

# PATENT LANDSCAPING AND TECHNOLOGY TRENDS – KNOWLEDGE TRANSFER TO AFRICA (KT2A)

RICCARDO PRIORE | PATLIB TRIESTE (AREA SCIENCE PARK) | 6 MAY 2025

# PRESENTER



**Riccardo Priore**

IP analyst @ Patlib Centre (Research Valorization Unit) hosted in AREA Science Park, a public research body under the supervision of the Italian Ministry of University and Research, established in 1978 and headquartered in Trieste.

In Jun 2019 has been acknowledged as Qualified Patent Information Professional (QPIP) by the International Standards Board for Qualified Patent Information Professionals (ISBQPIP).

Graduated in Molecular Biology in 1995, has subsequently received the PhD title at the International Centre of Genetic Engineering and Biotechnology (ICGEB) in 2001. He has then spent three years as post-doc at the New York University and two years as post-doc at the University of Trieste



# PATENT LANDSCAPING/INTELLIGENCE AGENDA

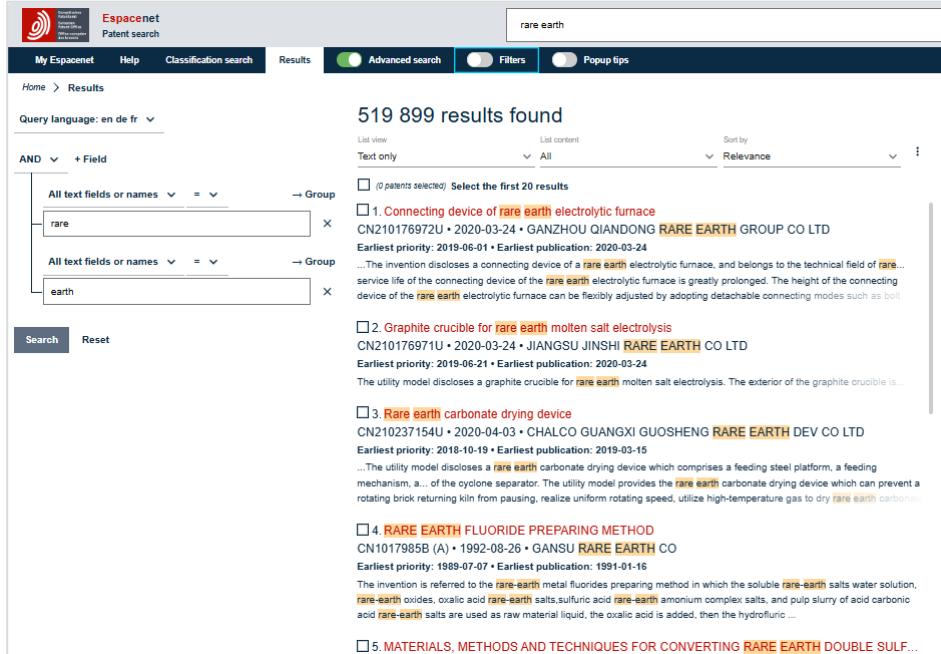
- Brief recap of basic options provided by Espacenet
  
- One step further... main features of PATSTAT and GPI
  
- **Latest evolutive step: TIP (→ towards AI based analysis)**

## BASIC USE OF ESPACENET (1/4)

- Espacenet is updated daily. It contains data on more than 150 million patent documents from around the world, offering free information about inventions from 1782 to today.
- Typical uses:
  - search and find patent publications,
  - machine-translate patent documents,
  - track the progress of emerging technologies,
  - find solutions to technical problems,
  - see what your competitors are developing
  - understand whether a patent has been granted and if it is still in force.
- **But it is not meant for bulk data retrieval!**

[Espacenet – patent search](#)

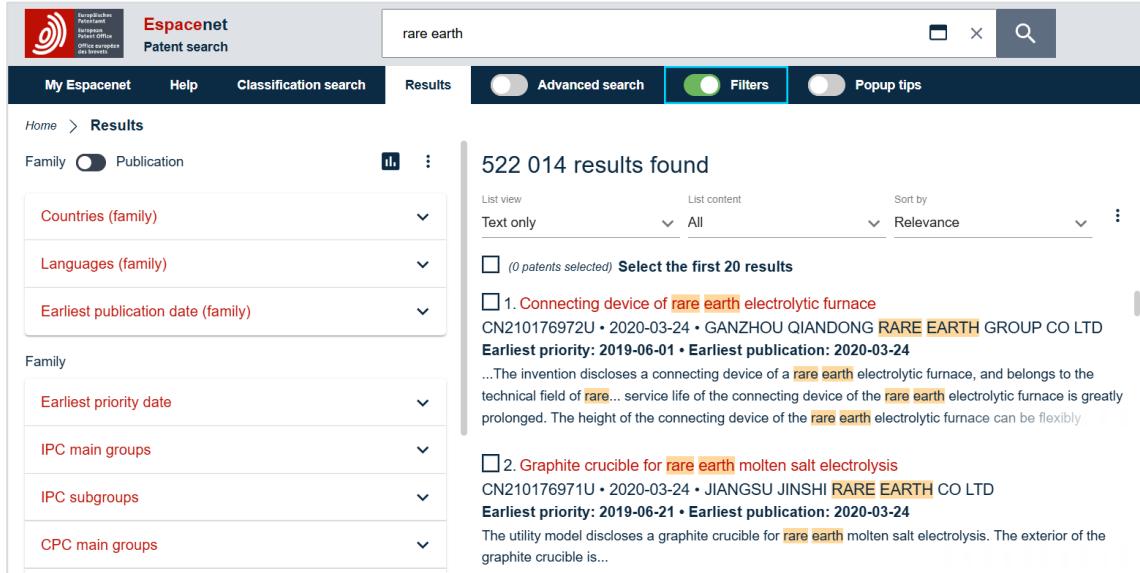
## BASIC USE OF ESPACENET (2/4)



The screenshot shows the Espacenet Patent search interface. The search term "rare earth" is entered in the search bar. The results page displays 519,899 results found. The search query is set to "AND" and includes two groups: "rare" and "earth". The results list includes five entries:

- 1. Connecting device of rare earth electrolytic furnace**  
CN210176972U • 2020-03-24 • GANZHOU QIANDONG RARE EARTH GROUP CO LTD  
Earliest priority: 2019-06-01 • Earliest publication: 2020-03-24  
...The invention discloses a connecting device of a rare earth electrolytic furnace, and belongs to the technical field of rare... service life of the connecting device of the rare earth electrolytic furnace is greatly prolonged. The height of the connecting device of the rare earth electrolytic furnace can be flexibly adjusted by adopting detachable connecting modes such as bolt...
- 2. Graphite crucible for rare earth molten salt electrolysis**  
CN210176971U • 2020-03-24 • JIANGSU JINSHI RARE EARTH CO LTD  
Earliest priority: 2019-06-21 • Earliest publication: 2020-03-24  
The utility model discloses a graphite crucible for rare earth molten salt electrolysis. The exterior of the graphite crucible is...
- 3. Rare earth carbonate drying device**  
CN210237154U • 2020-04-03 • CHALCO GUANGXI GUOSHENG RARE EARTH DEV CO LTD  
Earliest priority: 2018-10-19 • Earliest publication: 2019-03-15  
...The utility model discloses a rare earth carbonate drying device which comprises a feeding steel platform, a feeding mechanism, a... of the cyclone separator. The utility model provides the rare earth carbonate drying device which can prevent a rotating brick returning kiln from pausing, realize uniform rotating speed, utilize high-temperature gas to dry rare earth carbonate...
- 4. RARE EARTH FLUORIDE PREPARING METHOD**  
CN1017985B (A) • 1992-08-26 • GANSU RARE EARTH CO  
Earliest priority: 1989-07-07 • Earliest publication: 1991-01-16  
The invention is referred to the rare-earth metal fluorides preparing method in which the soluble rare-earth salts water solution, rare-earth oxides, oxalic acid rare-earth salts, sulfuric acid rare-earth ammonium complex salts, and pulp slurry of acid carbonic acid rare-earth salts are used as raw material liquid, the oxalic acid is added, then the hydrofluoric ...
- 5. MATERIALS, METHODS AND TECHNIQUES FOR CONVERTING RARE EARTH DOUBLE SULF...**

## BASIC USE OF ESPACENET (3/4)



The screenshot shows the Espacenet Patent search interface. The search term "rare earth" is entered in the search bar. The "Filters" button is highlighted with a blue border. The results page displays 522,014 results found. The results are presented in a list view, with sorting options for "Text only", "List content", and "Sort by Relevance". The first result is a patent application for a "Connecting device of rare earth electrolytic furnace" filed on 2019-06-01 and published on 2020-03-24 by GANZHOU QIANDONG RARE EARTH GROUP CO LTD. The second result is a utility model for a "Graphite crucible for rare earth molten salt electrolysis" filed on 2019-06-21 and published on 2020-03-24 by JIANGSU JINSHI RARE EARTH CO LTD.

Home > Results

Family  Publication

Countries (family) Languages (family) Earliest publication date (family)

Earliest priority date

IPC main groups

IPC subgroups

CPC main groups

522 014 results found

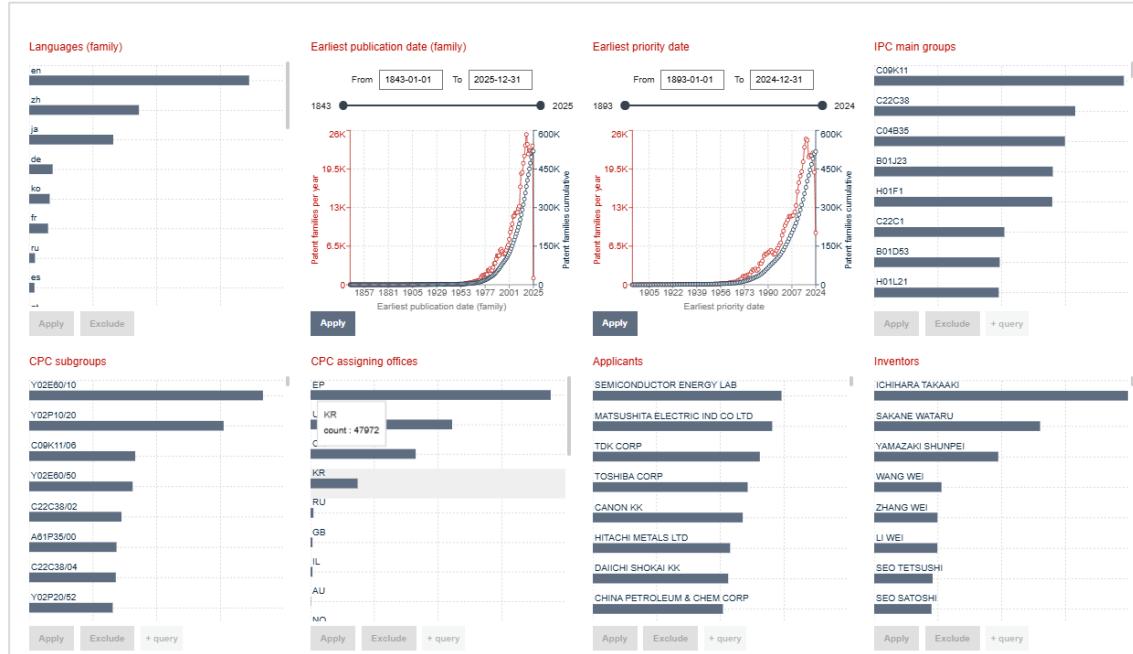
List view List content Sort by Relevance

(0 patents selected) Select the first 20 results

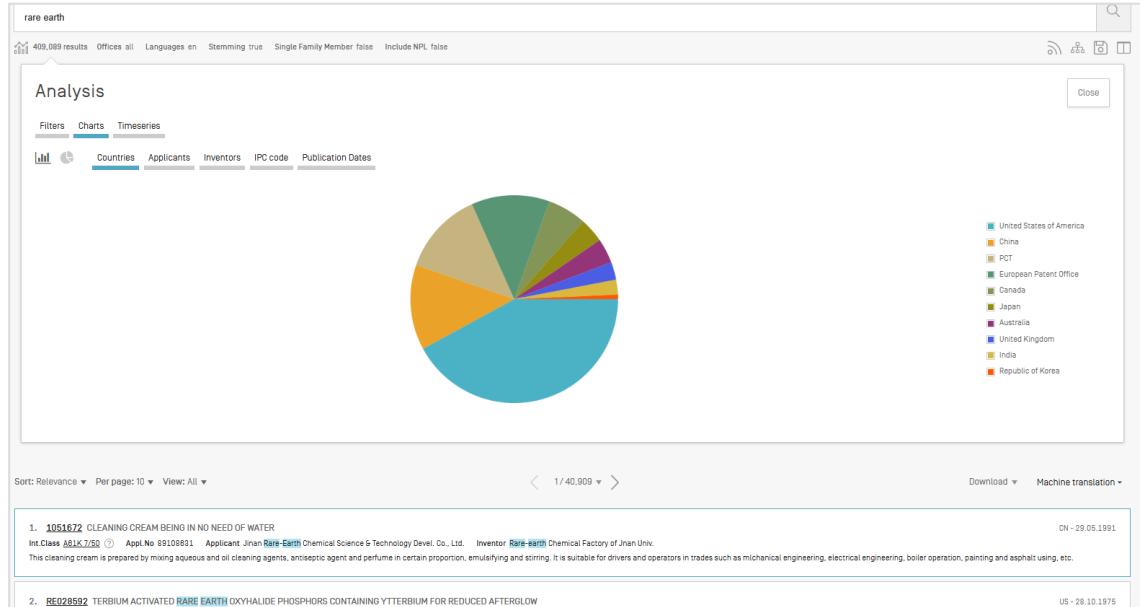
1. Connecting device of rare earth electrolytic furnace  
CN210176972U • 2020-03-24 • GANZHOU QIANDONG RARE EARTH GROUP CO LTD  
Earliest priority: 2019-06-01 • Earliest publication: 2020-03-24  
...The invention discloses a connecting device of a rare earth electrolytic furnace, and belongs to the technical field of rare... service life of the connecting device of the rare earth electrolytic furnace is greatly prolonged. The height of the connecting device of the rare earth electrolytic furnace can be flexibly

2. Graphite crucible for rare earth molten salt electrolysis  
CN210176971U • 2020-03-24 • JIANGSU JINSHI RARE EARTH CO LTD  
Earliest priority: 2019-06-21 • Earliest publication: 2020-03-24  
The utility model discloses a graphite crucible for rare earth molten salt electrolysis. The exterior of the graphite crucible is...

## BASIC USE OF ESPACENET (4/4)



# BASIC USE OF PATENTSCOPE



# ONE STEP FURTHER: PARADIGM PRIOR-ART VS. LANDSCAPING



## ONE STEP FURTHER: PATSTAT AND GPI (1/3)

■ With PATSTAT you can:

- identify business opportunities
- see what your competitors are doing
- monitor trends in technology

[PATSTAT | epo.org](http://PATSTAT | epo.org)

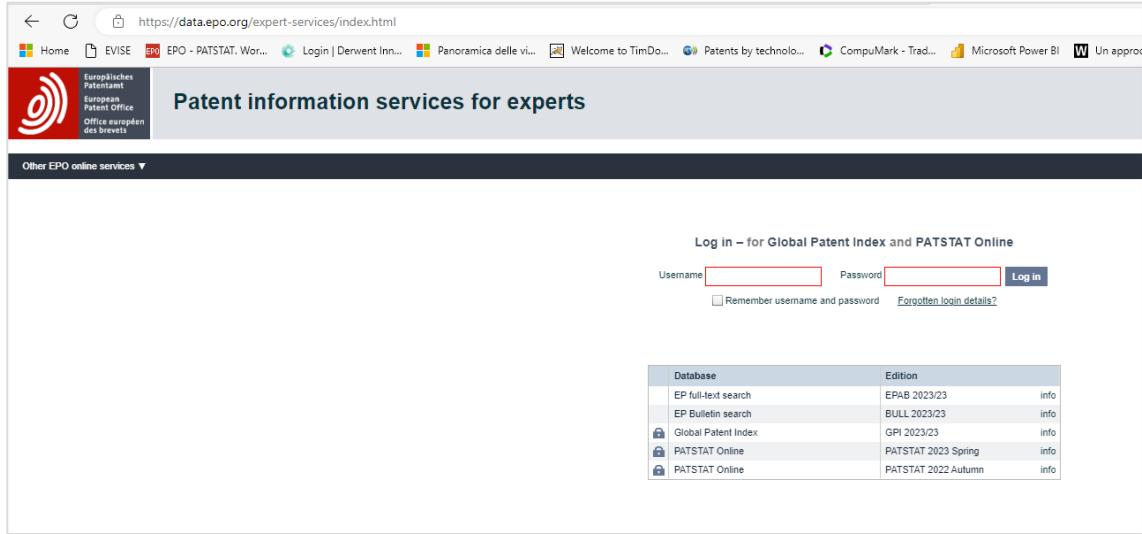
## ONE STEP FURTHER: PATSTAT AND GPI (2/3)

- With GPI you can:

- perform regular monitoring of technical areas or companies to identify newly added patent documents
- use the built-in charts to visualise technical trends and companies' patenting activity, monitor trends in technology
- choose the data you want to see and download to focus on what you are interested in
- run data quality assessments to measure the risk of incomplete search results

[Global Patent Index \(GPI\) | epo.org](http://Global Patent Index (GPI) | epo.org)

## ONE STEP FURTHER: PATSTAT AND GPI (3/3)



https://data.epo.org/expert-services/index.html

Home EVISE EPO - PATSTAT. Wor... Login | Derwent Inn... Panoramica delle vi... Welcome to TimDo... Patents by technolo... CompuMark - Trad... Microsoft Power BI Un approv...

Europäisches Patentamt European Patent Office Office européen des brevets

Patent information services for experts

Other EPO online services ▾

Log in – for Global Patent Index and PATSTAT Online

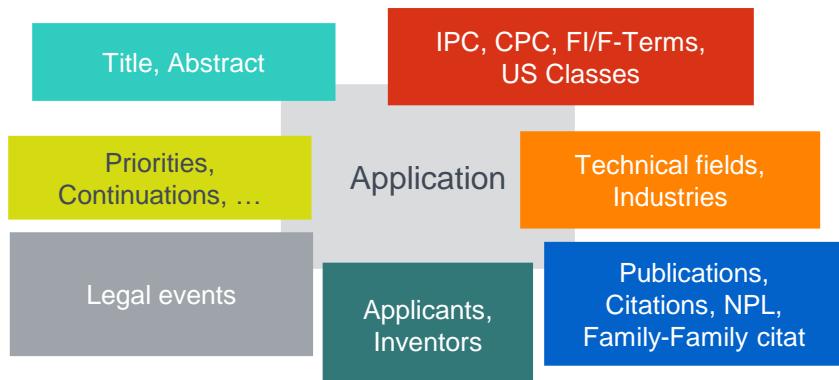
Username  Password  Log in

Remember username and password [Forgotten login details?](#)

Database	Edition	info
EP full-text search	EPAB 2023/23	info
EP Bulletin search	BULL 2023/23	info
Global Patent Index	GPI 2023/23	info
PATSTAT Online	PATSTAT 2023 Spring	info
PATSTAT Online	PATSTAT 2022 Autumn	info

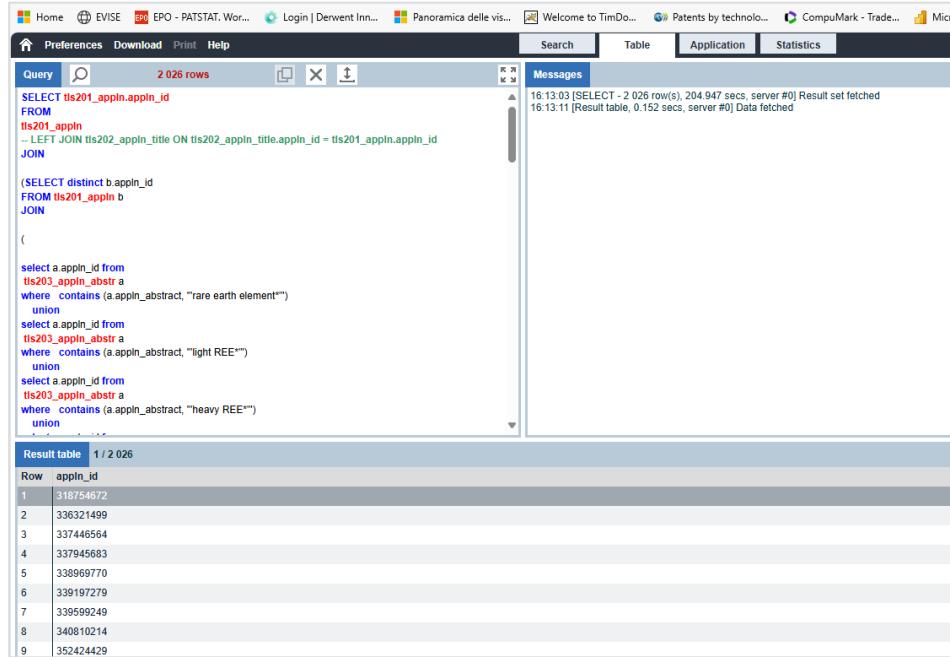
# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (1/7)

SQL: SELECT (attributes) FROM (table/s) WHERE (clause = data filtering)



```
355 SELECT tls201_appln.appln_id
356 FROM
357 tls201_appln
358 -- LEFT JOIN tls202_appln_title ON tls202_appln_title.appln_id = tls201_appln.appln_id
359 JOIN
360
361 (SELECT distinct b.appln_id
362 FROM tls201_appln b
363 JOIN
364 (
365
366
367 select a.appln_id from
368 | tls203_appln_abstr a
369 | where contains (a.appln_abstract, "rare earth element*")
370 | union
371 select a.appln_id from
372 | tls203_appln_abstr a
373 | where contains (a.appln_abstract, "light REE*")
374 | union
375 select a.appln_id from
376 | tls203_appln_abstr a
377 | where contains (a.appln_abstract, "heavy REE*")
378 | union
379 select a.appln_id from
380 | tls203_appln_abstr a
381 | where contains (a.appln_abstract, "rare earth metal*")
382 | union
383 select a.appln_id from
384 |
```

# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (2/7)



The screenshot shows the EPO-PATSTAT search interface. The top navigation bar includes links for Home, EVISE, EPO - PATSTAT, Wor..., Login | Derwent Inn..., Panoramica delle vis..., Welcome to TimDo..., Patents by technolo..., CompuMark - Trade..., and Microsoft. The main menu has options for Preferences, Download, Print, Help, Search, Table, Application, and Statistics.

The Query pane contains the following SQL code:

```
SELECT tis201_appln.appln_id
FROM
tis201_appln
-- LEFT JOIN tis202_appln_title ON tis202_appln_title.appln_id = tis201_appln.appln_id
JOIN
(
    SELECT distinct b.appln_id
    FROM tis201_appln b
    JOIN
    (
        select a.appln_id from
        tis203_appln_abstr a
        where contains (a.appln_abstract, "rare earth element")
        union
        select a.appln_id from
        tis203_appln_abstr a
        where contains (a.appln_abstract, "light REE")
        union
        select a.appln_id from
        tis203_appln_abstr a
        where contains (a.appln_abstract, "heavy REE")
        union
    )
)
```

The Messages pane displays log entries:

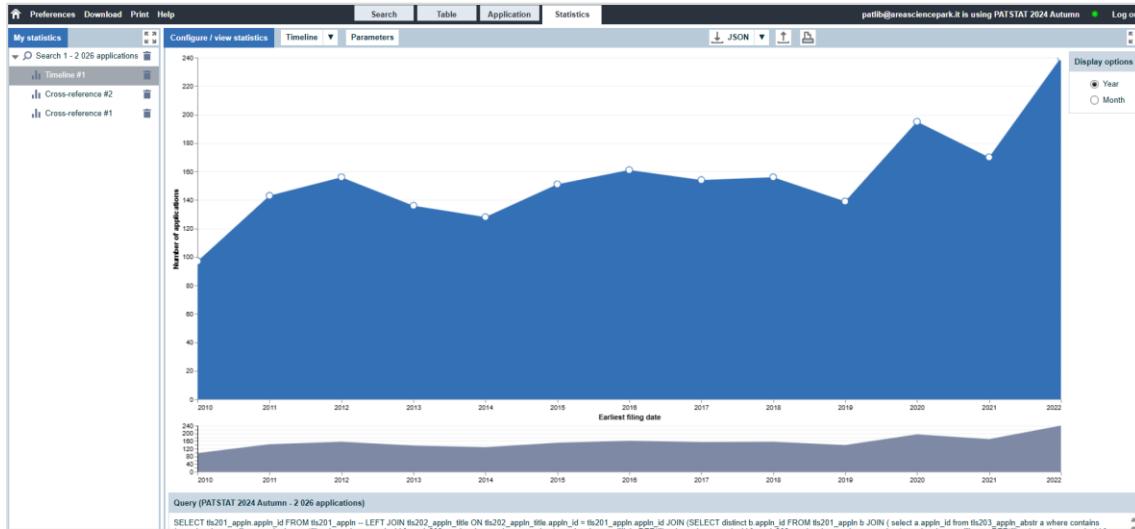
```
16:13:03 (SELECT - 2 026 row(s), 204.947 secs, server #0) Result set fetched
16:13:11 [Result table, 0.152 secs, server #0] Data fetched
```

The Result table shows the first 9 rows of the search results:

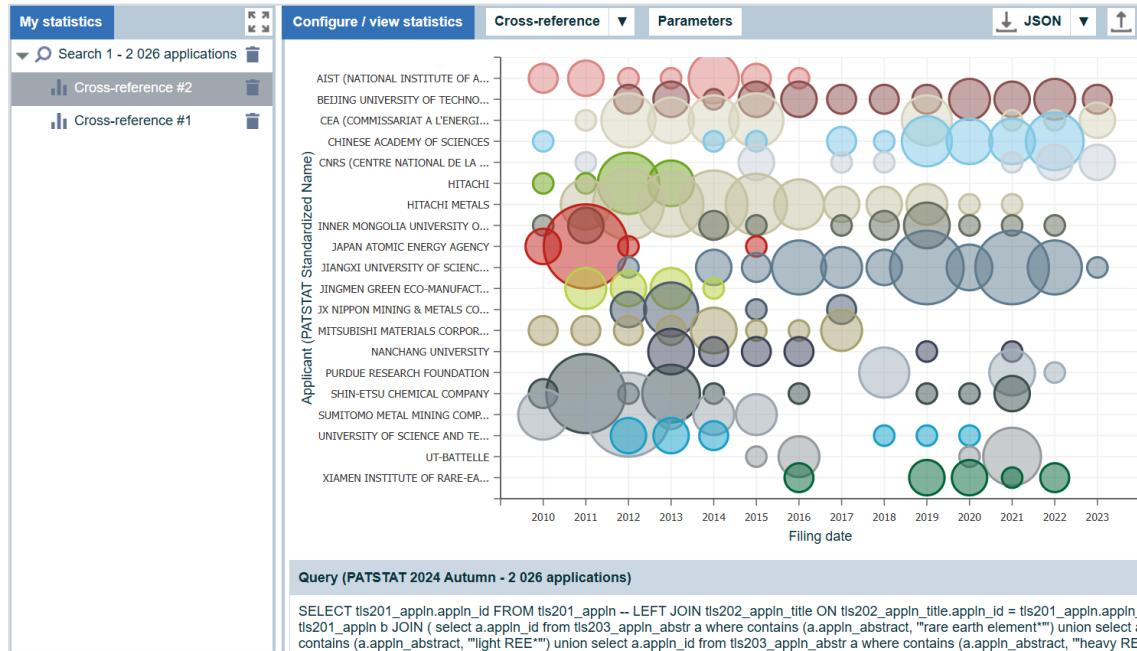
Row	appln_id
1	318754672
2	336321499
3	337446564
4	337945683
5	338969770
6	339197279
7	339595249
8	340810214
9	352424429

# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (3/7)

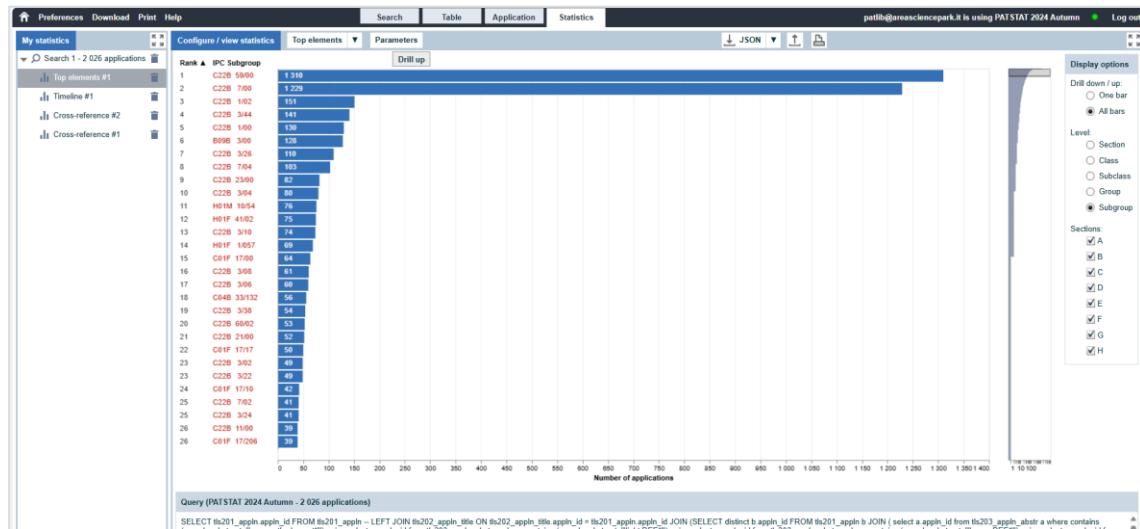
# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (4/7)



# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (5/7)



## ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (6/7)



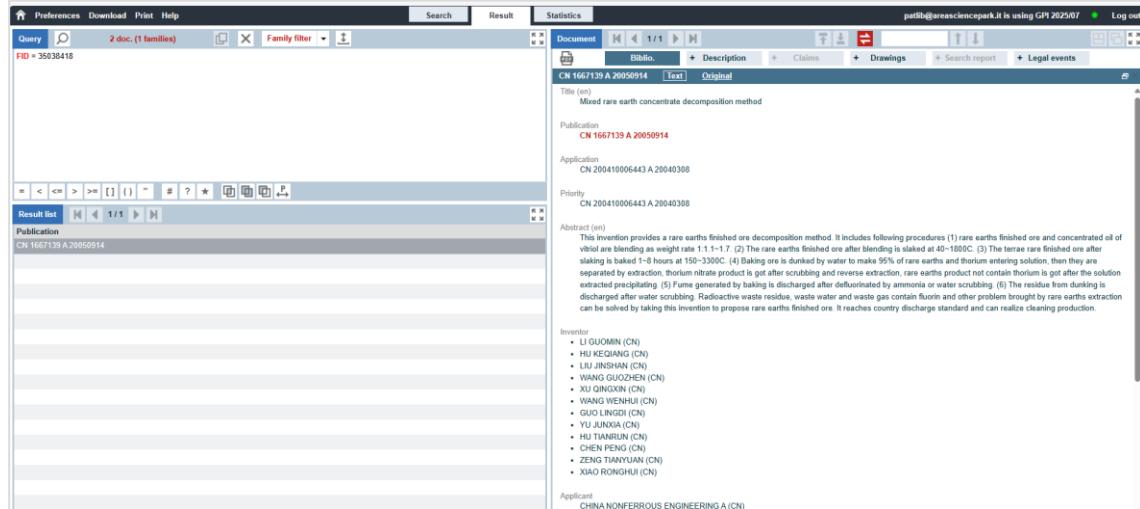
# ONE STEP FURTHER: PATSTAT SEARCH BASED ON SQL LANGUAGE (7/7)



## ONE STEP FURTHER: CONNECTION BETWEEN PATSTAT AND GPI (1/3)

	family	year	title
0	35038418	2004	Mixed rare earth concentrate decomposition method
1	36719828	2004	NONORIENTED MAGNETIC STEEL SHEET HAVING EXCELL...
2	36951179	2005	HARDENED MARTENSITIC STEEL, METHOD FOR MAKING ...
3	36951179	2005	Hardened martensitic steel, method for produci...
4	35963102	2004	Production method of acid extractant saponifyi...
...	...	...	...
6781	88602668	2023	Slag filtering equipment for rare earth oxide
6782	89097760	2023	Method for recovering and producing rare earth...
6783	88568561	2023	Method for separating bastnaesite and monazite...
6784	86976495	2023	Method for rapidly identifying partition type ...
6785	89568707	2023	Hoisting tool for rare earth electrolysis

# ONE STEP FURTHER: CONNECTION BETWEEN PATSTAT AND GPI (2/3)



The screenshot shows a patent document from the European Patent Office (EPO) search interface. The document ID is CN 1667139 A 20050914. The title is "Mixed rare earth concentrate decomposition method". The publication date is CN 1667139 A 20050914. The application date is CN 200410006443 A 20040308. The priority date is CN 200410006443 A 20040308. The abstract describes a rare earth finished ore decomposition method involving procedures such as calcining, leaching, precipitation, and reverse extraction to produce a thorium nitrate product and a rare earth product. The document also mentions radioactive waste residues, waste water, and waste gas.

Abstract (en)

This invention provides a rare earths finished ore decomposition method. It includes following procedures (1) rare earths finished ore and concentrated oil of vibrate and leach at 100-150°C for 1-1.7 hours; (2) rare earths finished ore and concentrated oil of vibrate and leach at 100-150°C for 1-1.7 hours; (3) The leach solution is separated by filter, the leach solution is alkalinized and then calcined at 100-150°C for 1-1.7 hours; (4) the calcined residue is leached by water to make 95% of rare earths and thorium; (5) The leach solution is separated by extraction, thorium nitrate product is got after scrubbing and reverse extraction, rare earths product not contain thorium is got after the solution extracted precipitating; (6) Fume generated by baking is discharged after defluorination by ammonia or water scrubbing; (6) The residue from leaching is discharged after water scrubbing. Radioactive waste residues, waste water and waste gas contain fluorine and other problem brought by rare earths extraction can be solved by taking this invention to propose rare earths finished ore. It reaches country discharge standard and can realize cleaning production.

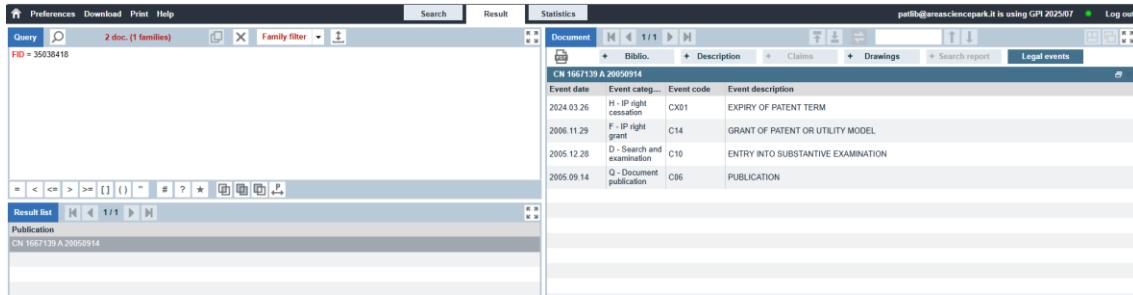
Inventor

- LI GUOMIN (CN)
- HU KEQIANG (CN)
- LIU JINSHAN (CN)
- WANG GUOZHEN (CN)
- XU QINGXIN (CN)
- YANG YUNJIAO (CN)
- GOU LINGHUA (CN)
- YU JUNXIA (CN)
- HU TIANRUN (CN)
- CHEN PEN (CN)
- ZENG TIANYUAN (CN)
- XIAO RONGHUI (CN)

Applicant

CHINA NONFERROUS ENGINEERING A (CN)

# ONE STEP FURTHER: CONNECTION BETWEEN PATSTAT AND GPI (3/3)



The screenshot shows the EPO Online Database interface. At the top, there are tabs for Preferences, Download, Print, Help, Search, Result, and Statistics. The Result tab is active. A search bar shows the query ID: 35038418, resulting in 2 doc. (1 families). There is a Family filter button. The main area displays a patent document with the identifier CN 1667139 A 20050914. Below the document title, there is a table of legal events:

Event date	Event category	Event code	Event description
2024.03.26	H - IP right cessation	CX01	EXPIRY OF PATENT TERM
2006.11.29	F - IP right	C14	GRANT OF PATENT OR UTILITY MODEL
2005.12.28	D - Search and examination	C10	ENTRY INTO SUBSTANTIVE EXAMINATION
2005.09.14	Q - Document publication	C06	PUBLICATION

At the bottom left, there is a Result list section with a Publication entry for CN 1667139 A 20050914.

# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (1/8)

<https://app.powerbi.com/view?r=eyJrIjoiYzE4YmU3ZDEzZDc0MDk3LThjMmM0OWRINmFindQzMTkyIiwidC16ImQ0YWFmY2E2LWjmMzUjNDUuNS1iMD2hLTQ5NzNjZGZyrmVkJMylsImM0Jh9EVSE>

EPO - PATSTAT, World Patent Information, Login | Derwent Innovations Index, Panoramica delle voci, Welcome to TimDoc, Patents by technology, CompuMark - Trade, Microsoft Power BI, Un approccio big data, Biopatent Law: Patent Data, Altri preferiti

PATENT DOCUMENTS' SEARCH STRATEGY BASED ON THE COMBINATION OF REE KEYWORDS AND IPC/CPC CLASSIFICATION CODES

AREA SCIENCE PARK

The patent search has been performed on PATSTAT online (ed. Spring 2022)

The timeframe is determined as the "earliest\_filing\_year" ranging from 2010 to 2022

The list of classification codes (either IPC or CPC) follows:

REE Keywords + → REE (recycling) → ALL → CONTROL (recycling)

Analysis of patent families (ranking of IPC/CPC codes, ranking of corresponding patent authorities, ranking of players, assessment of legal protection strategies adopted by TOP players in the last 12 years).

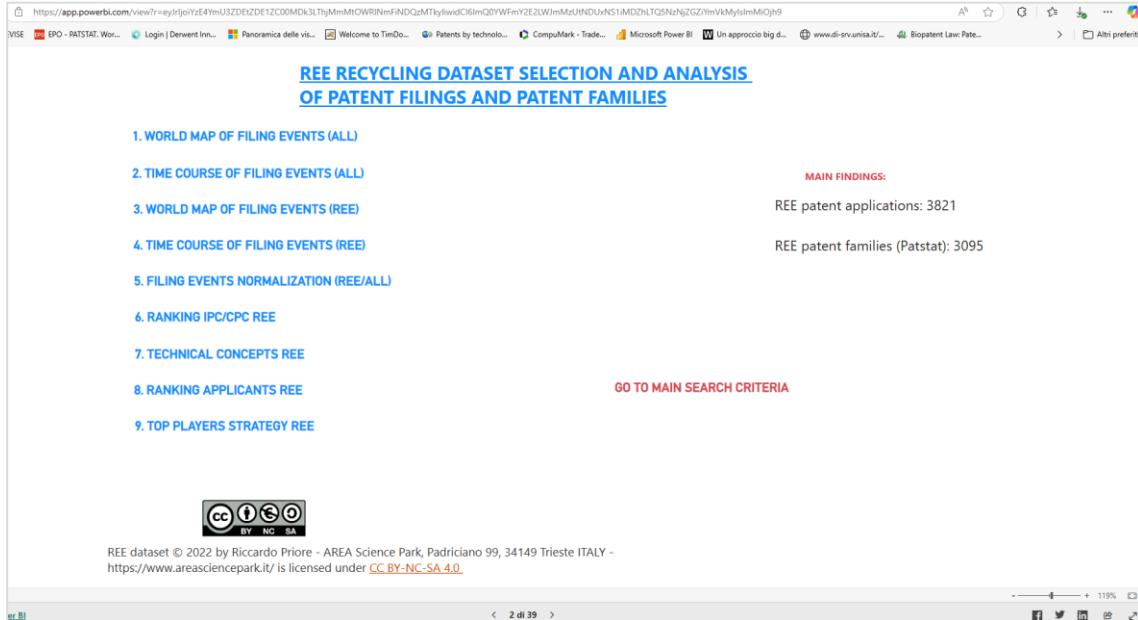
1) Worldwide mapping of patent applications' events and trends over time.  
2) Normalization (= patent applications REE Keywords + cl. codes per authority/patent applications cl. codes only per authority) over time

Analysis of patent families (ranking of corresponding patent authorities).

A43B1/12, B03B9/06, B22F8, B29B7/66, B29B17, B30B9/32, B62D67, B65H73, B65D65/46, C03B1/02, C04B7/24-30, C04B11/26, C04B18/04-305, C04B33/132, C08J1, C09K11/01, C10M175, C22B7, C22B19/28-30, C22B25/06, D01G11, D21B1/08-10, D21B1/32, D21C5/02, D21H17/01, H01B 15/00, H01J 9/52, H01M 6/52, H01M 10/54, Y02W30/52, Y02W30/56, Y02W30/58, Y02W30/60, Y02W30/62, Y02W30/64, Y02W30/66, Y02W30/74, Y02W30/78, Y02W30/80, Y02W30/82, Y02W30/84, Y02W30/91, **Y02P10/20**

GO TO SUMMARY

# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (2/8)



https://app.powerbi.com/view?r=eyJrIjoiYzE4YmI3ZDEzZDE1ZC00MDk3LThjMmMtOWRlNmFINDQzMThyIiwidCI6ImQ0YWfmY2E2WjmMzUHNDUxNS1MD2hLTQS NzNjZGZjYmVkJMylsJmMiQjh9

VISE EPO - PATSTAT. Wor... Login | Derwent Inn... Panoramica delle vis... Welcome to TimDo... Patents by technolo... CompuMark - Trade... Microsoft Power BI Un approccio big d... www.di-srv.unisa.it/... Biopatent Law Pat... Altri preferiti

### REE RECYCLING DATASET SELECTION AND ANALYSIS OF PATENT FILINGS AND PATENT FAMILIES

1. WORLD MAP OF FILING EVENTS (ALL)  
2. TIME COURSE OF FILING EVENTS (ALL)  
3. WORLD MAP OF FILING EVENTS (REE)  
4. TIME COURSE OF FILING EVENTS (REE)  
5. FILING EVENTS NORMALIZATION (REE/ALL)  
6. RANKING IPC/CPC REE  
7. TECHNICAL CONCEPTS REE  
8. RANKING APPLICANTS REE  
9. TOP PLAYERS STRATEGY REE

MAIN FINDINGS:

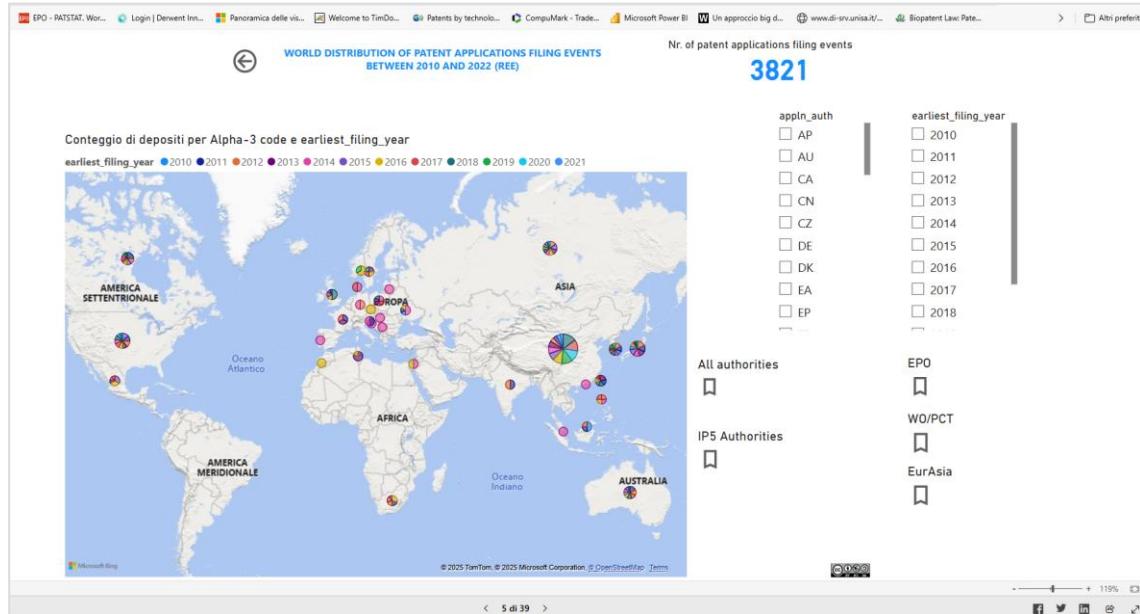
REE patent applications: 3821  
REE patent families (Patstat): 3095

GO TO MAIN SEARCH CRITERIA

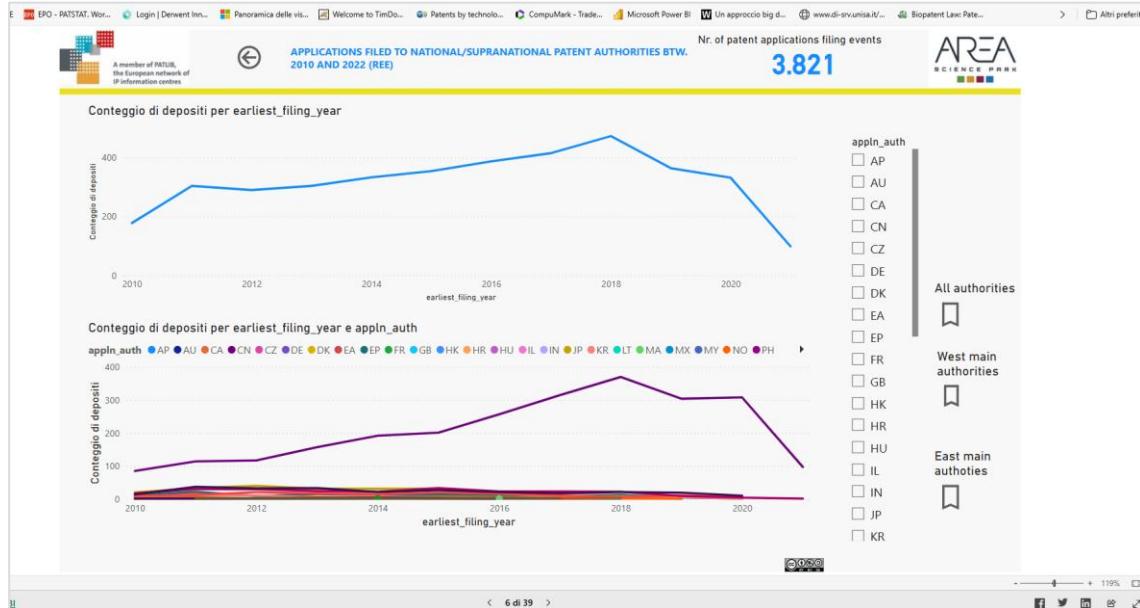
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# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (3/8)



# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (4/8)



# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (5/8)

EPO - PATSTAT: Wor... Login | Derwent Inv... Panorama delle vis... Welcome to TimDo... Patents by technolo... CompuMark - Trade... Microsoft Power BI Un approccio big d... www.di-srv.unisa.it/... Biopatent Law Pat... > Altri preferiti

A member of PATLIB, the European network of IP information centres

CHECK: REE PATENT FAMILIES, RANKING OF TECHNICAL CONCEPTS 3004 AREA SCIENCE PARK

Value

Value

Concetto di docdb\_family\_id per Value

Famiglie appn\_title

42246034 Water-soluble bis-triazinyl-pyridines, bipyridines and terpyridine synthesis and use of same

42286706 EXTRACTION OF ELEMENTS FROM CARBONATE-CONTAINING N

42460234 Rare-earth low-nickel austenitic stainless steel

42475890 Method for recycling smelting slag of ABS type rare earth-based hydrogen storage alloy

42521872 Method for recovering rare earth from cill shale waste slag

42530828 Method for improving efficiency of acidic organophosphorus ex for extraction separation of rare-earth elements

42585760 Rare-earth-containing iron and steel modifier and preparatic

Value

RARE EARTH 450

LEACHING 289

RARE EARTH ORE 286

RARE EARTH EXTRACTION 243

RARE EARTH OXIDE 216

ORGANIC PHASE 211

LEACHING SOLUTION 195

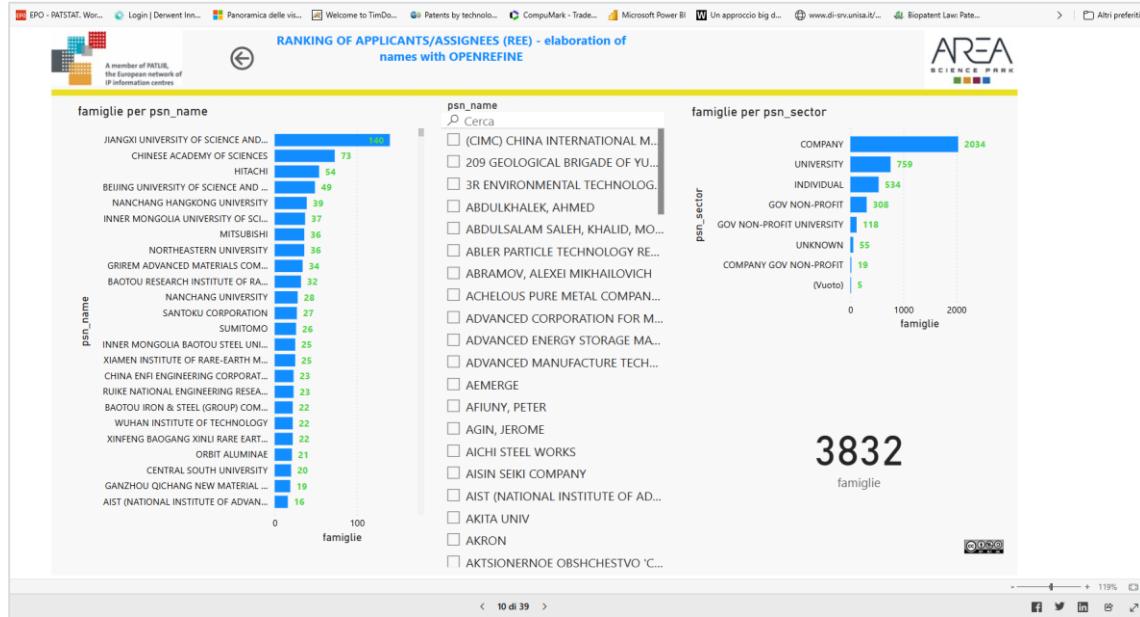
0 1,000

Concetto di docdb\_family\_id

docdb_family_id	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	0
MAGNESIUM ALLOY	M	HALIDE ALLOY	MG AL ALLOY	SIMULTANEOUS DEPOSITION	CHARGING ELECTROLYTE	HALIDE SALT	RECRYSTALLIZE D ALUMINA CRUCIBLE	GRAPHITE ANODE	ALKALI CHLORIDE	ALLOY PARTICLE	MAGNESIUM DEPOSITION	MAGNESIUM ALUMINUM ALLOY	ELECTROLYTIC CELL	HALIDE ADDITION	METALLIC MAGNESIUM S	ELECTR ALUMINUM ALLOY PARTICLE	
11510817 TAPPET	ATTACHING SHAFT	SEAT	SHAFT	BOUNCE CHAIR	FIXED SHAFT END	ESTHETIC APPEARANCE	FLOOR	DEVICE TITLE	BEARING GROOVE	FIXING SHAFT	FIXING BOLT	BEARING COVER	OUTER CIRCUMFERENCE	INNER CHAIR	BOLT H		
11512069 TAPPET	CAM	PUSH ROD	PUSH ROD VALVE	VALVE	PUSH UP	OUTER CYLINDER	OUTER CIRCUMFERENCE	MACHINING CYLINDER	INNER CYLINDER	ACTUALITY	UPPER END OUTER CIRCUMFERENCE	COMBUSTOR BASKET HALF	INNER TUBE SLIDE	TAPPET DURABILITY	CAMSH		
12097594 COMPANY LINE	CONTACT STATION	AUTOMATIC TIRE BUILDER	MIDDLE	TICKET USAGE	AUTOMATIC TICKET MACHINE	STAYED STATION	UIC EXTRACTIO N	TICKET	ENTRY EXTRACTI ON	FRAUDULENT RIDING	EXTRACTION DATA	TELECOMMUNICATIO N TICKET	REGULAR PASSENGER EXIT	DISALLOWING	REGUL TICKET		
12127433 HORIZONTAL CAPACITOR	HORIZONTAL INPUT	HORIZONTAL	OUTPUT	HORIZONTAL CURRENT IB	CONVERSION	INPUT HORIZONTAL CIRCUIT	SIGNAL	LOW FREQUEN	OUTPUT CURRENT IA	FREQUENCY CURRENT	OUTPUT CURRENT	HORIZONTAL VARIABLE RESISTOR	VARIABLE RESISTOR	HORIZC			

8 di 39 < > + 119% 🔍

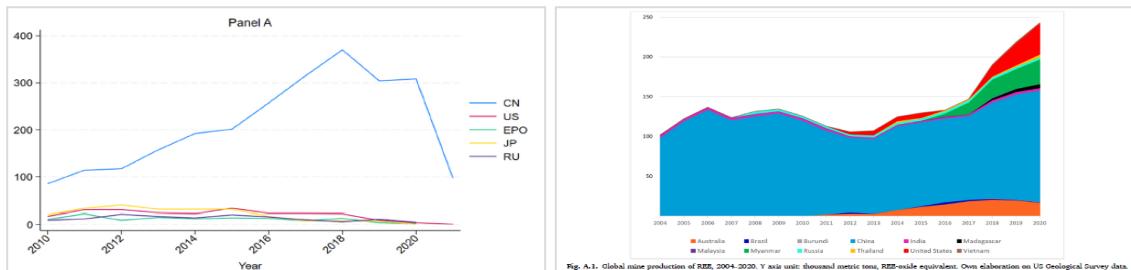
# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (6/8)



# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (7/8)



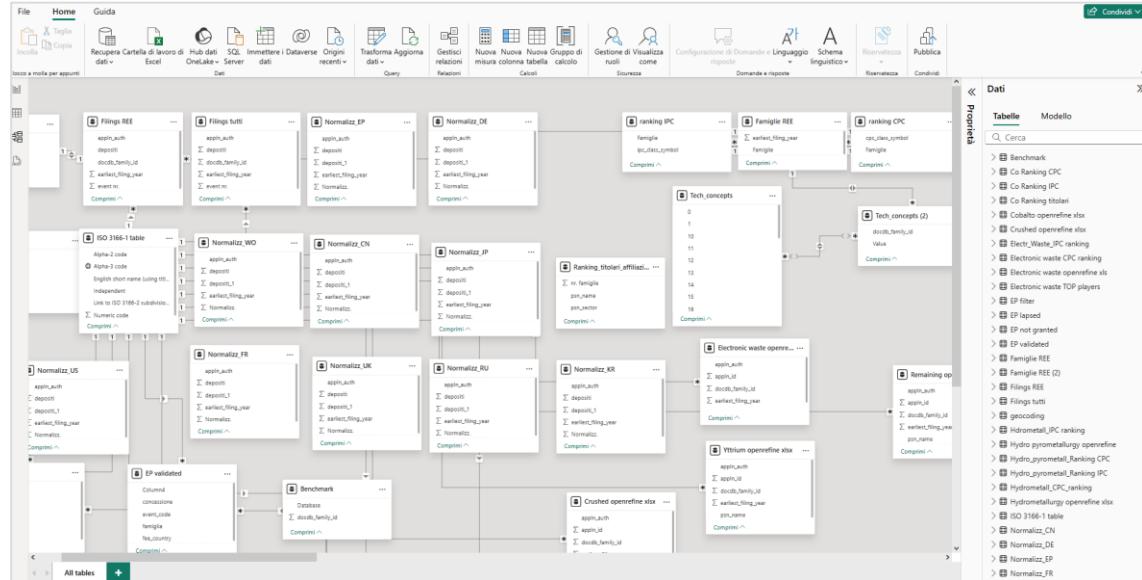
# ONE STEP FURTHER: DELIVERY OF CUSTOMIZED RESULTS FROM PATSTAT (8/8)



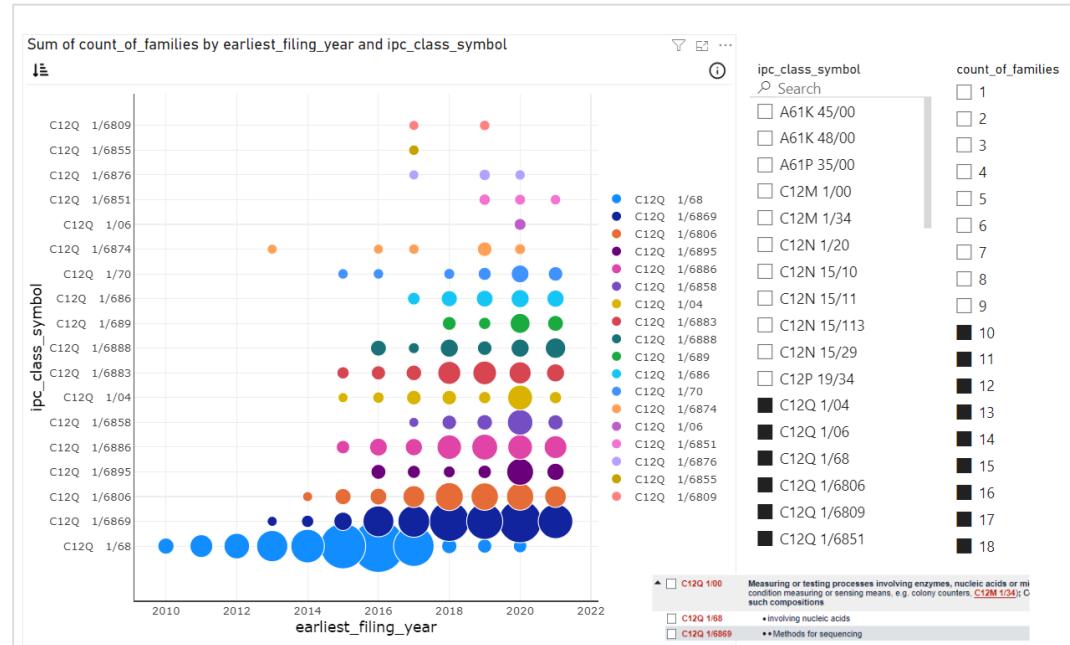
## ONE STEP FURTHER: PATSTAT AND GPI

- Delivery of the data might be improved, however:
  - Need of subscription to MS Power BI (institution's account)
  - Share a URL with the customer (possible leakage of information because of online publication of the data)
  - Assembling the data is time consuming (avg. 1 week to produce a complete report)
  - refinement of Patstat results. For example: normalization, YoY growth elaboration, IPC/CPC classification codes co-occurrence, maps of forward citations, maps of applicant/attorney relationships etc. require additional elaboration of the data.
  - ...

# WHY MIGHT BE IMPROVEMENT WELCOME... (1/2)



## WHY MIGHT BE IMPROVEMENT WELCOME... (2/2)



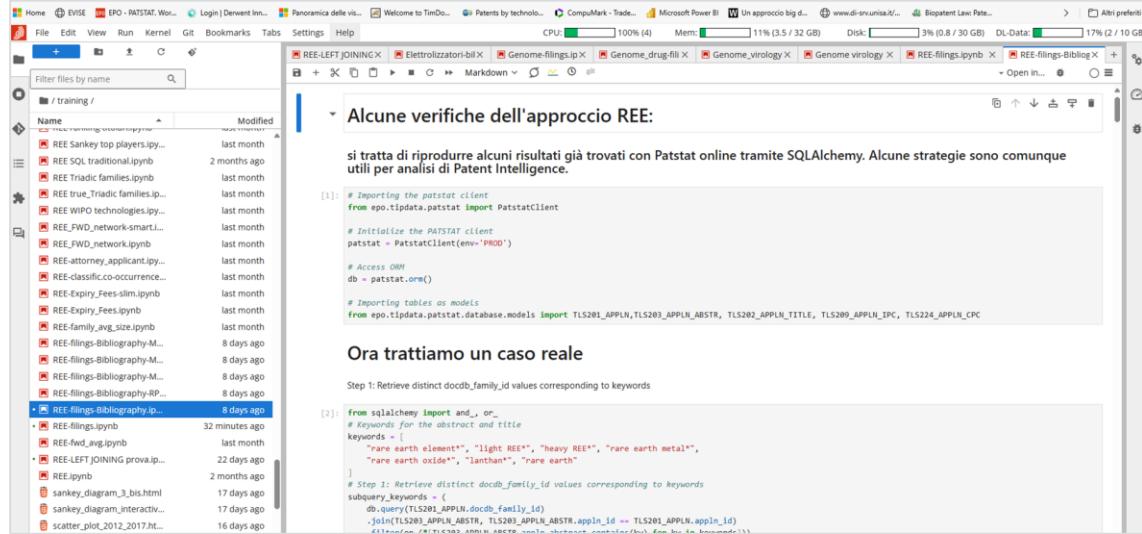
## TIP ("ONE STOP SHOP TOWARDS AI BASED ANALYSIS")

## TIP: TECHNOLOGY INTELLIGENCE PLATFORM

- With TIP you can:
  - Easily process, analyse and visualise patent data,
  - Benefit from free access to the EPO's high quality patent data (PATSTAT and EP full-text)
  - **Merge patent data with other sources of data to gain valuable insights**
  - Establish the foundation for data-driven decision-making
  - Develop advanced patent information solutions, e.g. by leveraging generative AI
  - Interact with the patent intelligence community.

[Technology Intelligence Platform |  
epo.org](https://www.epo.org/tip.html)

# TIP (→ TOWARDS AI BASED ANALYSIS) (1/2)



The screenshot shows a Jupyter Notebook interface with several tabs open in the background, including "REE-LEFT JOINING X", "Elettrolizzatori-bil X", "Genomics delle vis... X", "Welcome to TimDo...", "Patents by technolo...", "CompuMark - Trade...", "Microsoft Power BI", "Un approccio big d...", "www.di-invinia.it...", "Bipatent Law Pat...", and "REE-filings.Biblogb X".

The main notebook cell contains the following text:

Alcune verifiche dell'approccio REE:  
si tratta di riprodurre alcuni risultati già trovati con Patstat online tramite SQLAlchemy. Alcune strategie sono comunque utili per analisi di Patent Intelligence.

```
[1]: # Importing the patstat client
from epo.tipdata.patstat import PatstatClient

# Initialize the PATSTAT client
patstat = PatstatClient(env='PDD0')

# Access ORM
db = patstat.orm()

# Importing tables as models
from epo.tipdata.patstat.database.models import TLS201_APPLN,TLS201_APPLN_ABSTR, TLS202_APPLN_TITLE, TLS209_APPLN_IPC, TLS224_APPLN_CPC
```

The next cell is titled "Ora trattiamo un caso reale" and contains the following text:

Step 1: Retrieve distinct docdb\_family\_id values corresponding to keywords

```
[2]: from sqlalchemy import and_, or_
# Keywords for the abstract and title
keywords = [
    "rare earth element*", "light REE*", "heavy REE*", "rare earth metal",
    "rare earth oxide*", "lanthan*", "rare earth"
]
# Step 1: Retrieve distinct docdb_family_id values corresponding to keywords
subquery_keywords = (
    db.query(TLS201_APPLN.docdb_family_id)
    .join(TLS201_APPLN_ABSTR, TLS201_APPLN_ABSTR.appln_id == TLS201_APPLN.appln_id)
    .filter(or_(*[TLS201_APPLN_ABSTR.keywords.contains(keyword) for keyword in keywords]))
).distinct()
```

## TIP (→ TOWARDS AI BASED ANALYSIS) (2/2)

Queries syntax might be based on SQL (as in Patstat) or SQLAlchemy (similar) and other languages can be used, such as

- Python
- Javascript
- Html
- ...



# REPORT FROM THE SCRATCH (1/3)

Click on any of the following links to view detailed data.

## Distribution of technical concepts

1. bibliographic\_data (B)
2. international\_applications\_trends (F)
3. national\_applications\_trends (F)
4. filings\_map (F)
5. yoy\_variation\_plot (F)
6. yoy\_variation\_plot (N)
7. applicants\_ranking (R)
8. grant\_rate\_with\_searchable\_table (GR)
9. sankey\_diagram\_whole (S)
10. bar\_diagram\_US (STR)
11. bar\_diagram\_china (STR)
12. bar\_diagram\_japan (STR)
13. bar\_diagram\_none (STR)
14. bar\_diagram\_canada (STR)
15. fee\_renewals (TAX)
16. triadic\_families\_map (TRI)
17. average\_forward\_citations\_plot (AFC)
18. scatter\_plot\_country\_codes\_percentage\_horizontal (FCN)
19. average\_family\_size\_by\_country (AFD)
20. tree\_diagram (W)
21. scatter\_plot\_2012\_2017 (CL)
22. scatter\_plot\_2018\_2023 (CL)
23. applicant\_attorney\_relationships (TMN)

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## REPORT FROM THE SCRATCH (2/3)

Home EUIPO EPO - PATSTAT, Wor... Login | Derwent In... Panoramica delle vis... Welcome to TimDo... Patents by technolo... CompuMark - Trade... Microsoft Power BI Un apprezzio big d... www.di-srujanika.it/... Biopatent Law Pat... > Altri preferiti

### Patent Bibliographic Data

Total number of distinct patent families: 5419

EP: 166 (3.06%)  
 WO: 230 (4.24%)  
 US: 101 (1.86%)  
 CN: 4564 (84.22%)

2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023

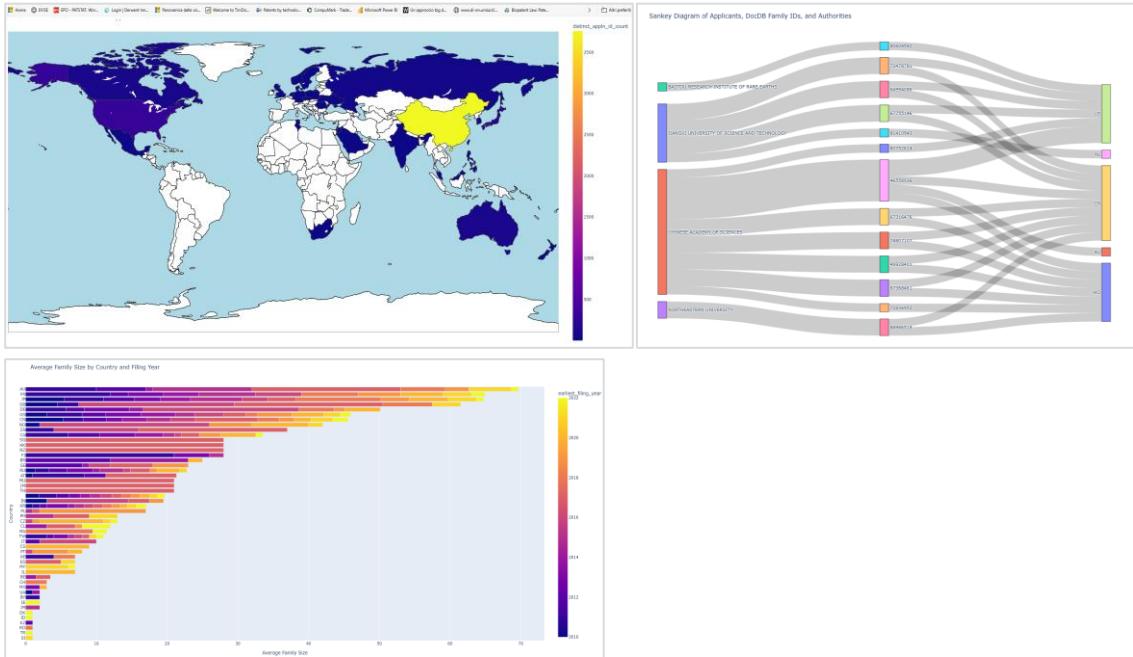
EP | WO | US | Reset | Show: 10 ▾ entries

Publication Number	docdb_family_id	Year	Title	Applicant	Main topic
EP1273284A1	81654533	2022	METHOD FOR SEPARATING A RARE EARTH ELEMENT IN SOLUTION	DUNNE, Peter	
EP4287220A1	82811813	2022	METHOD OF PREPARING A NDFEB MAGNET AND A NDFFB MAGNET OBTAINED THEREBY	Kashong, Ding	
EP1345980A8	84347415	2022	NICKEL-METAL HYDRIDE (NiMH) BATTERY RECYCLING	Kim, Kee-Chan	
EP4066963A1	75277823	2021	METHOD OF FORMING A STARTING MATERIAL FOR PRODUCING RARE EARTH PERMANENT MAGNETS FROM RECYCLED MATERIALS AND CORRESPONDING STARTING MATERIAL	Sturm, Saso	
EP4120297A1	82403753	2021	METHOD FOR RECYCLING RARE EARTH SINTERED MAGNET	AKADA, Kazuhito	
EP4137478A4	80975929	2021	N,N-DIHYDROCARBONYL AMINO CARBOXYLIC ACID, PREPARATION METHOD THEREFOR, AND USE THEREOF	Fujian Changting Golden Dragon Rare-Earth Co., Ltd.	
EP41155291A4	80659070	2021	N,N-DIHYDROCARBYL AMIDE CARBOXYLIC ACID, PREPARATION METHOD THEREFOR AND USE THEREOF	Fujian Changting Golden Dragon Rare-Earth Co., Ltd.	
EP4198152A1	80112021	2021	RECOVERY OF RARE EARTH ELEMENTS FROM ACIDIC MINE WATER	VALDERRAMA ANGEL, Cesar A.	
EP4271681A1	83285063	2021	MATERIALS, METHODS AND TECHNIQUES FOR GENERATING RARE EARTH CARBONATES	ZULKIFLI, Norazihan	
EP4298357A1	83049443	2021	SYSTEMS AND METHODS FOR EXTRACTING RARE EARTH ELEMENTS WITH ENGINEERED MICROORGANISMS	MEDIN, Sean	

Show 1 to 10 of 166 entries (filtered from 5,419 total entries)

Previous 1 2 3 4 5 ... 17 Next

## REPORT FROM THE SCRATCH (3/3)



# REPORT FROM THE SCRATCH: APPLICATIONS/GRANTED

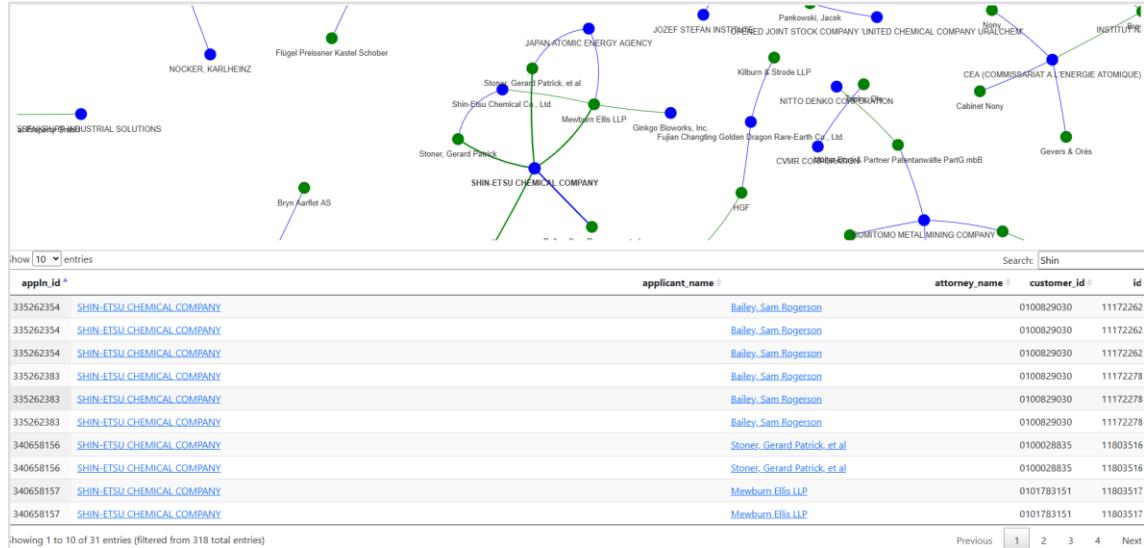


## Full List of Applicants

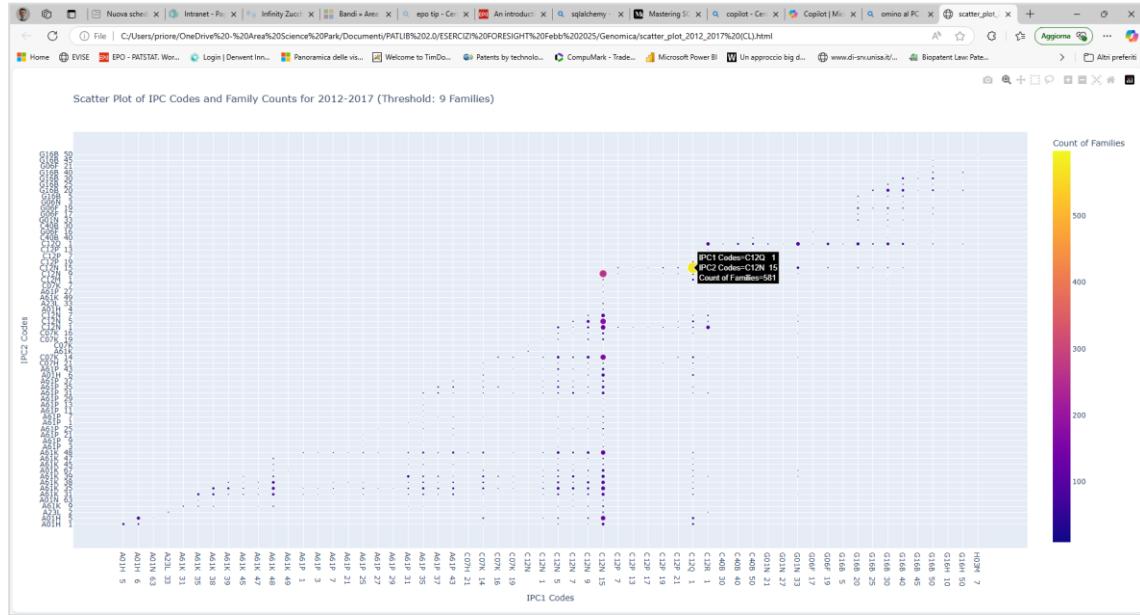
Search for applicants.

Applicant	Total Applications	Granted Applications	Not Granted Applications
JIANGXI UNIVERSITY OF SCIENCE AND TECHNOLOGY	183	135	48
CHINESE ACADEMY OF SCIENCES	109	65	44
BAOTOU IRON & STEEL (GROUP) COMPANY	66	20	46
HITACHI METALS	61	40	21
GRIREM ADVANCED MATERIALS COMPANY	61	48	13
BAOTOU RESEARCH INSTITUTE OF RARE EARTHS	49	32	17
NORTHEASTERN UNIVERSITY	48	30	18
SHIN-ETSU CHEMICAL COMPANY	45	31	14

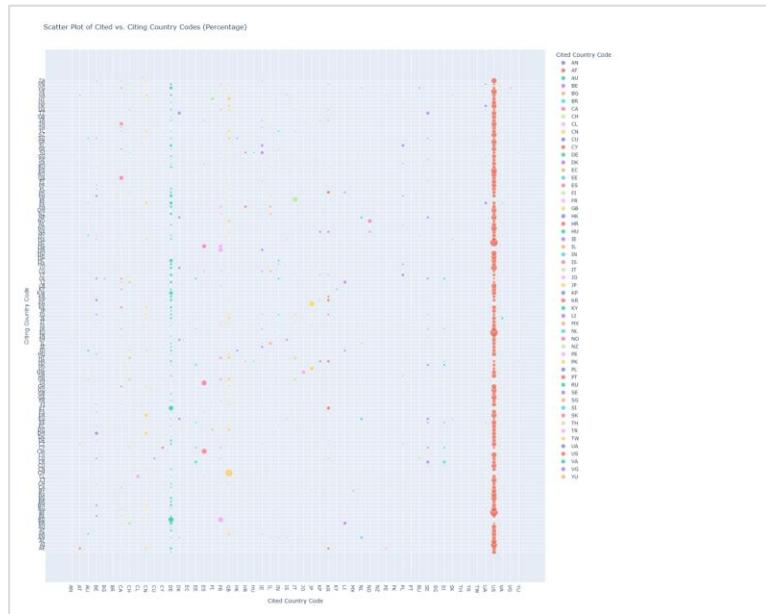
# REPORT FROM THE SCRATCH: APPLICANT/ATTORNEY



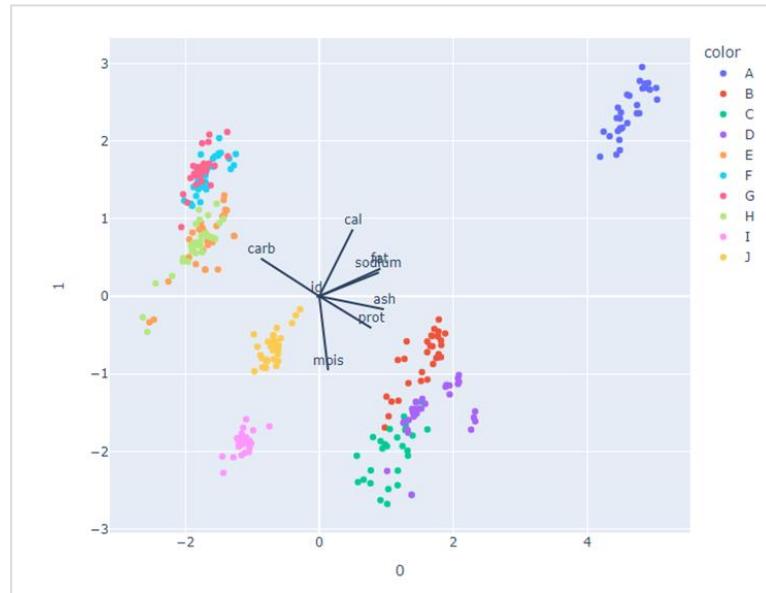
# REPORT FROM THE SCRATCH: COMBINATIONS OF IPC CLASSIFICATION CODES



# REPORT FROM THE SCRATCH: THE RATE OF FORWARD CITATIONS BY COUNTRY OF RESIDENCE



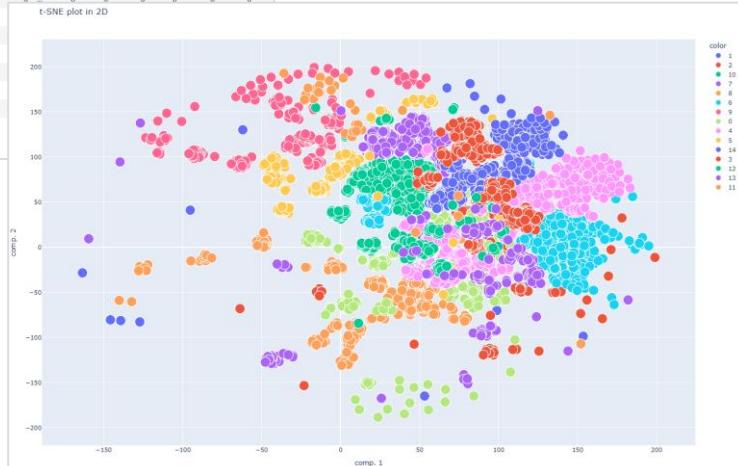
# REPORT FROM THE SCRATCH: "PIZZA BRAND CLUSTERING" BASED ON NUTRITIONAL FEATURES...



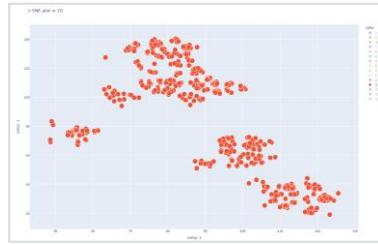
# ... REPORT FROM THE SCRATCH: T-SNE CLUSTERING BASED ON IPC COMBINATIONS (1/2)

[17]	FAMIGLIE	C12N15	C12Q1	C12N9	C07K14	G16B20	C12N5	A61K39	G16B30	A61K35	...	C12N7	A01H5	A01K67	C12R1	G01N33	A61K48	C07
0	50643553	0	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
1	42803352	1	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
2	35709224	1	1	0	1	0	0	0	0	0	...	0	0	1	0	1	0	0
3	88204987	1	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
4	59138902	1	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
33756	46207768	0	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1
33757	48628223	1	1	1	0	0	1	0	0	0	...	0	0	0	0	0	0	0
33758	55926311	0	1	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
33759	34797051	1	0	0	1	0	0	0	0	0	...	0	0	0	0	0	0	0
33760	58292847	1	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0

33761 rows x 21 columns



# ... REPORT FROM THE SCRATCH: T-SNE CLUSTERING BASED ON IPC COMBINATIONS (2/2)



	Percentage
docdb_family_id	
C12N15	96,23189394
C12Q1	23,95693136
C12N9	53,0282638
C07K14	45,22207268
G16B20	0,80753012
C12N5	54,10497981
A61K39	24,49528937
G16B30	0,403768506
A61K35	58,81561238
C12N1	23,01480485
C12N7	26,6487214
A01H5	2,960990044
A01K67	9,55585643
C12R1	4,441453567
G01N33	13,4589502
A61K48	33,4051144
C07K16	7,133243607
A61K31	56,39303135
A61K38	95,82772544
G16B40	0,269179004

Concepts	Count of patent families
NUCLEIC ACID	439
MAMMALIAN CELL	417
GENOME	347
DELETION	345
VECTOR	338
VIRAL VECTOR	309
NUCLEIC ACID SEQUENCE	305
ELECTROPORATION	301
EXCIPIENT	298

- A61K 38/00 Medicinal preparations containing peptides (peptides containing beta-lactam rings **A61K 31/00**; cyclic dipeptides not having in their molecule any other peptide link than those which form their ring, e.g. piperazine-2,5-diones, **A61K 31/00**; ergot alkaloids of the cyclic peptide type **A61K 31/48**; containing macromolecular compounds having statistically distributed amino acid units **A61K 31/74**; medicinal preparations containing antigens or antibodies **A61K 39/00**; medicinal preparations characterised by the non-active ingredients, e.g. peptides as drug carriers, **A61K 47/00**)
- A61K 48/00 Medicinal preparations containing genetic material which is inserted into cells of the living body to treat genetic diseases; Gene therapy
- C12N 15/00 Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification; Use of hosts therefor (mutants or genetically engineered microorganisms, *per se* **C12N 1/00**, **C12N 5/00**, **C12N 7/00**; new plants *per se* **A01H**; plant reproduction by tissue culture techniques **A01H 4/00**; new animals *per se* **A01K 67/00**; use of medicinal preparations containing genetic material which is inserted into cells of the living body to treat genetic diseases, gene therapy **A61K 48/00**)

## EVOLUTION OF PATENT LANDSCAPING

**Entry level DB:** Espacenet (free, easy to use and updated on daily basis) but not meant for analysis of bulk data. Equivalent tool: Patentscope

**State of art DB:** Patstat/GPI (free for Patlib, exclusively based on patent data), see also: [Searching for patents | epo.org](#) Reports may be implemented through additional tools, e.g. MS Power BI, Tableau...

**Innovative tools:** TPI (Beta-test available upon request). One stop shop based on notebooks (like Jupyter or Google Colab), compatible with several programming languages. Customized inputs allow the combination and analysis of patent and non patent data.

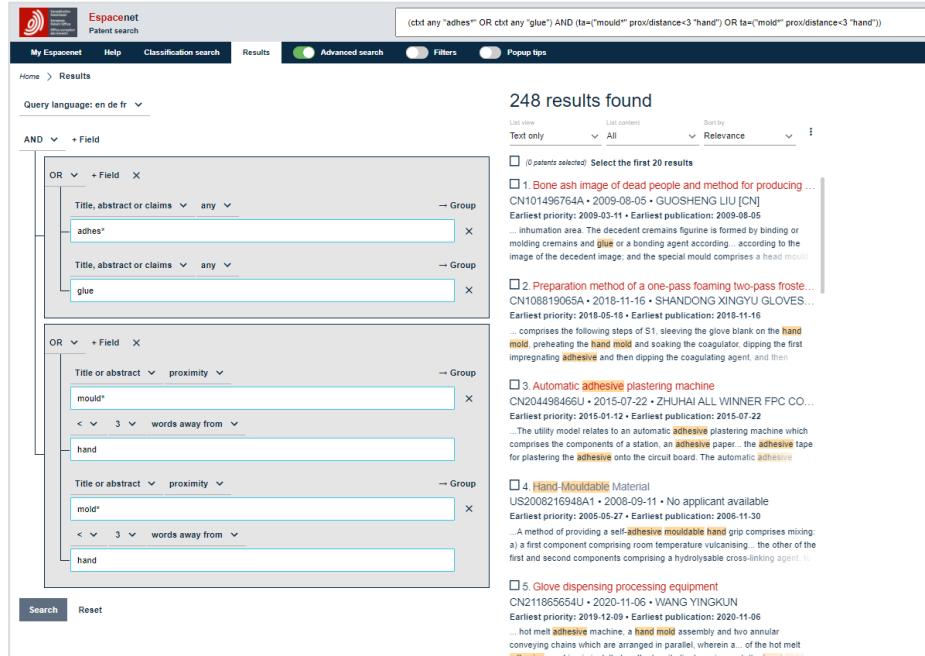
**Towards AI:** TIP permits the classification of patent documents by means of unsupervised unsupervised non-linear dimensionality reduction technique (PCA, tSNE, UMAP,...) and analysis based on machine learning

**AI based patent search tools:** commercial/free tools

## FURTHER SEARCH IMPLEMENTATION BASED ON AI (1/3)

- A.B. needs a versatile, slightly flexible mass, being **comfortably mouldable** and facilitating durable fixing for different applications.
- While sealing the greenhouse support structure with silicone, she reflected on the material's variety from **flexible silicone elastomer** baking moulds via mechanically resistant industrial casting forms up to semiliquid sealing compounds. Thus, the idea of inventing a **silicone-based all purpose adhesive**, arose.
- She started experimenting with silicone household sealants from the DIY store. She wanted to develop a **glue mass individually workable by hand** and comprising **good shape stability and high mechanical strength** after **curing at room temperature** as well.
- To achieve such properties, she made various compounds of silicone and **organic or inorganic reinforcing materials**.
- Additionally, she plans to use pulps of **natural filler materials**, like wood dust or wheat flour, rice hulls or coconut fibres.

# FURTHER SEARCH IMPLEMENTATION BASED ON AI (2/3)



The screenshot shows the Espacenet search interface with the following search parameters:

- Query language: en de fr
- Advanced search filters applied: (ctrl any "adhes\*" OR ctrl any "glue") AND (ta\*("mould" prox:distance<3 "hand") OR ta\*("mold" prox:distance<3 "hand"))
- Results: 248 results found
- Sort by: Relevance

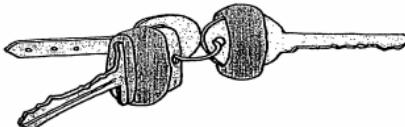
The search results list includes:

1. Bone ash image of dead people and method for producing ...  
CN101496764A - 2009-08-05 • GUOSHENG LIU [CN]  
Earliest priority: 2009-03-11 • Earliest publication: 2009-08-05  
... inhumation area. The decedent remains figurine is formed by binding or molding cremains and glue or a bonding agent according to the image of the decedent image, and the special mould comprises a head model.
2. Preparation method of a one-pass foaming two-pass frost...  
CN108819056A - 2018-11-16 • SHANDONG XINGYU GLOVES...  
Earliest priority: 2018-05-18 • Earliest publication: 2018-11-16  
... comprises the following steps of S1, sleeveing the glove blank on the hand mold; preheating the hand mold and soaking the coagulator dipping the first impregnating adhesive and then dipping the coagulating agent, and then
3. Automatic adhesive plastering machine  
CN204498466U - 2015-07-22 • ZHJUHAI ALL WINNER FPC CO...  
Earliest priority: 2015-01-12 • Earliest publication: 2015-07-22  
...The utility model relates to an automatic adhesive plastering machine which comprises the components of a station, an adhesive paper... the adhesive tape for plastering the adhesive onto the circuit board. The automatic adhesive
4. Hand-Mouldable Material  
US2008216948A1 • 2008-09-11 • No applicant available  
Earliest priority: 2005-05-27 • Earliest publication: 2008-11-30  
...A method of providing a self-adhesive mouldable hand grip comprises mixing:  
a) a first component comprising room temperature vulcanising... the other of the first and second components comprising a hydrolysable cross-linking agent, to
5. Glove dispensing processing equipment  
CN211865654U - 2020-11-06 • WANG YINGKUN  
Earliest priority: 2019-12-09 • Earliest publication: 2020-11-06  
... hot melt adhesive machine, a hand mold assembly and two annular conveying chains which are arranged in parallel, wherein a... of the hot melt

## FURTHER SEARCH IMPLEMENTATION BASED ON AI (3/3)

(EP1896525)

A method of providing a **self-adhesive mouldable pad** **comprises** mixing: a) a first component comprising **room temperature vulcanising silicone composition**; and b) a second component, one of the first and second components comprising a moist, **powdered filler**, and the other of the first and second components comprising a hydrolysable cross-linking agent, to produce a self-adhesive RTV silicone elastomer composition, applying the RTV moisture cure silicone elastomer composition to a substrate, and **moulding it by hand** to form a pad.



## FURTHER SEARCH IMPLEMENTATION BASED ON AI (COMMERCIAL TOOL)

- *Q: What is a hand-moldable adhesive based on silicone or polysiloxane that can be cured or vulcanized at room temperature?*
- **General Description:**
  - These adhesives are generally two-part or one-part compositions that, when mixed or exposed to moisture, cure at room temperature to form a rubbery or elastomeric material (list of patents: 1, 4, 6, 7, 11, 19).
  - The uncured composition often has a putty-like consistency, making it hand-moldable (list of patents: 16).
  - A key advantage is that they can be easily molded by the user into various shapes for padding, cushioning, or grip enhancement (list of patents: 18, 19, 20).
- **Applications:**
  - Sealing materials (list of patents: 6, 7, 11)
  - Adhesives (list of patents: 6, 7, 11, 14)
  - Protective coatings for electric/electronic components (list of patents: 14)
  - Gap filling in ultrasound transducer assemblies (list of patents: 15)
  - Forming earplugs (list of patents: 19)
  - Padding, cushioning, or grip enhancement (list of patents: 18)
  - Insulator systems (list of patents: 10)

## FURTHER SEARCH IMPLEMENTATION BASED ON AI (1/4)

- Q: *What is a hand-moldable adhesive based on silicone or polysiloxane that can be cured or vulcanized at room temperature?*
- **Composition:**
  - **Base Polymer:** Typically includes a polysiloxane or a mixture of polysiloxanes. Hydroxyl-terminated polydimethylsiloxane is a common base (list of patents: 2, 17). The viscosity of the base polymer is generally high (list of patents: 16).
  - **Crosslinking Agent:** Polyalkoxysilanes are often used as crosslinking agents in dealcoholization-type RTV silicone rubbers (list of patents: 2). Reactive silicon groups on the polymer undergo a siloxane bond-forming condensation reaction in the presence of moisture, leading to crosslinking (list of patents: 6, 7).
  - **Filler:** Reinforcing and non-reinforcing fillers are incorporated. The type and amount of filler influence the properties of the uncured and cured adhesive (list of patents: 16, 17).
  - **Curing Catalyst:** Catalysts like organic titanates, organic zirconates, or dibutyltin oxide are used to accelerate the curing process (list of patents: 2, 9, 16, 17). Some compositions avoid hazardous metal catalysts (list of patents: 4).
  - **Adhesion Promoter:** Some formulations include adhesion promoters to improve bonding to various substrates (list of patents: 17).
  - **Other Additives:** May contain pigments, stabilizers, and other additives to modify properties (list of patents: 16).

## FURTHER SEARCH IMPLEMENTATION BASED ON AI (2/4)

- Q: *What is a hand-moldable adhesive based on silicone or polysiloxane that can be cured or vulcanized at room temperature?*
- **Properties:**
  - **Hand-Moldability:** The uncured composition is designed to be non-tacky to the user's hands, allowing for easy handling and shaping (list of patents: 11, 19, 20).
  - **Adhesion:** The cured adhesive exhibits good adhesion to various substrates like glass, metals, and other materials (list of patents: 1, 4, 11).
  - **Flexibility:** The cured material is typically a rubbery elastomer with good flexibility and elongation (list of patents: 6, 7, 19).
  - **Electrical Insulation:** Polysiloxane compositions often have excellent electrical insulating properties (list of patents: 8).
  - **Thermal Conductivity:** Some formulations include thermally conductive fillers for heat dissipation applications (list of patents: 13).
- **Curing Mechanism:**
  - Curing occurs through a hydrolysis-condensation reaction of reactive silicon groups on the polymer, forming siloxane bonds (list of patents: 6, 7).
  - Moisture in the air often triggers the curing process for one-part systems (list of patents: 1, 11).
  - Two-part systems require mixing of the components to initiate curing (list of patents: 3, 19).

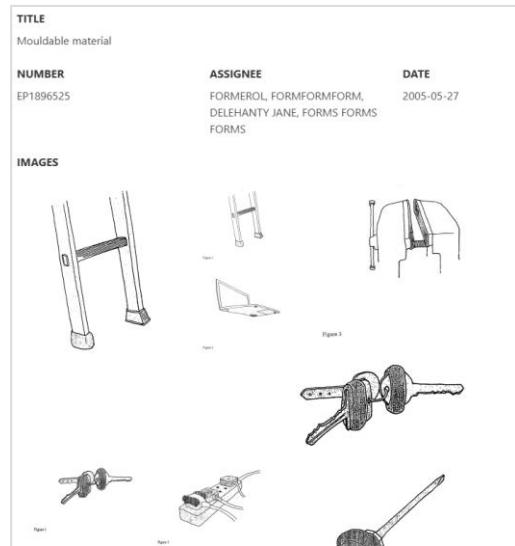
## FURTHER SEARCH IMPLEMENTATION BASED ON AI (3/4)

- Q: *What is a hand-moldable adhesive based on silicone or polysiloxane that can be cured or vulcanized at room temperature?*
- **Specific Examples and Patents:**
  - **US20240084180** describes silicone sealants with improved adhesion to wet surfaces (list of patents: 1).
  - **CN115181273** relates to dealcoholization-type RTV silicone rubber (list of patents: 2).
  - **EP3969517** describes a room temperature curable composition that is non-tacky to hands but still bonds effectively (list of patents: 11).
  - **EP3555211** describes a tin-free, room temperature curable silicone elastomer composition with specific filler requirements (list of patents: 16).
  - **US3897376** describes a two-package RTV silicone rubber composition that is easily molded by hand (list of patents: 19).

*In summary, hand-moldable adhesives based on silicone or polysiloxane are one- or two-part systems that cure at room temperature to form a flexible, adhesive elastomer. They typically consist of a polysiloxane base polymer, crosslinking agent, fillers, and a curing catalyst. These materials are designed to be easily shaped by hand and adhere to various substrates, making them suitable for a wide range of applications.*

## FURTHER SEARCH IMPLEMENTATION BASED ON AI (4/4)

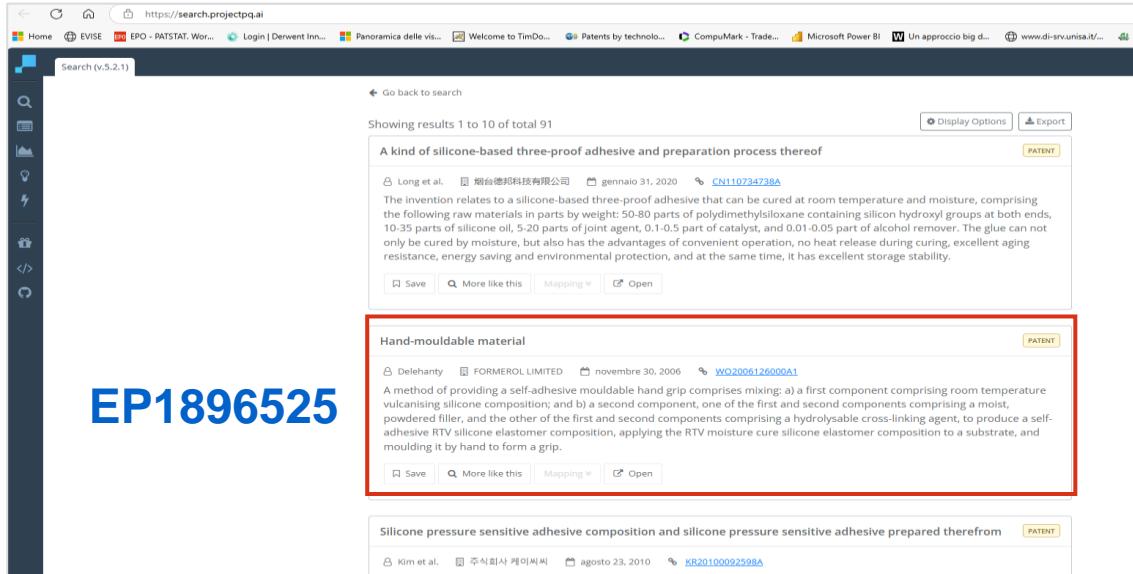
- Q: *What is a hand-moldable adhesive based on silicone or polysiloxane that can be cured or vulcanized at room temperature?*



**2005-05-27 | EP1896525 | FORMEROL,  
FORMFORMFORM, DELEHANTY  
JANE, FORMS FORMS FORMS**  
*Mouldable material*

The document **describes a hand-moldable self-adhesive silicone elastomer composition that cures at room temperature, which directly answers the question.**

# FURTHER SEARCH IMPLEMENTATION BASED ON AI (FREE TOOL: PQAI – PATENT QUALITY INTELLIGENCE)



EP1896525

Search (v.5.2.1)

Go back to search

Showing results 1 to 10 of total 91

A kind of silicone-based three-proof adhesive and preparation process thereof

Long et al. 烟台德邦科技有限公司 gennaio 31, 2020 CN11073478A

The invention relates to a silicone-based three-proof adhesive that can be cured at room temperature and moisture, comprising the following raw materials in parts by weight: 50-80 parts of polydimethylsiloxane containing silicon hydroxyl groups at both ends, 10-35 parts of silicone oil, 5-20 parts of joint agent, 0.1-0.5 part of catalyst, and 0.01-0.05 part of alcohol remover. The glue can not only be cured by moisture, but also has the advantages of convenient operation, no heat release during curing, excellent aging resistance, energy saving and environmental protection, and at the same time, it has excellent storage stability.

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Hand-mouldable material

Delehaney FORMEROL LIMITED novembre 30, 2006 WO2006126000A1

A method of providing a self-adhesive mouldable hand grip comprises mixing: a) a first component comprising room temperature vulcanising silicone composition; and b) a second component, one of the first and second components comprising a moist, powdered filler, and the other of the first and second components comprising a hydrolysable cross-linking agent, to produce a self-adhesive RTV silicone elastomer composition, applying the RTV moisture cure silicone elastomer composition to a substrate, and moulding it by hand to form a grip.

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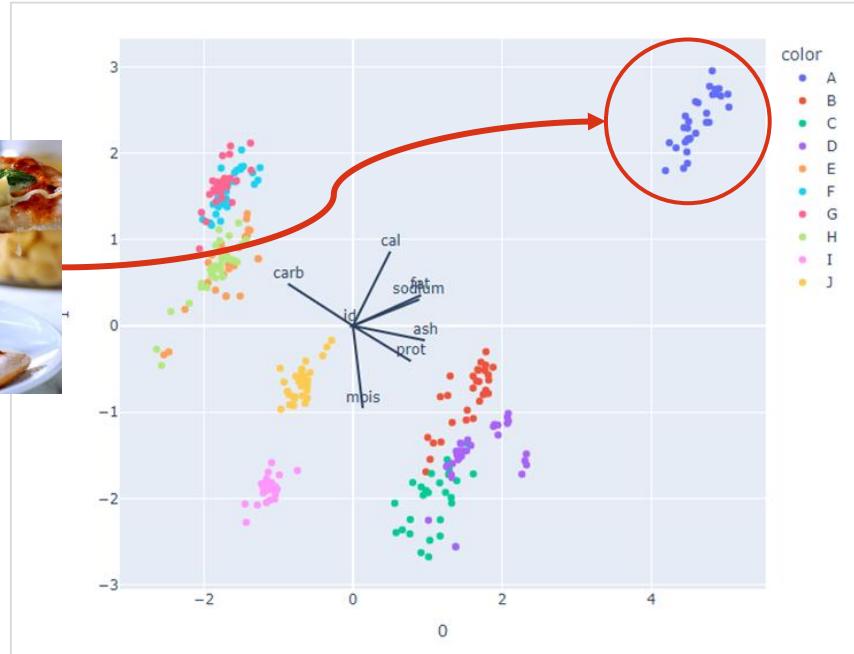
Silicone pressure sensitive adhesive composition and silicone pressure sensitive adhesive prepared therefrom

Kim et al. 주식회사 페이씨씨 agosto 23, 2010 KR20100092598A

# INNOVATIVE LANDSCAPING PARADIGM "TAILORED WITH AI"



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# QUESTIONS? MANY THANKS FOR THE ATTENTION!

In case of further questions pls. contact:

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