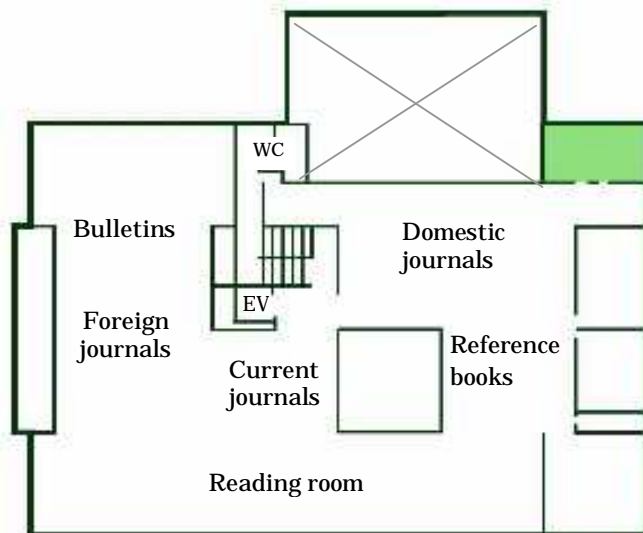


1 F

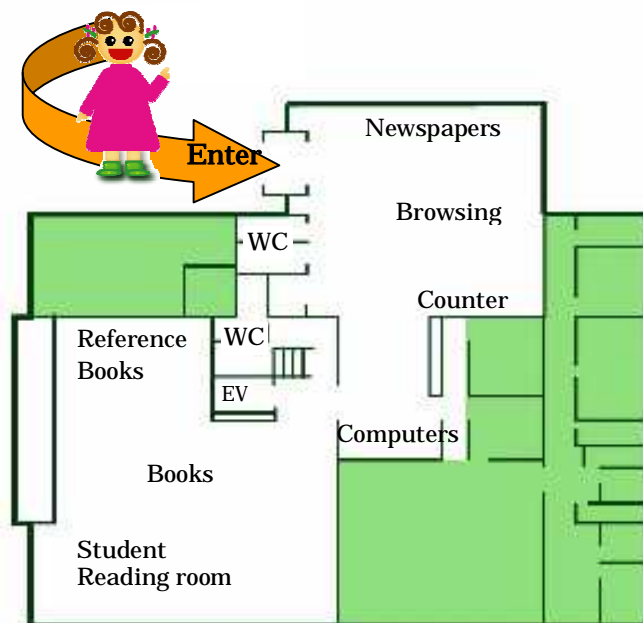
3) Kita-Aobayama Library



3 F



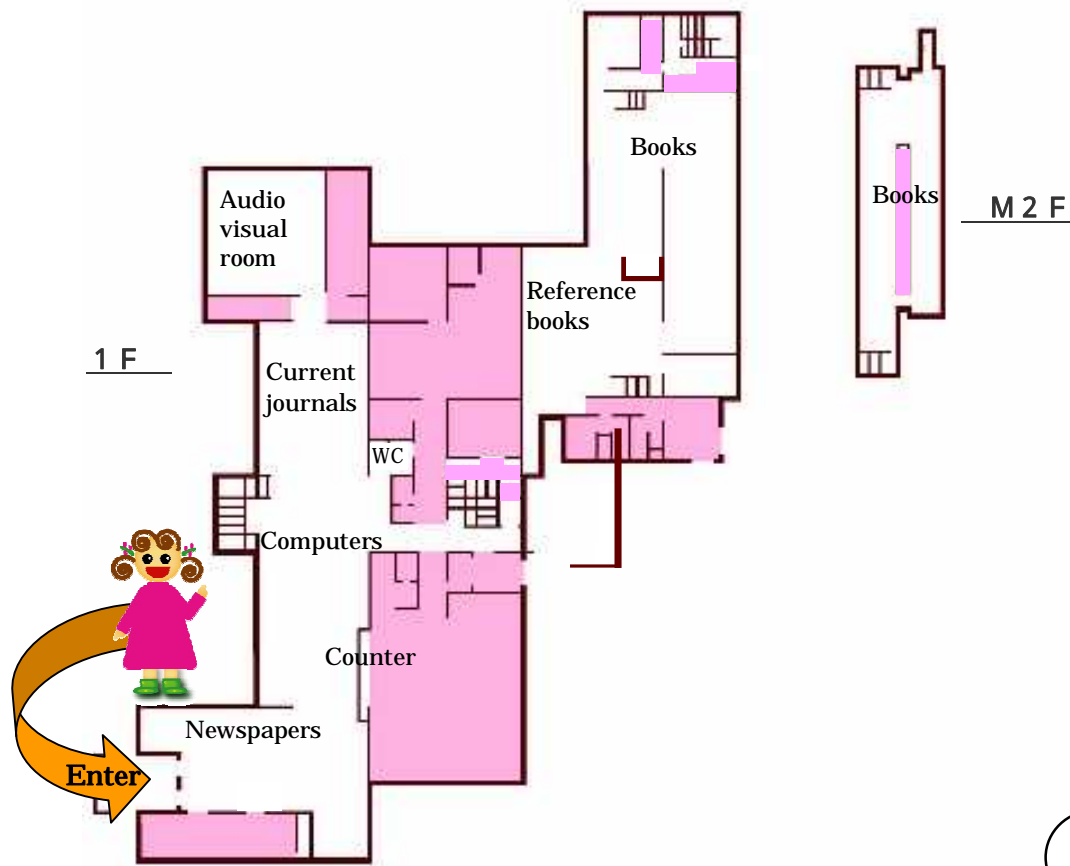
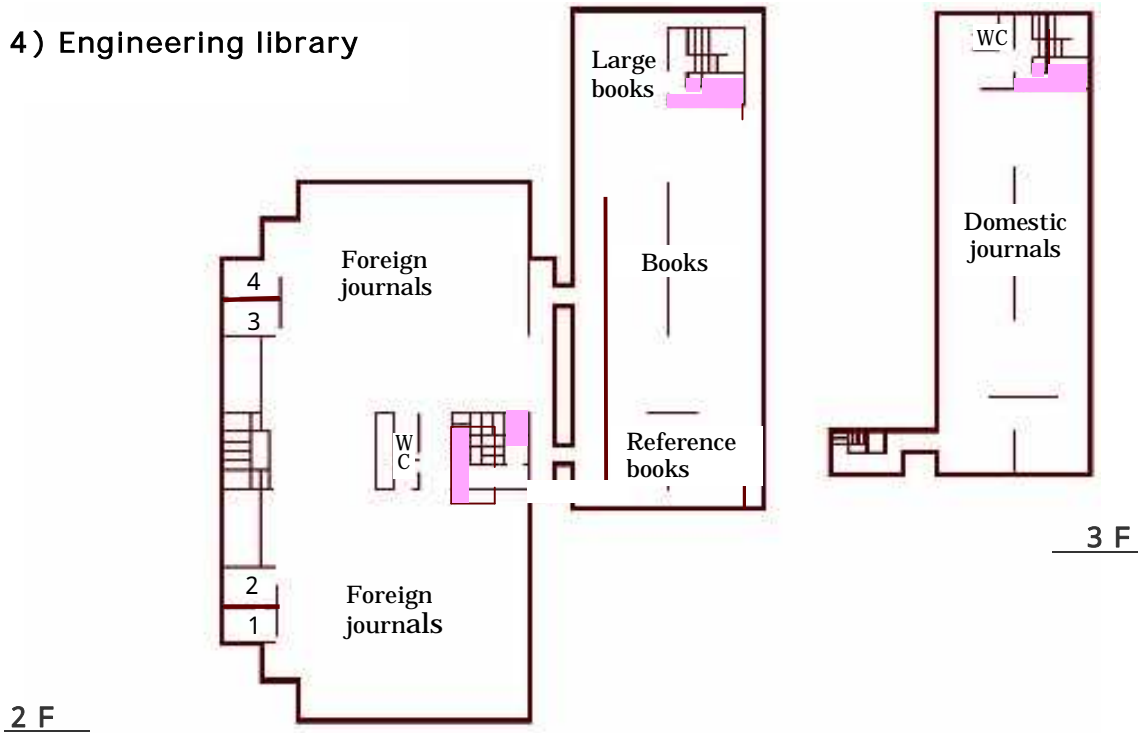
2 F



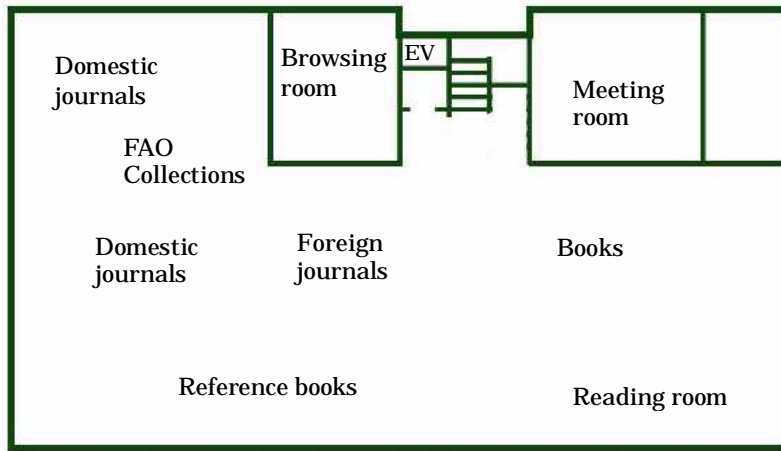
1 F



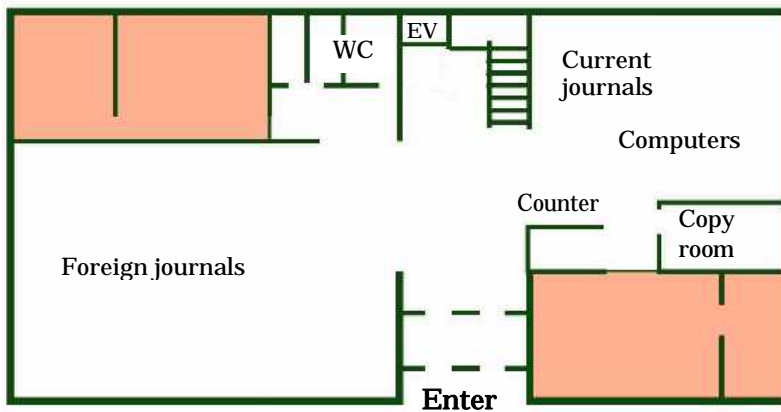
4) Engineering library



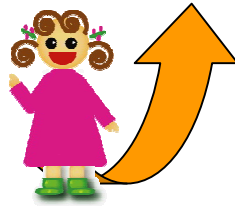
5) Agricultural library



2 F



1 F



Appendix 2 Information Service Institutions

(1) Japanese Institutions

- National Institute of Informatics (NII)
(<http://www.nii.ac.jp/index.shtml.en>)
- Japan Science and Technology Agency (JST)
(<http://www.jst.go.jp/EN/index.html>)
- National Diet Library (NDL) (<http://www.ndl.go.jp/en/index.html>)

(2) Foreign Institutions

- The British Library (BL) (<http://www.bl.uk/>)

(3) Data-base Service Institutions

- Thomson Scientific (<http://www.thomsonscientific.jp/>)
- Japan Association for International Chemical Information (JAICI)
(<http://www.jaici.or.jp/english/>)
- National Library of Medicine (NLM) (<http://www.nlm.nih.gov/>)

(4) Others

- Japan Patent Office (JPO) (<http://www.jpo.go.jp/>)
- National Center for Industrial Property Information and Training (NCIPI) (<http://www.inpit.go.jp/english/index.html>)
- Japanese Standards Association (JSA)
(http://www.jsa.or.jp/default_english.asp)
- International Medical Information Center (IMIC)
(<http://www.imic.or.jp/>)

Appendix 3 Abbreviation Table

Abbreviation	Full form
Ann. Annu.	annals / annual / annalen / annale / annali
anon.	anonymous
app.	appendix
arch.	archives
art.	article
Aufl.	auflage
Ausg.	ausgabe
Bd.	band
beil.	beilage
bibl. bibliog.	bibliography
Bull.	bulletin
c.	copyright
c. ca.	circa (=about)
cf.	confer (=compare)
ch. chap. chaps.	chapter
col.	color
col. cols.	column
comp. comps.	compiled by / compiler
conf.	Conference
cong.	Congress
corr.	correction
C.R.	Comptes Rendus
Dept. Depts.	department
Diss.	dissertation
div. divs.	division
do.	ditto
doc.	document
ed. eds.	edited by / edition / editor
ed.cit.	editio citata / edition cited
e.g.	exempli gratia (=for example)
enl. enlgd.	enlarged
et al.	et alia (=and others) et alibi (=and elsewhere)

Abbreviation	Full form
fac. facsim.	facsimile
fasc.	fascicle
fig. figs.	figure
hb. hbk.	hardback
hft.	Heft
hg.	herausgeber
hrsg.	herausgegeben
ib. ibid.	ibidem(=in the same place)
id.	idem (=the same)
i.e.	id est (=that is)
ill. illus.	illustrated / illustration
inst.	institute
int.	international
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
izv.	izvestiia / izvestiya
J.	journal
Jahrg.	jahrgang
l. ll.	line
l.c. loc.cit.	loco citato(=in the same place cited)
m.s. MS. mss.	manuscript
N/A	not applicable / not available
n.d.	no date
n.p.	no place / no publisher
n.pag.	no pagination
n. no. nos.	number
n.s. NS	new series / new style
op.cit.	opere citato(=in the work cited)
p. pp.	page
par.	paragraph
Pat.	patent
pb. pbk.	paperback
pl.	plate
proc.	proceedings

Abbreviation	Full form
pt. pts.	part
pub.	published by / publication / publisher
repn. rpt.	reprint / reprinted
rept.	reported by / report
rev.	review
rev.ed.	revised edition
sec. sect. secs.	section
ser.	series
[<i>sic</i>]	(=so, thus)
s.l.	sine loco(=no place of publication)
s.n.	sine nomie(=without name)
supp. suppl.	supplement
symp.	symposium
t. tom.	tome
tab.	table
T.O.C.	table of contents
t.p.	title page
t.p.verso	title page verso
T.R.	technical report
tr. trans.	translator / translation / translated
trans.	transaction
v. vol. vols.	volume
Z.	Zeitschrift