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Charlotte Beauchamp

Head, Publications and Design

A Decade of Digital Innovation: Celebrating 10 years of CEPAL's Digital Repository

May 14, 2024

Intergovernmental organizations have a mandate to publish knowledge and data

- Preserving and facilitating access to knowledge and data
- Marketing and selling publications and databases

Intergovernmental organizations and open access

- ~~Marketing and selling publications and databases~~
- Sharing and facilitating reuse of our knowledge and data

Open access and Creative Commons licenses

- Removes legal barriers to reuse
- Simple
- Globally recognized

Adopted by major digital platforms, e.g. YouTube, Flickr and Wikipedia

Sharing and facilitating reuse of our data and knowledge…

Very few people know who we are or what we do

A great many people could benefit from the data we collect and the knowledge we generate

Wikipedia (and Google)

- 500 million people read Wikipedia articles every month
- 20 billion articles co-written by 100,000 volunteers
- Available in 300 languages

“Wikipedia editors have been on the frontlines of preventing the spread of misinformation surrounding the coronavirus, ensuring information about the pandemic is based on reliable sources and updated regularly on Wikipedia.”

WHO press release, October 22, 2020

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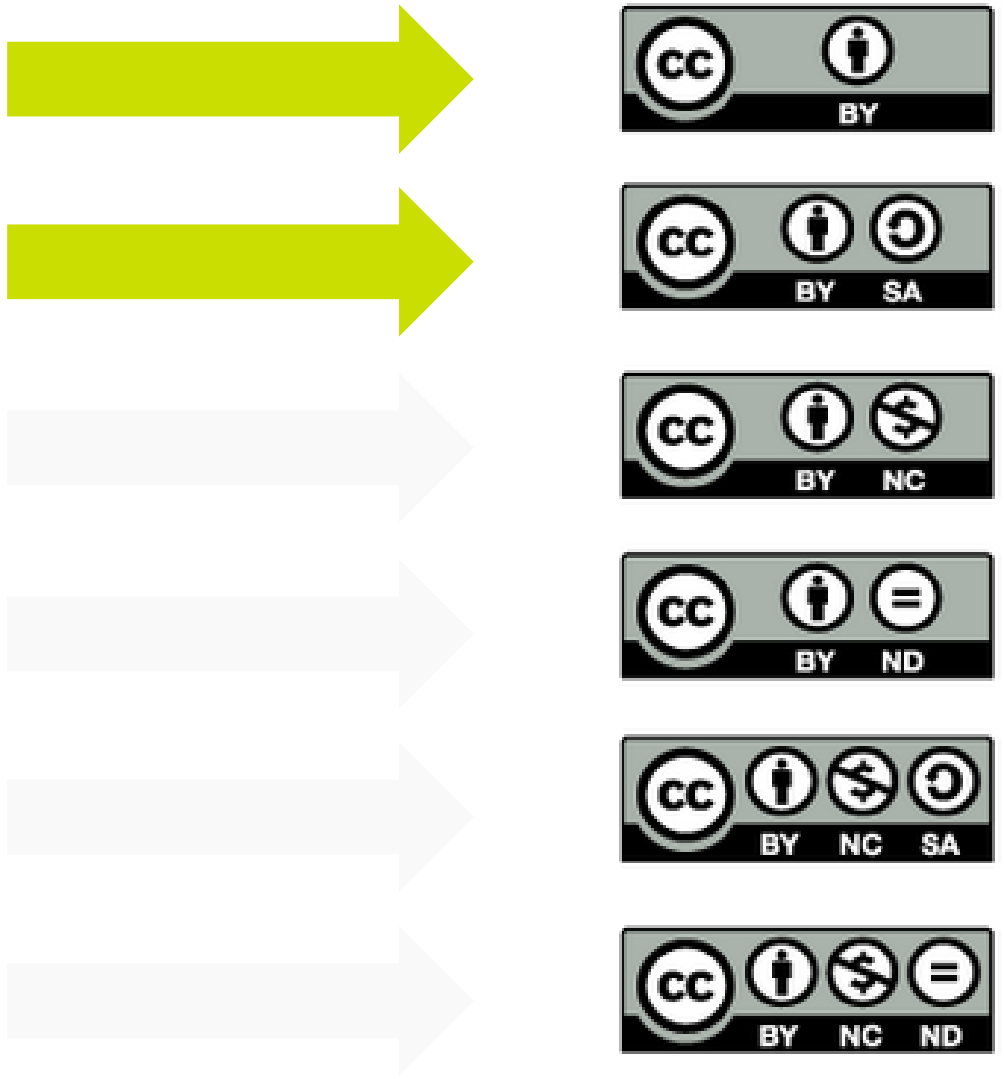

Open licensing means simple sharing

- WIPO copyright text, images and datasets are licensed under CC BY – so can be shared directly on Wikipedia
    - Additions to exiting articles
    - Creation of new articles
    - Bulk upload of images
    - Sharing of indicators and datasets

Connecting our open content with Wikipedia

In 2022 and 2023, we worked with two Wikimedians-in-Residence

Over 1,000 Wikipedia articles directly improved with WIPO content

They work across articles in English, French and Spanish

4,334 Wikipedia articles now cite WIPO sources

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Collaboration | FAO | WIPO

The World Intellectual Property Organization (WIPO) is one of several UN agencies producing publications and other text available under an open license (CC BY) that can be copied into Wikipedia and other Wikimedia projects.

Collaboration with World Intellectual Property Organization (WIPO) [edit]

Wikimedia has been collaborating with organisations in education, science, culture and many other areas for over 10 years, and several projects have been implemented with UN agencies. A specific area of Wikimedia called Wikiproject United Nations has been set up to help all UN agencies share content and knowledge on Wikimedia projects. A full list and history of those collaborations may be found here. WIPO has been collaborating with Wikimedia since 2021, which resulted with the creation and improvement of several articles on the English Wikipedia, as well as additions to Wikidata and Wikimedia Commons. Since February 2022, Florence Devouard is working as Wikimedian in Residence at WIPO to help WIPO share its knowledge and content through Wikipedia.

WIPO publications are licensed under the Creative Commons Attribution 4.0 since 2017 [1].

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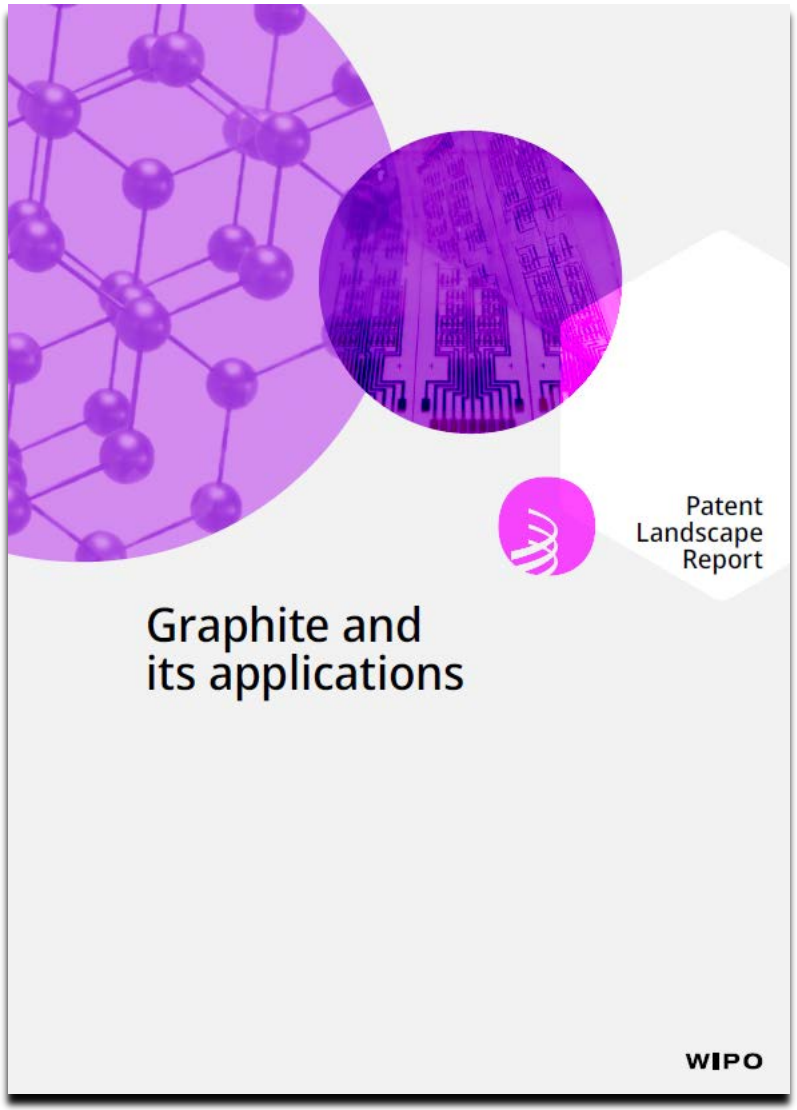

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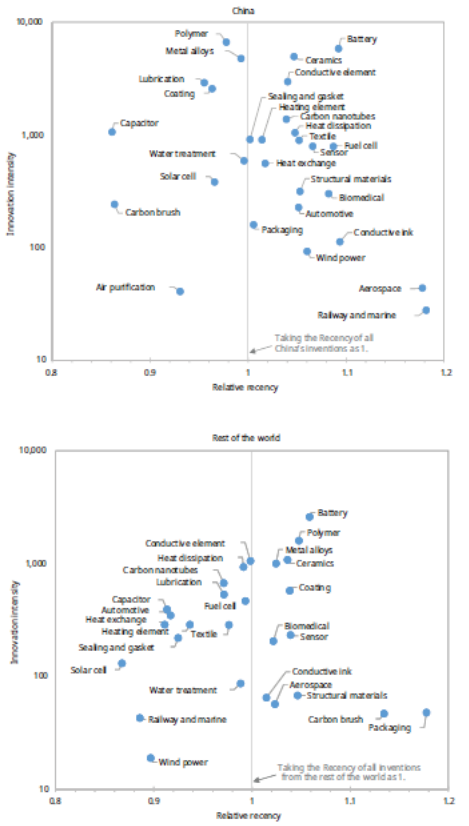
Figure 15. Innovation Maturity Matrix of graphite-related patent families, China and the rest of the world.

The Innovation Maturity Matrix helps identify current research hot topics and emerging areas.



Note: Categories are not mutually exclusive, some graphite patent applications may encompass more than one type of product or application. For example, an invention may include graphite in a metal alloy for biomedical applications, in which case it is grouped under both metal alloys and biomedical applications.

Source: WIPO, based on patent data from Questel Orbit up to May 2022. See Annex A, Methodology, for the methods of computing recency and relative recency. Annex Tables C2 and C3 summarize the innovation intensity, recency and relative recency of each graphite use and product illustrated.

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Graphite

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From Wikipedia, the free encyclopedia

For other uses, see Graphite (disambiguation).
Not to be confused with Graphene.

Graphite (/ˈgræfaɪt/) is a crystalline form of the element carbon. It consists of stacked layers of graphene. Graphite occurs naturally and is the most stable form of carbon under standard conditions. Synthetic and natural graphite are consumed on large scale (300 kton/year, in 1989) for uses in pencils, lubricants, and electrodes. Under high pressures and temperatures it converts to diamond. It is a good (but not excellent) conductor of both heat[6] and electricity.[7]

Graphite	
	
Graphite specimen	
General	
Category	Native mineral

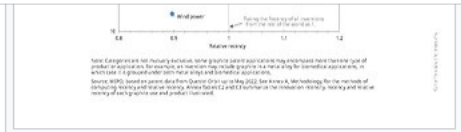
Types and varieties [edit]

Natural graphite [edit]

The principal types of natural graphite, each occurring in different types of ore deposits, are

- Crystalline small flakes of graphite (or flake graphite) occurs as isolated, flat, plate-like particles with hexagonal edges if unbroken. When broken the edges can be irregular or angular;

Global patenting activity relating to ultrasonic exfoliation has decreased over the years, indicating that this low-cost technique has become well established. Thermal exfoliation is a more recent process. Compared to ultrasonic exfoliation, this fast and solvent-free thermal approach has attracted greater commercial interest.[81]



Innovation Maturity Matrix of graphite

As the most widespread anode material for lithium-ion batteries, graphite has drawn significant attention worldwide for use in battery applications. With over 8,000 patent families filed from 2012 to 2021, battery applications were a key driver of global graphite-related inventions. Innovations in this area are led by battery manufacturers or anode suppliers who have amassed sizable patent portfolios focused strongly on battery performance improvements based on graphite anode innovation. Besides industry players, academia and research institutions – Chinese universities, in particular – have been an essential source of innovation in graphite anode technologies.

Graphite for polymer applications was an innovation hot topic from 2012 to 2021, with over 8,000 patent families recorded worldwide. However, in recent years, in the top countries of applicant origin in this area, including China, Japan and the United States of America (US), patent filings have decreased.[81]

Graphite for manufacturing ceramics represents another area of intensive research, with over 6,000 patent families registered in the last decade alone. Specifically, graphite for refractory accounted for over one-third of ceramics-related graphite patent families in China and about one-fifth in the rest of the world. Other important graphite applications include high-value ceramic materials such as carbides for specific industries, ranging from electrical and electronics, aerospace and precision engineering to military and nuclear applications.

Carbon brushes represent a long-explored graphite application area. There have been few inventions in this area over the last decade, with less than 300 patent families filed from 2012 to 2021, very significantly less than between 1992-2011.

Biomedical, sensor, and conductive ink are emerging application areas for graphite that have attracted interest from both academia and commercial entities, including renowned universities and multinational corporations. Typically for an emerging technology area, related patent families were filed by various organizations without any players dominating. As a result, the top applicants have a small number of inventions, unlike in well-explored areas, where they will have strong technology accumulation and large patent portfolios. The innovation focus of these

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(Top)

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Natural graphite

History of natural graphite use

Uses of natural graphite

History of synthetic graphite

Graphite mining, beneficiation, and milling

Graphite recycling

Research and innovation in graphite technologies

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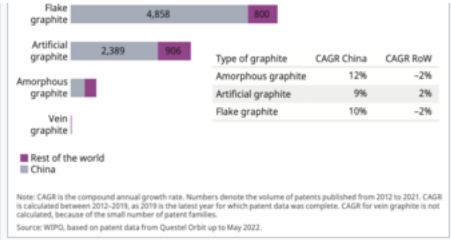
were filed by applicants from over 80 countries and regions. However, graphite-related patent families originated predominantly from just a few countries. China was the top contributor with more than 47,000 patent families, accounting for four in every five graphite patent families filed worldwide in the last decade. Among other leading countries were Japan, the Republic of Korea, the United States and the Russian Federation. Together, these top five countries of applicant origin accounted for 95 percent of global patenting output related to graphite.[81]

Among the different graphite sources, flake graphite has the highest number of patent families, with more than 5,600 filed worldwide from 2012 to 2021. Supported by active research from its commercial entities and research institutions, China is the country most actively exploiting flake graphite and has contributed to 85 percent of global patent filings in this area.

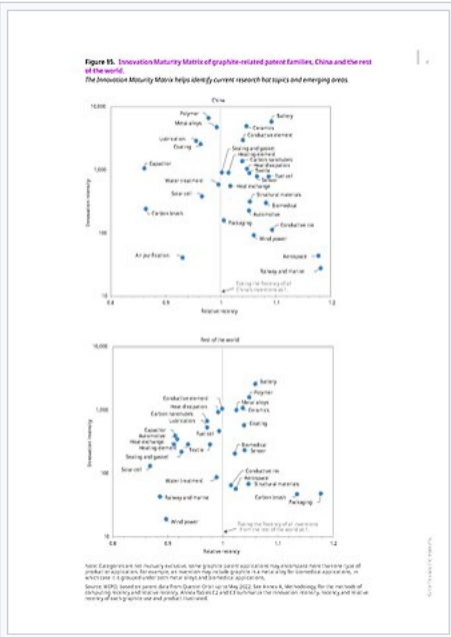
At the same time, innovations exploring new synthesis methods and uses for artificial graphite are gaining interest worldwide, as countries seek to exploit the superior material qualities associated with this man-made substance and reduce reliance on the natural material. Patenting activity is strongly led by commercial entities, particularly world-renowned battery manufacturers and anode material suppliers, with patenting interest focused on battery anode applications.[81]

The exfoliation process for bulk graphite, which involves separating the carbon layers within graphite, has been extensively studied between 2012-2021. Specifically, ultrasonic and thermal exfoliation have been the two most popular approaches worldwide, with 4,267 and 2,579 patent families, respectively, significantly more than for either the chemical or electrochemical alternatives.

Global patenting activity relating to ultrasonic exfoliation has decreased over the years, indicating that this low-cost technique has become well established. Thermal exfoliation is a more recent process. Compared to ultrasonic exfoliation, this fast and solvent-free thermal approach has attracted greater commercial interest.[81]



Distribution of graphite-related patent families by source type - 2012-2022



Innovation Maturity Matrix of graphite

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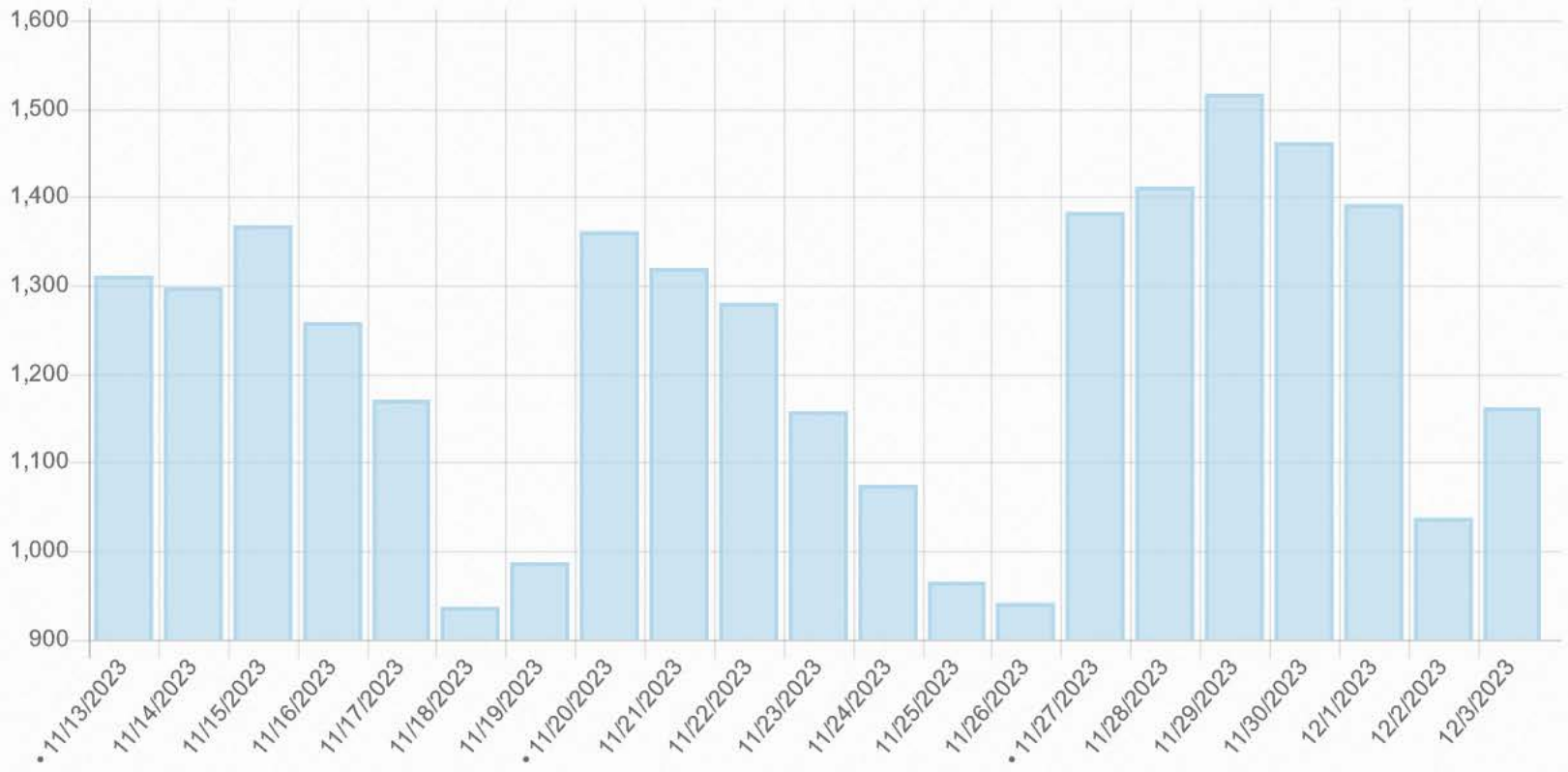

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Thank you!

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