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EMPOWERING CHEMICAL INNOVATORS

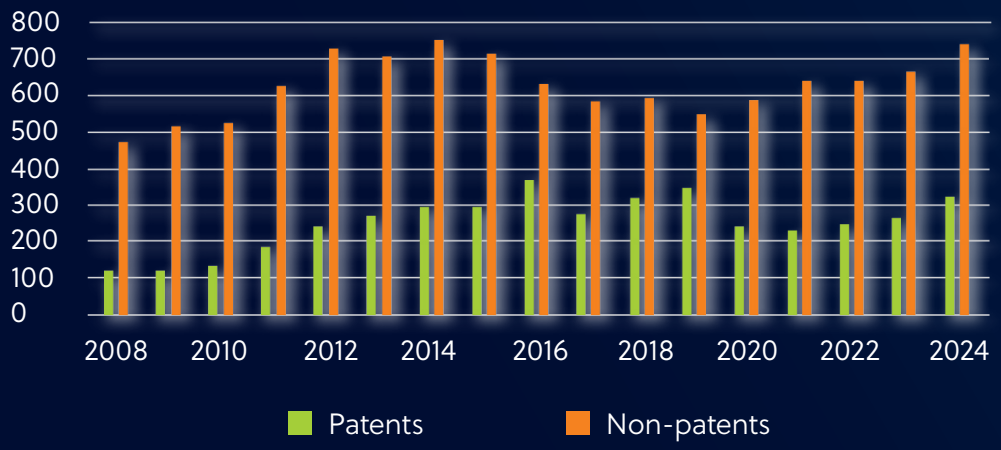
Trends and strategies for effective IP search and analytics

CAS
A division of the
American Chemical Society

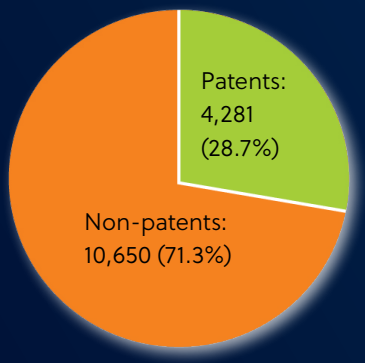
The chemical industry is experiencing rapid growth and innovation, necessitating effective intellectual property (IP) search and analytics strategies to stay ahead of the competition and mitigate the risk of duplication or misdirected investment.

For example, the enzyme industry is one of the fastest-growing markets worldwide, valued at $14.3 billion (USD) in 2024 and projected to reach nearly $27.6 billion (USD) in 2033 at a compound annual growth rate (CAGR) of 5.7%.[1] Laccases, due to their applicability in various industrial fields, have the potential to represent a significant portion of the global enzyme market. While production costs continue to pose a barrier to practical commercialization, significant progress has been made in applying laccases across various industrial fields, both at the laboratory and industrial scales, as evidenced by the vast number of patent applications.[2] Using CAS search technologies, we found 4,281 patent applications disclosing laccase that were filed between 2008 and 2024. This is expected to steadily increase based on the volume of scientific literature during this same time, which is 2.5 times higher than the number of patents.

All publications on laccase

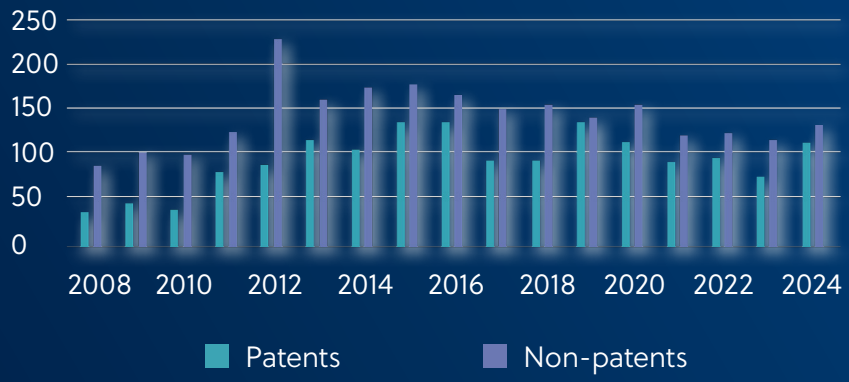


All publications on laccase (2008-2024)

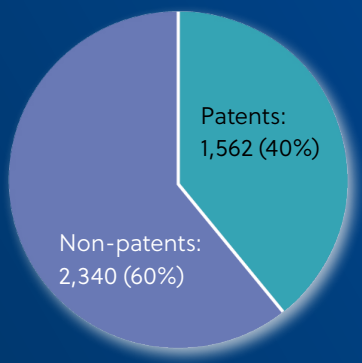


Of those patent publications, 1,562 were on the catalytic use of laccase, accounting for 26.7% of the laccase-related patent publications from 2008 to 2024. Notably, there were 1,042 patent publications and 2,356 non-patent publications on the catalytic use of Candida Antarctica Lipase B between 2008 and 2024.

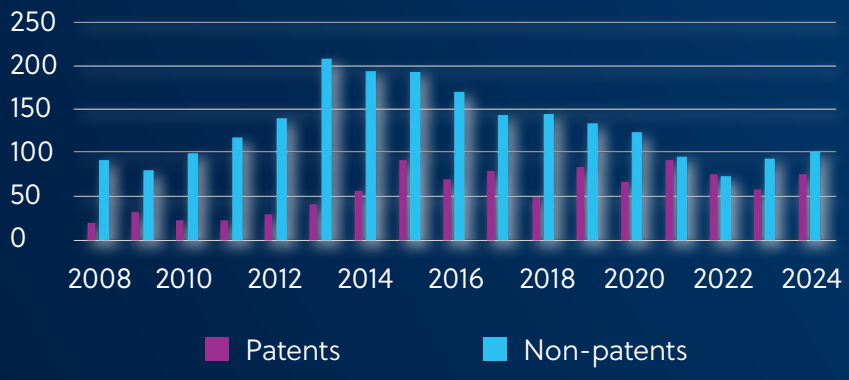
Publications on the catalytic use of laccase



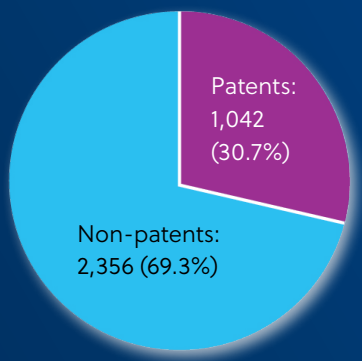
Publications on the catalytic use of laccase (2008-2024)



Publications on the catalytic use of Candida Antartica Lipase B



Publications on the catalytic use of Candida Antartica Lipase B (2008-2024)



This information highlights the complexity and evolving nature of chemical innovations. To keep pace with chemical technologies and competitive landscapes, chemical companies must adapt and establish IP search strategies that provide reliable insights for R&D and business decision-making. This white paper examines key trends in IP search and analytics within the chemical industry, emphasizing strategies to enhance IP insights, optimize search methods, and utilize digital technologies for improved outcomes.

The trends discussed include:

- Getting chemists and R&D team members more involved in IP strategy and patent programs.
- Selecting patent and non-patent search sources for a multifaceted approach.
- Partnering with trusted experts to understand claims and IP search trends.
- Addressing complex search needs with cognitive tools.

By embracing these trends, chemical industry stakeholders can strengthen their patent programs and confidently navigate the competitive landscape.

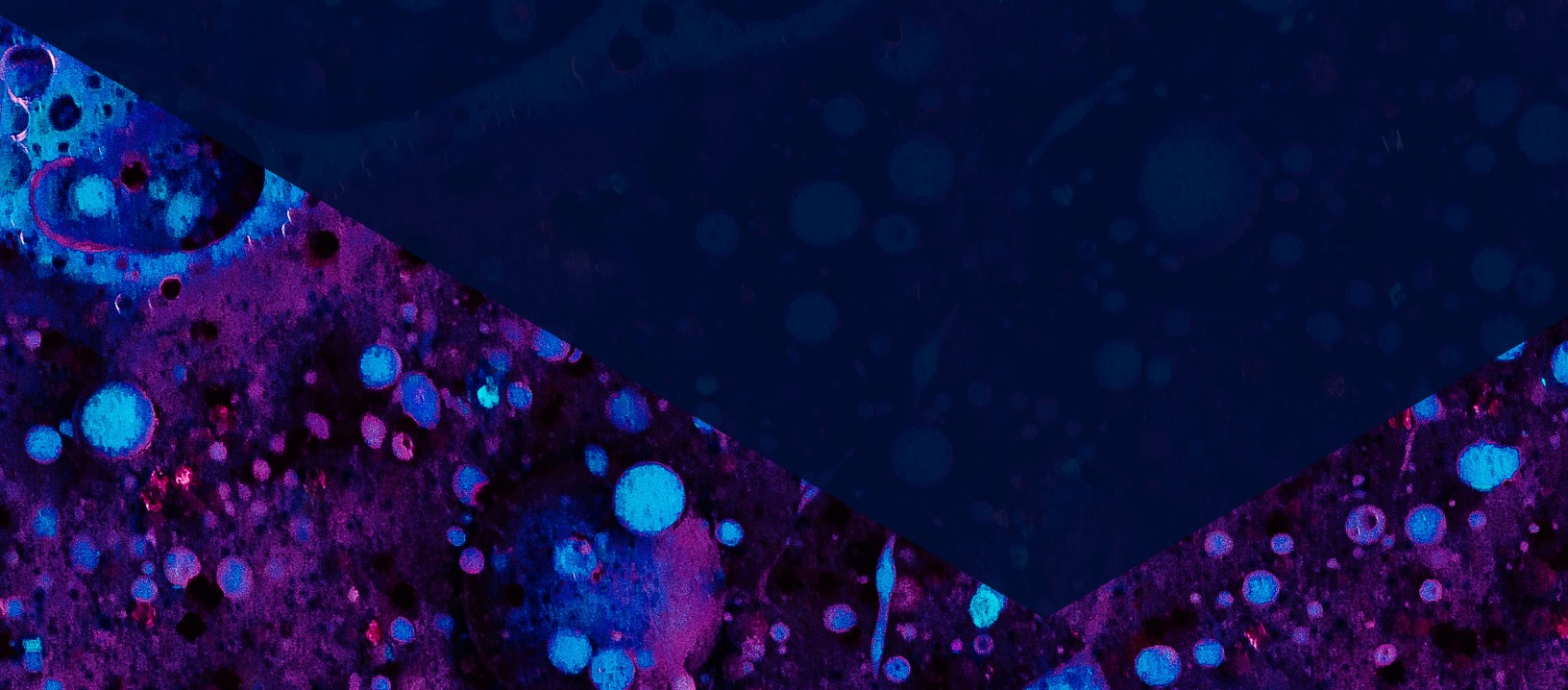
Getting chemists and R&D team members more involved in IP strategy and patent programs

The importance of cross-functional collaboration

In today's competitive landscape, an effective IP search strategy requires collaboration among multiple stakeholders. Involving chemists and R&D team members in IP programs ensures alignment between IP strategy and research objectives. By fostering a culture of collaboration, organizations can leverage the expertise of the entire team to identify, protect, and commercialize valuable innovations.

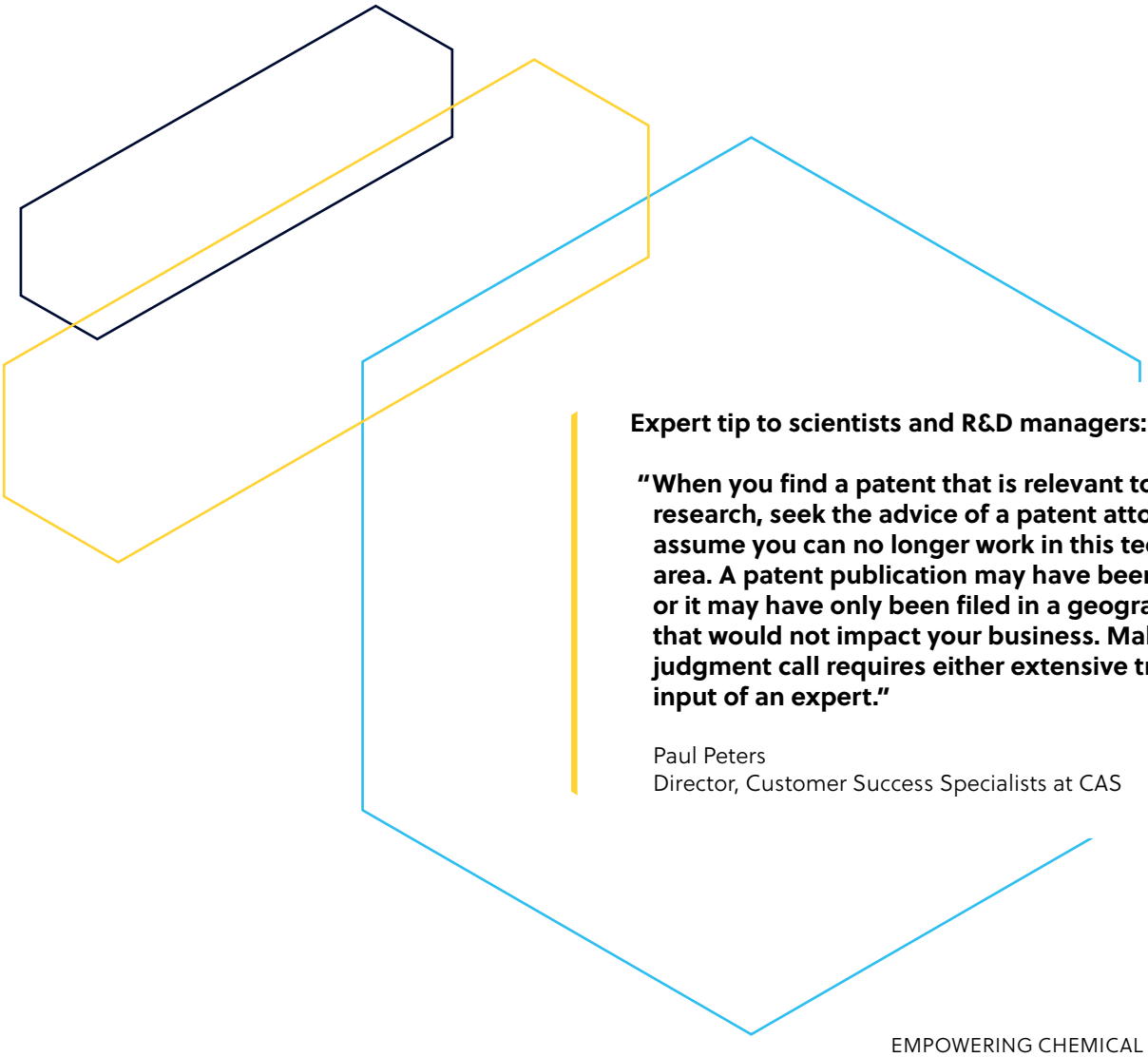
Empowering chemists as IP stakeholders

Chemists and R&D team members have a deep understanding of the industry's unique technical landscape and positioning (i.e., terminology, related innovations). Empowering them as stakeholders and subject matter experts can provide valuable insights to inform IP strategy. Successfully integrating these individuals into the broader IP planning process may involve providing education and training on IP fundamentals, patent filing processes, and the importance of IP protection. As technologies become more complex, scientists and R&D professionals are more connected to the patent search and review process, helping IP professionals and patent analysts better understand technological advancements and complex claims in their fields. Organizations can introduce search solutions to R&D teams, offering intuitive access to reliable and industry-relevant innovation data, making it easier to identify, review, and utilize existing patent information. This empowers chemists to actively contribute to developing an organization's IP strategy and patent programs while better understanding how their innovations fit within the broader competitive landscape.



Integrating IP education and awareness programs

To foster a culture of IP awareness, organizations should consider implementing educational programs that highlight the importance of IP, best practices for invention disclosure, and the value of patent protection. These initiatives can be delivered through workshops, training sessions, and internal communication channels to ensure widespread understanding and engagement. Moreover, the IP search tools introduced to R&D teams should include task-specific tutorials and, ideally, access to search experts who can help guide the search strategy.



Expert tip to scientists and R&D managers:

"When you find a patent that is relevant to your research, seek the advice of a patent attorney. Don't assume you can no longer work in this technology area. A patent publication may have been abandoned, or it may have only been filed in a geographic region that would not impact your business. Making that judgment call requires either extensive training or the input of an expert."

Paul Peters
Director, Customer Success Specialists at CAS

Selecting patent and non-patent sources for multifaceted search strategies

Comprehensive search sources are the foundation of your strategy

Successful IP search and analysis depends on access to comprehensive patent and non-patent literature sources. Organizations should use multiple databases that cover many jurisdictions and provide access to global patent documents, scientific literature, and industry publications. This thorough approach helps uncover prior art, identify opportunities and risks, and inform decision-making processes.

For exhaustive searches, such as those for patentability and freedom to operate, patent-savvy searchers should use solutions like CAS IP Finder, powered by STN. This tool provides access to over 100 patent and non-patent databases, enhancing search precision through expert indexing and technology designed to support IP searches.

To enhance reporting and collaboration, CAS IP Finder™ users—often patent analysts or IP attorneys—can share search results with CAS SciFinder® users. Within CAS SciFinder, results can be reviewed in a familiar display format and filtered to refine the answer set by document type, language, publication year, and more.

Search by structure, properties, authors, and more

To enhance the efficiency and precision of IP searches, it is essential to use search sources that provide multifaceted capabilities. Chemical structures, properties, modifications, authors, CAS Registry Numbers®, and keywords are vital search criteria for scientific innovators.

Leveraging advanced search functionalities within databases, such as structure and sequence search, enables researchers to identify relevant patents and scientific literature more efficiently. Chemical companies are advancing IP search by using platforms that offer specially designed search capabilities. For example, when using the tools of the CAS IP Finder, users can search by ring structure, stereoisomers, physical and spectral data tags (e.g., adhesive strength, boiling point, compressibility), chemical formulae, keywords, and more.

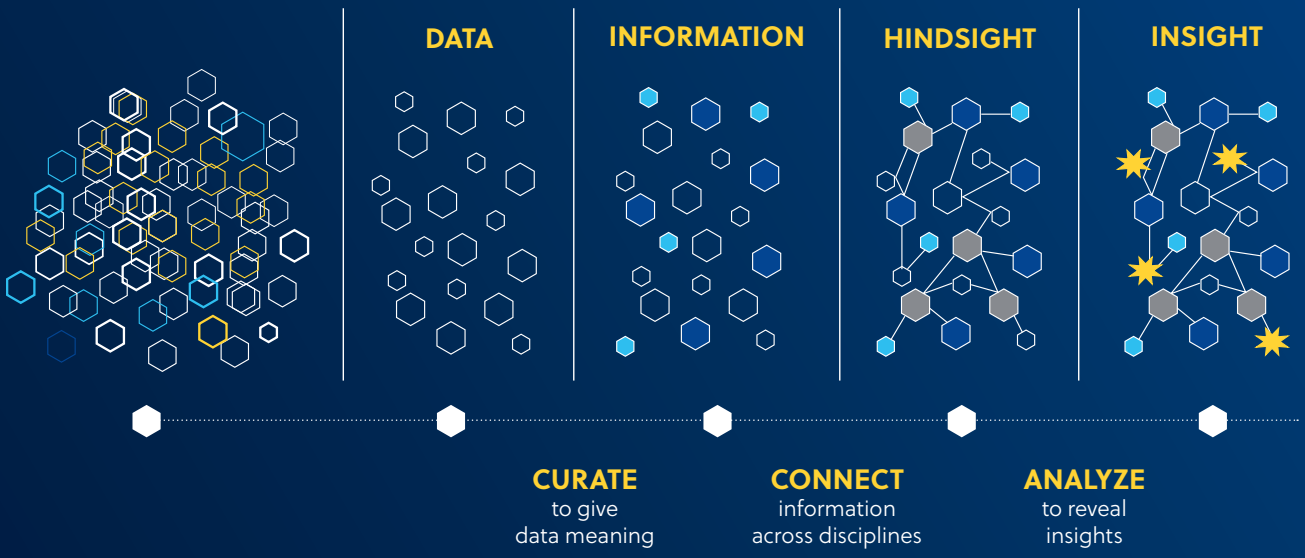
CAS IP Finder provides precision not found in other solutions. A search for a specific enzyme, such as laccase, mentioned earlier, can be further refined by using unique CAS Roles linked to a CAS Registry Number for this enzyme.



Harnessing high-quality data for enhanced precision

When data collections are based on expert indexing policies and data curation, a broader range of patent and non-patent literature becomes accessible. Modern tools assist searchers in identifying a comprehensive set of concepts, authors, institutions, substances, reactions, patent family members, and cited documents, enabling them to analyze these references and develop actionable insights.

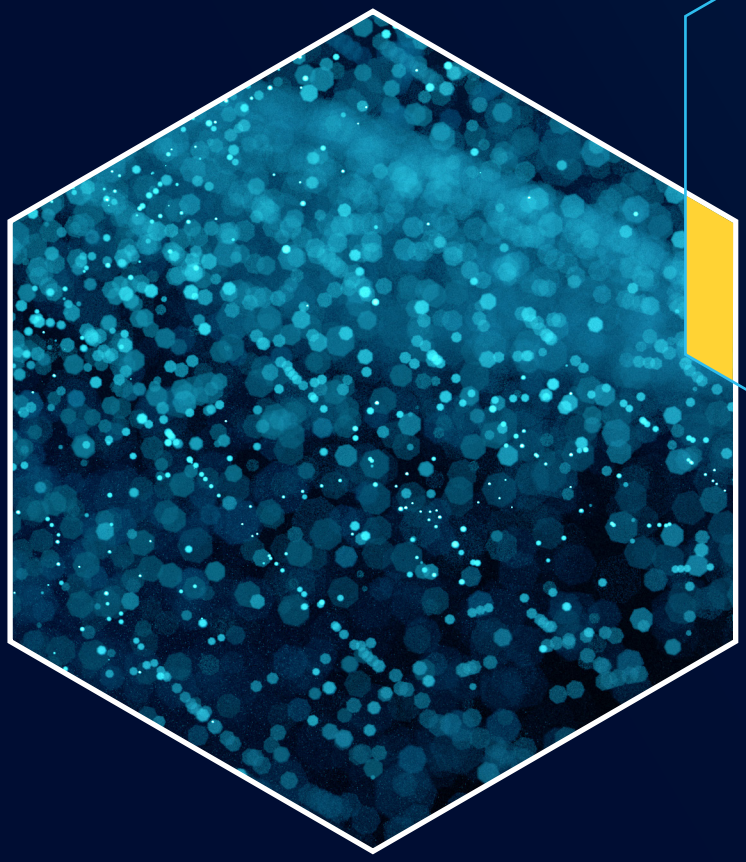
The scientific experts at CAS possess a profound understanding of patent language and emerging trends in publications, along with foreign language expertise to distinguish the signal from the noise. Their proficiency in taxonomies, semantic linking, and data categorization is a crucial capability vital for building and maintaining a high-quality data set.



Addressing complex search needs with cognitive tools

Supplementing human-constructed search strategies

The evolution of cognitive technologies, including natural language processing (NLP), artificial intelligence (AI), and machine learning, presents exciting opportunities for IP search and analytics across scientific domains. When implemented responsibly, these tools can enhance human capabilities, improve search efficiency, and reveal valuable insights.



"While you might not use an AI analysis to totally replace human-driven search, it is a great opportunity for insights into the art and confidence to further validate your own search strategies."

Mike Axton
Customer Success Specialist,
CAS



Incorporating AI and predictive features into your search strategy

Cognitive tools, although they may not match the capabilities of highly skilled human searchers, can leverage artificial intelligence (AI) and machine learning to streamline the search process and identify risks and essential documents.

For example, CAS has developed a proprietary AI-enhanced exploratory search that is available in CAS IP Finder. This feature uses advanced technology to generate a set of relevant patent and non-patent literature references, enabling skilled searchers to find IP information that could otherwise be challenging to discover.

By combining machine learning technology with the unmatched CAS Content Collection™ and curation processes, advanced features assist users in generating valuable insights, including:

- Supplemental searching.
- Patent and non-patent publishing authors and organizations.
- Database indexing of concepts and substance registrations.
- Identifying additional search terms such as indexed substances, controlled terms, and IPC/CPC codes.
- Pearl-growing strategies.

Responsible implementation of cognitive tools

While cognitive tools offer significant benefits, responsible implementation is essential. Organizations should ensure that the data used for training AI models is diverse, representative, and free from bias. Furthermore, data privacy and security must be protected throughout the process. By prioritizing ethical considerations and responsible practices, organizations can maximize the potential of cognitive tools in their IP search and analytics efforts.

CAS data scientists develop algorithms based on a powerful, curated data foundation. By leveraging a deep learning approach and several unique models to analyze the distinct aspects of patents and relevant literature, CAS technologies can sift through vast quantities of information and retrieve pertinent results to support a more efficient and comprehensive prior art search. CAS continues to explore opportunities for the responsible implementation of AI, machine learning, and predictive features in IP search tools.

Partnering with trusted experts for an in-depth understanding of claims and IP search trends

The value of expert insights

Navigating the complexities of chemical patent claims and understanding IP search trends demands expertise. Collaborating with trusted IP professionals and consultants who are knowledgeable about the chemical industry gives organizations access to detailed analysis, interpretation of claims, and identification of emerging IP trends. These experts provide valuable insights to guide IP search strategies and facilitate informed decision-making.

Partnering with IP professionals with industry expertise

To establish successful partnerships, organizations should seek out search tools and databases curated by IP professionals and consultants specializing in the chemical industry. These experts must have a deep understanding of the industry's technological advancements, global innovations, and emerging trends, enabling them to provide tools with industry-specific search capabilities. Ideally, users of these databases and search tools will also have access to the IP professionals powering the technology. By collaborating with these trusted partners, organizations can gain valuable guidance in developing effective IP strategies, conducting thorough IP searches, and leveraging market insights to enhance their competitive advantage.



Engaging in continuous knowledge exchange

Partnering with experts shouldn't just involve occasional consultations. It's essential to establish a collaborative relationship that encourages continuous knowledge exchange. Regular discussions, workshops, and seminars with IP professionals enable organizations to stay informed about the latest developments in IP search and analytics. This ongoing information exchange ensures that IP strategies remain relevant and aligned with industry trends and business objectives.

Protect your valuable innovations and drive innovation forward

The chemical industry is rapidly transforming, necessitating robust IP search and analytics strategies. By embracing the key trends discussed in this white paper, including involving chemists and R&D team members in IP strategy, using diverse search sources, harnessing cognitive tools, and partnering with trusted experts, organizations can position themselves for success in an increasingly competitive landscape.

CAS IP Finder can help you navigate the complexities of patent search strategies in the chemical industry as you incorporate the trends and strategies outlined in this white paper.

> Explore how you can augment your search strategies with the CAS IP Finder at **cas.org**

1. Straits Research. (2025). Enzymes Market Global Report: Enzymes Market Size, Share, Trends, Growth Forecast by 2033. https://straitsresearch.com/report/enzymes-market
2. Zerva, A., Simić, S., Topakas, E., & Nikodinovic-Runic, J. (2019). Applications of microbial laccases: Patent review of the past decade (2009–2019). Catalysts, 9(12), 1023. https://www.mdpi.com/2073-4344/9/12/1023

CAS connects the world's scientific knowledge to accelerate breakthroughs that improve lives. We empower global innovators to efficiently navigate today's complex data landscape and make confident decisions in each phase of the innovation journey. As a specialist in scientific knowledge management, our team builds the largest authoritative collection of human-curated scientific data in the world and provides essential information solutions, services, and expertise. Scientists, patent professionals, and business leaders across industries rely on CAS to help them uncover opportunities, mitigate risks, and unlock shared knowledge so they can get from inspiration to innovation faster. CAS is a division of the American Chemical Society.

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