

STN IP PROTECTION SUITE™

EMPOWERING CHEMICAL INNOVATORS

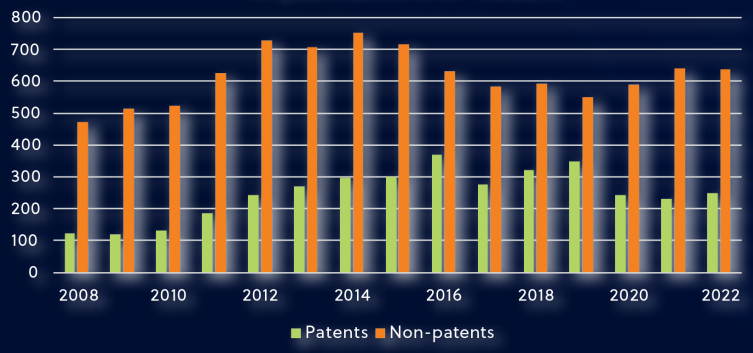
Trends and strategies for effective IP search and analytics

CAS
A division of the
American Chemical Society

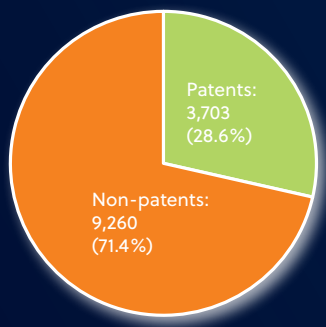
The chemical industry is experiencing rapid growth and innovation, necessitating effective intellectual property (IP) search and analytics strategies to stay ahead of the competition and avoid the risk of duplication or misdirected investment.

For example, the enzyme industry is one of the fastest-growing markets worldwide; it was valued at nearly $7.1 billion (USD) in 2017 and is projected to reach $10.5 billion (USD) in 2024 at a compound annual growth rate (CAGR) of 5.7%[1]. Laccases, due to their applicability in various industrial fields, have the potential to account for a significant part of the global enzyme market. While production costs continue to be a barrier to practical commercialization, great progress has been made in applying laccases in these fields, both at the laboratory and industrial scale. This is demonstrated in the vast number of patent applications. Using CAS search technologies, we found 3,703 patent applications disclosing laccase were filed between 2008 and 2022. This is expected to steadily increase based on the volume of scientific literature in this same time frame being 2.5 times higher than the number of patents.

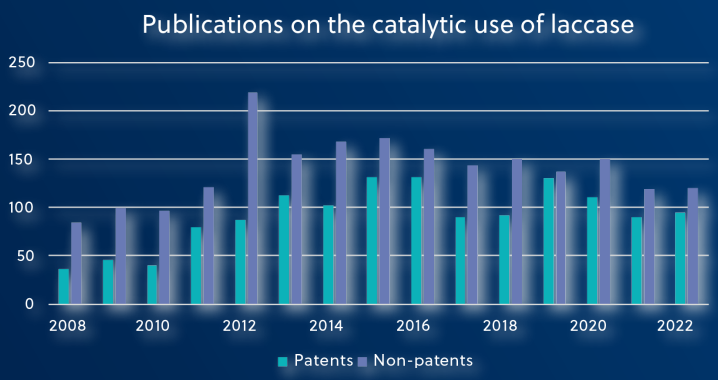
All publications on laccase

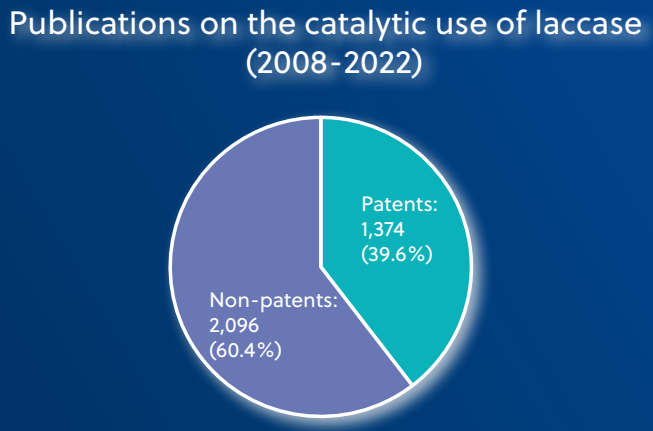


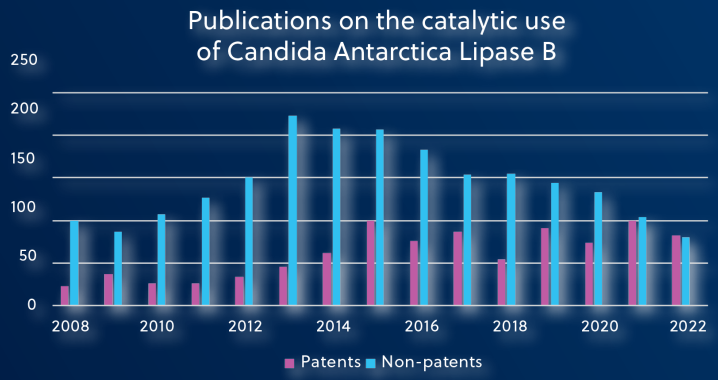
All publications on laccase (2008-2022)

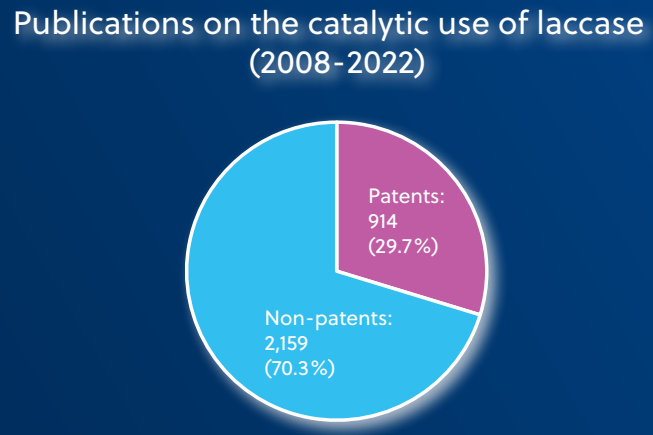


Of those patent publications, 1,374 were on the catalytic use of laccase, accounting for 27% of the laccase-related patent publications between 2008 and 2022. Notably, there were 914 patent publications and 2,159 non-patent publications on the catalytic use of Candida Antarctica Lipase B between 2008 and 2022.









This information reflects the complexity and evolving nature of chemical innovations. To keep up with chemical technologies and competitive landscapes, chemical companies must adjust and establish IP search strategies that deliver reliable insights for R&D and business decision-making. This white paper explores key trends in IP search and analytics within the chemical industry, highlighting strategies to enhance IP insights, optimize search approaches, and leverage 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 multi-faceted 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 navigate the competitive landscape with confidence.

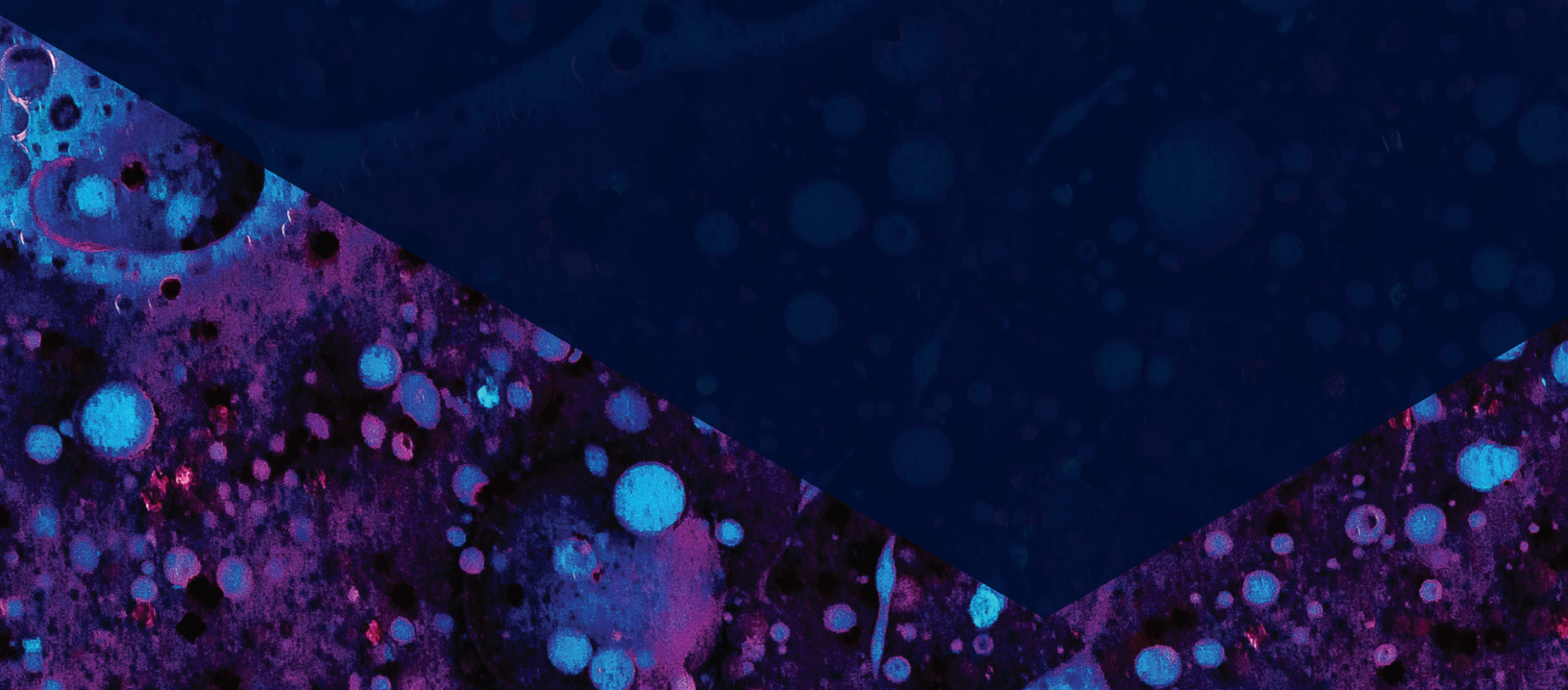
Getting chemists and R&D team members more involved in IP strategy and patent programs

The importance of cross-functional collaboration

In today's competitive landscape, an effective IP search strategy requires the collaboration of 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 harness the expertise of the full team of stakeholders to identify, protect, and commercialize valuable innovations.

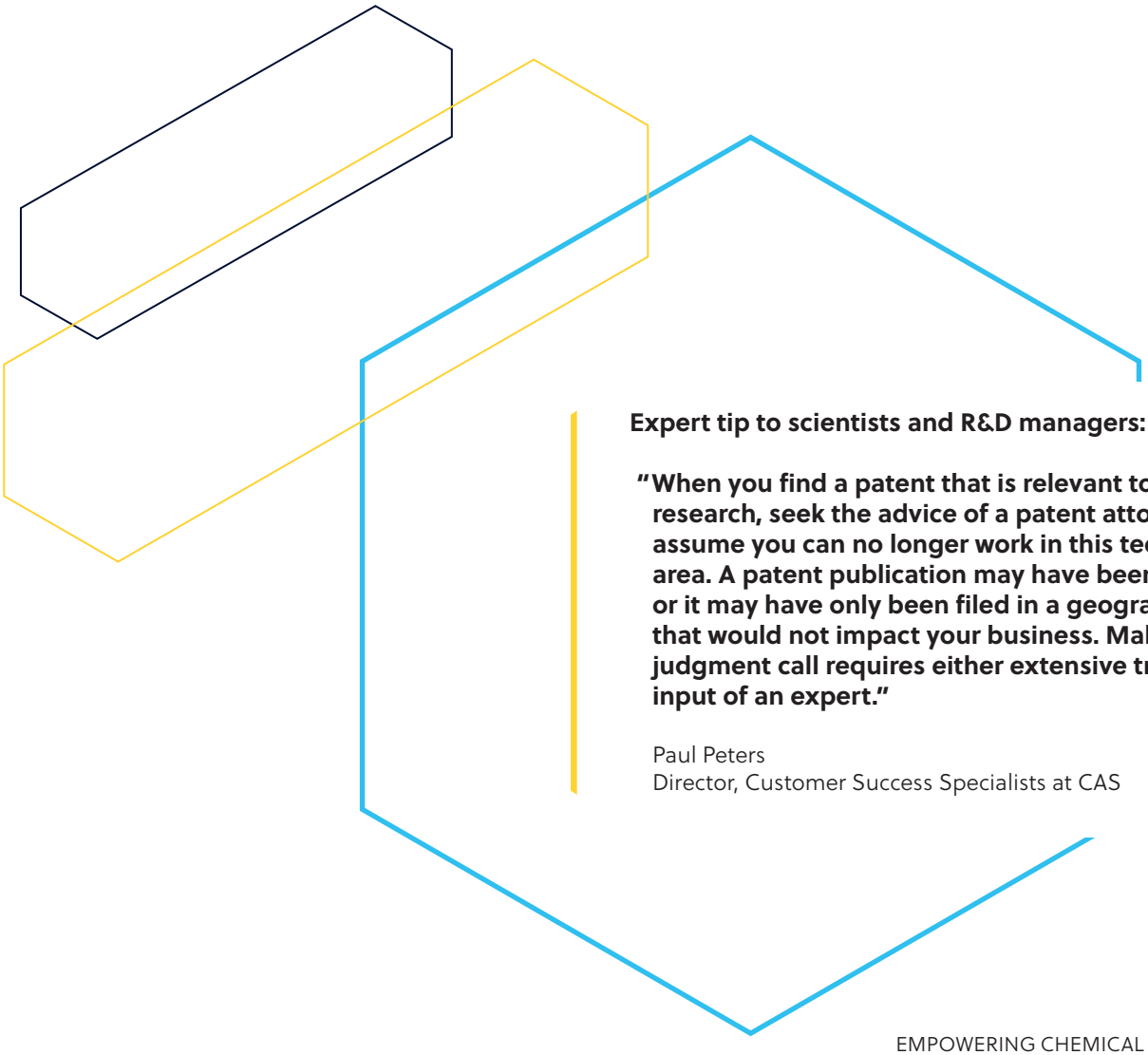
Empowering chemists as IP stakeholders

Chemists and R&D team members possess a deep understanding of the industry's unique technical landscape or unique technical positioning (i.e., terminology and related innovations). Empowering them as stakeholders and subject matter experts can provide valuable insight to inform IP strategy. Successful integration of 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 becoming increasingly connected to the patent search and review process to help IP professionals and patent analysts more clearly understand technology advancements and complex claims in their field. Organizations can introduce search solutions, such as CAS Scientific Patent Explorer™, to R&D teams to provide intuitive access to reliable and industry-relevant innovation data and make it easier to identify, review, and use existing patent information. This empowers chemists to actively contribute to the development of an organization's IP strategy and patent programs, and understand more clearly 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. What's more, the IP search tools introduced to R&D teams should come with 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 searches and analyses rely on access to comprehensive patent and non-patent literature sources. Organizations should use multiple databases that cover a wide range of jurisdictions and provide access to global patent documents, scientific literature, and industry publications. This comprehensive 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-sophisticated searchers can use other tools such as CAS STNext®. This solution offers access to nearly 150 patent and non-patent databases and makes searchability uniquely precise via expert indexing and technology built specifically to fuel IP searches.

To enhance reporting and collaboration, CAS STNext users (often patent analysts or IP attorneys) can now share search results with CAS SciFinder^{n} users. Within CAS SciFinder^{n}, results can be reviewed in a familiar display format and filtered to focus the answer set by document type, language, publication year, etc.

Search by structure, properties, authors, and more

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

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

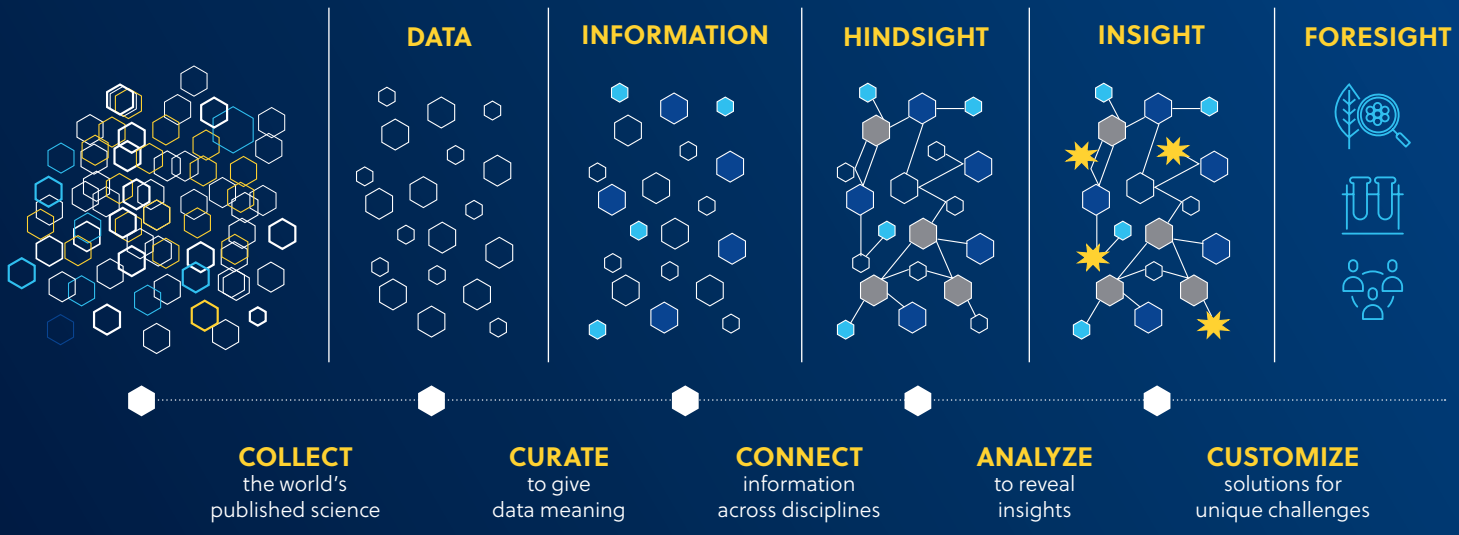
CAS STNext, in particular, provides precision not found in other tools. A search on a specific enzyme like laccase, mentioned earlier, can be further refined using unique CAS Roles linked to a CAS Registry Number for this particular enzyme that indicates the context of the enzyme is the use as a catalyst.



Harnessing high-quality data for enhanced precision

When data collections are built on expert indexing policies and data curation, a wider array of patent and non-patent literature comes into view. Modern tools will help searchers identify a comprehensive set of concepts, authors, institutions, substances, reactions, patent family members, and cited documents and analyze those references to develop actionable insights.

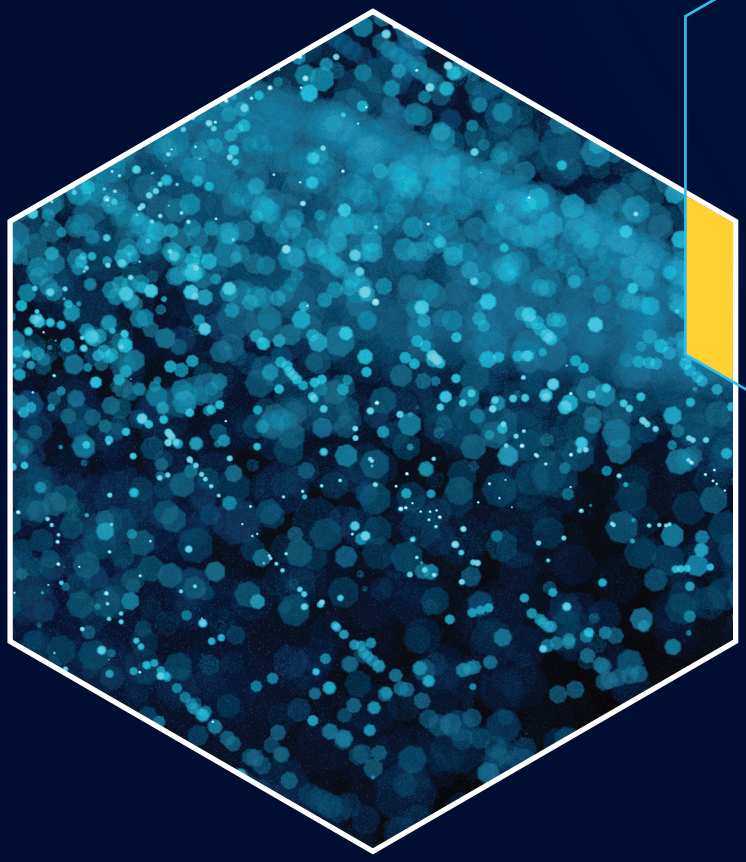
The scientific experts at CAS have a deep understanding of patent language and emerging trends in publications, as well as foreign language expertise to identify the signal from the noise. Their expertise in taxonomies, semantic linking, and data categorization are critical capabilities essential to building and maintaining a high-quality data set.



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

Supplementing human-constructed search strategies

The evolution of cognitive technologies such as natural language processing (NLP), artificial intelligence (AI), and machine learning, presents exciting opportunities for IP search and analytics across scientific domains. When responsibly implemented, these tools can augment human capabilities, improve search efficiency, and uncover 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 further confidence to further validate your own search strategies."**
>
> Customer Success Specialist, CAS

Incorporating AI and predictive features into your search strategy

Cognitive tools, while not a match for skilled human searchers, can harness the power of artificial intelligence (AI) and machine learning to streamline the search process and identify risks and vital documents.

CAS has developed an AI-based prior art search technology, which is now available in CAS STNext. This feature generates a set of relevant patent and non-patent literature references published prior to the starting patent document. This technology allows skilled searchers to find relevant, often elusive IP information. By pairing machine learning technology with unmatched content collection and curation processes from CAS, this feature helps users generate valuable findings, including:

- Supplemental searching.
- Insight into patent and non-patent publishing authors and organizations.
- Insight into 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 tremendous benefits, responsible implementation is crucial. Organizations must ensure that the data used for training AI models is diverse, representative, and free from bias. Additionally, data privacy and security must be safeguarded throughout the process. By prioritizing ethical considerations and responsible implementation, organizations can maximize the potential of cognitive tools in their IP search and analytics endeavors.

CAS data scientists developed algorithms based on a powerful, curated data foundation. By leveraging a deep learning approach and several unique models to digest the unique aspects of patents and relevant literature, CAS technologies can comb through mass quantities of information and retrieve relevant findings to support a more efficient and comprehensive prior art search. CAS continues to explore opportunities and 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 requires expertise and experience. Collaborating with trusted IP professionals and consultants familiar with the chemical industry provides organizations with in-depth analysis, interpretation of claims, and identification of emerging IP trends. These experts can offer valuable insights to guide IP search strategy and support 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 who specialize in the chemical industry. These experts should possess a deep understanding of the industry's technological advancements, global innovations, and emerging trends, allowing them to offer tools with industry-specific search capabilities. Ideally, users of those databases and search tools should also have access to the IP professionals who power 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 should not be limited to occasional consultations. Establishing a collaborative relationship that fosters continuous knowledge exchange is crucial. Regular discussions, workshops, and seminars with IP professionals allow organizations to stay updated on the latest developments in IP search and analytics. This ongoing exchange of information ensures that IP strategies remain relevant and aligned with industry trends and business objectives.

Protect your valuable innovations. Drive innovation forward

The chemical industry is undergoing rapid transformation, 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, utilizing multifaceted search sources, harnessing cognitive tools, and partnering with trusted experts, organizations can position themselves for success in an increasingly competitive landscape.

The STN IP Protection Suite can help you address the complexities of patent search strategies within the chemical industry and incorporate the trends and strategies mentioned in this white paper.

> Explore how you can augment your search strategies with the STN IP Protection Suite at **cas.org**

1. Lopes, A. D. M., Ferreira Filho, E. X., & Moreira, L. R. S. (2018). An update on enzymatic cocktails for lignocellulose breakdown. Journal of Applied Microbiology, 125(3), 632-645.
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.

CAS is a leader in scientific information solutions, partnering with innovators around the world to accelerate scientific breakthroughs. CAS employs over 1,400 experts who curate, connect, and analyze scientific knowledge to reveal unseen connections. For over 100 years, scientists, patent professionals, and business leaders have relied on CAS solutions and expertise to provide the hindsight, insight, and foresight they need so they can build upon the learnings of the past to discover a better future. CAS is a division of the American Chemical Society.

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