Patents, a source of information often overlooked by Academics
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Abstract—Patents are an essential source of scientific and technical information. Yet it is only rarely used by academics, although access to patent databases is free. Patents thus constitute a source of information which, by testing ideas or highlighting the applications of academic research, paves the way for innovation. We briefly present here the main characteristics useful for the use of patents in the academic field.

Keywords: patent, innovation, information source, automatic analysis, idea testing

Résumé
Les brevets constituent une source d’information scientifique et technique incontournable. Pourtant celle-ci n’Pourtant celle-ci n’est que rarement utilisée par les universitaires, bien que l’accès aux bases de données brevets soit gratuit. Les brevets constituent ainsi une source d’information qui permet en testant ses idées ou en mettant en évidence les applications des recherches académiques d’ouvrir la voie à l’innovation. On présente ici brièvement les principales caractéristiques utiles pour l’utilisation des brevets dans le champ académique.

Mots clés : brevet, innovation, information source, analyse automatique, test des idées

1 - INTRODUCTION
Patents are often considered from a legal point of view, as a tool for protecting product, ideas, etc. However, they constitute a unique base of scientific and technical, even economic information, and this aspect is almost never used in publications of a scientific nature [1]. Indeed, if we examine the bibliography of published articles, we only very rarely find a patent citation. However, the number of patents filed is growing, for example 3.27 million for the year 2020¹. Patent information allows to:

¹ Patents applications year 2020
https://www.statista.com/statistics/257610/number-of-

patent-applications-worldwide/#:.text=As%20of%202020%2C%20the%20number%20reached%20around%203.22%20million%20applications.
the patent citations introduced by the writer of the patent. This allows to introduce a bibliographic extension with a high hierarchy value.

**Example:**

Distributive Photonic Monobit Analog-to-digital Converter

<table>
<thead>
<tr>
<th>Application</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>US2020023151</td>
<td>WO2020190943A1</td>
</tr>
</tbody>
</table>

Sideband Photonic Radio Frequency (Rf) Noise Generator

<table>
<thead>
<tr>
<th>Application</th>
<th>Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>US201916359248</td>
<td>US11216251B2</td>
</tr>
</tbody>
</table>

2 – THE MAIN PATENT DATABASES

Most of industrialized countries have a national intellectual property office, and a related database of national patents to be consulted in the language of the country. But there is also a very interesting database for researchers: the worldwide database (Espacenet) of the EPO (European Patent Office) which is searchable in English on the titles and the summary of the patents, as well as on the applicant field, inventors, dates, this database contains more than 120 million notices! You can also consult the databases of European patents, Patent Scope (for world patents), Asean Patent Scope, US patents (via the two national databases or via Google Scholar) they can be consulted in English and in full text, if necessary. Moreover, and this is important, their access is free!

*The case of Chinese patents*

China currently produces more than half of the world’s patents. If we want to avoid an excessive presence of Chinese patents in the results (mainly at the level of statistical analyses), we can use the patent database dealing only with world patents. Statistically, Chinese patents can be treated separately with a distinction between patents and utility models (utility certificate) [2].

3 – THE INTERNATIONAL PATENT CLASSIFICATION A USEFUL TOOL FOR RESEARCHERS

Patents are not indexed with keywords. But they are indexed via the International Patent Classification (IPC) which classifies inventions in different fields, which makes it possible by combination with other descriptors (applicants, inventors, dates, words from titles or titles plus abstracts ..) to facilitate searches and on the other hand to carry out powerful statistical analyses. This classification is based on the combination of 8 digits (numbers plus letters). For example A61K deals with what is medical, dental and hygiene. The asterisk is a truncation to select all codes starting with A61K. The heading letters go from A to H to cover most of the application domains, such as Physics, Electricity, Agriculture, etc.

*Example:*

![Diagram of patent citations]

Patent WO2020190943A1 cites patent EP3370353A1 which also cites another patent. On the other hand, the same patent is cited by patent US11216251B2. So it value increases.
4 – AUTOMATIC ANALYSIS OF A GROUP OF PATENTS

Given the large number of patent notices currently available, a search often leads to an important number of patent notices. The use of automatic analysis then leads to better understand the trends, actors and sub-domains of these sets of responses. Platforms such as Patent Pulse\(^7\) allows this processing to be carried out on various bases (Espacenet, US, European, Canadian, Spanish, world patent databases).

5 – A FEW EXAMPLES

A What are the uses of 4-Methyl Thiazole in Medical Field

Most of researchers will look for the answer in scientific publications, which is not obvious, but a query of the Espacenet database leads to 26 answers. The search was carried out on the term "4-methyl thiazole" associated with the international classification A61K\(^8\) which deals with preparations for medical, dental, or toilet purposes. We can note among the results:

Composition fragrance
Shiseido Co Ltd, Takasago Perfumery Co Ltd
Patent number JP2011132359A

PROBLEM TO BE SOLVED: To provide a fragrance composition that people feel excellently natural, fresh and mellow like a rose, which has been difficult to reproduce even with combinations of various kinds of ingredients usually known as rose perfumes.

SOLUTION: The rosy fragrance composition comprises being supplied with methyl epi-jasmonate alone or in combination with 2-isopropyl-4-methyl thiazole; the method for producing the rosy fragrance composition; and the method for providing a fragrance composition with a perfume, which comprises providing the base fragrance composition having primarily a rosy perfume with methyl epi-jasmonate alone or in combination with 2-isopropyl-4-methyl thiazole The method allows to provide a fragrance composition that feels excellently natural, fresh and mellow like a rose

B Evolution of technological research in the capture of CO2 from the combustion of coal and analysis of the results\(^8\).

We use the World patent database (patents extended to several countries), we query the database with the terms: capture and coal and (CO2 OR “carbon dioxide”) since 2010, on the title of the patents.

We get the following result: 42 patents. This number is low and indicates that we are in a very specialized field, which does not mean that it is not current.

The field is growing rapidly. The figures indicated are families of patents (patents extended to various countries and covering the same invention). The subject is therefore, because of the current economic situation, promising.

\(^7\) Patent Pulse [www.patent-pulse.com](http://www.patent-pulse.com)

\(^8\) Analysis from the platform Patent Pulse [www.patent-pulse.com](http://www.patent-pulse.com)
The main actors are:

<table>
<thead>
<tr>
<th>Companies</th>
<th>CA</th>
<th>CN</th>
<th>GB</th>
<th>US</th>
<th>WO</th>
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</thead>
<tbody>
<tr>
<td>Air Liquide</td>
<td>1</td>
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<tr>
<td>Canada Natural Resources</td>
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<td>Design Inst Co Ltd</td>
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<tr>
<td>China Resources Power Halfeng Co Ltd</td>
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<td>Gasconsult Ltd</td>
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<tr>
<td>Guanxi Southern Carbon Capture and Storage Center</td>
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<tr>
<td>Guanxi Guisheng New Energy Science and Technology Co Ltd</td>
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<td>Huaneng Clean Energy Res Inst</td>
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<tr>
<td>Jiangsu Fang Tian Power Tech co</td>
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<tr>
<td>Lu An Mining Industry Group Co Ltd</td>
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<td>Savannah River Nuclear Solutions Llc</td>
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<tr>
<td>Univ China Petroleum</td>
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<td>Univ North China Elec Power</td>
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<tr>
<td>Univ Southeast</td>
<td></td>
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</tr>
</tbody>
</table>

The automatic creation of a complete report (in word) will conduct to deepen the relations between fields of application, applicants, dates, inventors, countries, etc. An excerpt is shown below.

6 – CONCLUSION

The use of patents in addition to academic scientific information allows to situate knowledge or research in the world of applications and economy [3]. It also helps to promote links between research and industry [4] [5] as well as the search for potential partnerships. Knowing the ideas and products protected by third parties also avoids embarking on sterile research, but it is also the starting point for potential innovations [6].

For technical and engineering schools, it should be an essential source of information [7]. On the other hand, if a certain number of databases are searchable in English, it is good, depending on the research to be carried out, to also consult national databases. The problem of languages is then partly solved by automatic translators such as Google Translate\(^9\) for instance.

7 – BIBLIOGRAPHY


\(^9\) Google Translate

https://translate.google.fr/?hl=fr&tab=rT


