



TIPLO News

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This news mail distributed in Japanese and English from time to time provides updates on the development of law in Taiwan with focus on intellectual property rights law. For more information about the status of intellectual property right protection and practice in Taiwan, please visit our website www.tiplo.com.tw

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01 TIPO releases *Patent Trends on Wastewater Treatment and Recycling Technologies in Semiconductor Industry* report to assist in green transformation

The water supply strategies and water treatment technologies for high-tech industry are receiving increasing attention. In view of the domestic semiconductor industry's dedication to the research and development of wastewater recycling and water resource regeneration technologies for the purpose of water resource management, TIPO released the "Patent Trends on Wastewater Treatment and Recycling Technologies in Semiconductor Industry" report on September 25, 2024, which explores the key technologies and patent trends for the semiconductor wastewater treatment and serves as significant reference for the industry to achieve green transformation, circular economy, ESG development, and the 2050 net-zero emissions goal.

According to the TIPO, the global semiconductor industry has made significant advancement in the field of sustainable water resource development through wastewater recycling and water resource regeneration technologies. As the leading manufacturer of semiconductor components around the world, Taiwan has well-established industrial chains and technological foundation, with relevant R&D achievements on par with those developed by the advanced countries, such as, the U.S, Japan, and Europe. In addition, Taiwan's academic research institutions (for example, ITRI) and semiconductor-related companies (for example, TSMC and Mega Union Technology) have been actively engaged in the research and development of wastewater recycling and water resource regeneration technologies. These efforts not only decrease the dependence on natural water resources but also create economic benefits and further drive the development of circular economy.

The report highlighted the trend of patent filings by global semiconductor industry for "wastewater recycling and water resource regeneration", which surged and then stably developed for the past sixty years. The trend can be roughly divided into five phases when the development initiated (in 1970~1997), and then took off (in 1997~2011), and slowed down and slightly declined (in 2012~2014), and further recovered and rebounded (in 2015~2018), and recently matured and stabilized (2019~2023).

In industrial aspect, as every country's industrial structures are different, in advanced countries, like Europe, the U.S., and Japan, there are long-established large companies that engage in manufacturing electric appliances, water purification equipment, or relevant materials and have made R&D investment early in around 1970, while research institutions or small-scale companies in these countries are relatively less common. Among the top 20 global patent applicants, Japanese applicants accounted for 60% of all filings and they are large-scale famous multinational corporations whose filing numbers still remain outstanding. On the contrary, China started late to engaged in this field of patent applications (around 1997), but small and startup companies in China emerged rapidly after 2005 as a result of national policies and incentives, and therefore, China outpaced its competitors in the number of patent filings for relevant technologies.

It is noteworthy that Taiwan, as the major semiconductor manufacturer, has robust and complete supply chains and a prominent corporate culture. Also due to the increasing weight placed on the issues of ESG, sustainable development and circular economy, the leading semiconductor manufacturers in Taiwan have engaged in the implementation of waste recycling, regeneration, and reuse or the development of relevant technologies, with wastewater recycling and water resource regeneration being key focus areas. That is to say, Taiwan's development is mainly led by leading

semiconductor manufacturers, and their collaboration with domestic companies or academic research institutions also achieves commendable results.

The report concluded by analyzing the key technologies in semiconductor wastewater treatment, pointing out that these technologies usually rely on a combination of methods, instead of one single technique to achieve wastewater treatment and water resource regeneration. These technologies can be roughly categorized into physical, chemical, and biological processes in terms of the reaction types. Physical and chemical treatment processes have been developed earlier, and therefore, there have been relatively more institutions involved or patent filings. Currently, the mainstream treatment processes are reverse osmosis, micro/ultra/nano-filtration and advanced oxidation, coagulation-precipitation, or ion exchange process. Biological treatment process utilizes the characteristics of microorganisms to degrade pollutants in wastewater and convert them into harmless substances, making large-scale and low-cost treatment feasible. Hence, this process, primarily through activated sludge processes or membrane bioreactor, offers significant economic value and becomes one of primary developments by worldwide industries. Moreover, future advancements in artificial intelligence (AI) and in its applications will enhance the importance of the control, monitoring, and detection treatment systems, which will further lead to the increase in patent filings and deserve ongoing attention.

With the international market's continued rising demand for semiconductor products, enterprises should boost their competitiveness through green technology innovation to realize the 2050 net-zero transformation while fulfilling their sustainable development. (Released 2024.09.25)

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02 Semiconductor is the dominant technical field for invention patent filings in Taiwan

On September 16, 2024, the Department of Statistics, Ministry of Economic Affairs issued a press release reporting the statistics of invention patent applications in Taiwan as outlined below.

1. Invention patent applications comprised more than 70% of the overall patent filings in Taiwan throughout 2023.

Governments worldwide have been establishing patent systems to encourage innovation, protect inventors' rights and also to guide patent holders and the public in utilizing inventions in legal and appropriate manners, so as to enhance industrial development. Observation of patent filings in recent years reveals that the number of patent filings in Taiwan in 2020 dropped to 72,000 applications, marking a 3.2% annual decline as a result of the global economy being weighed down by the impact of the COVID-19 pandemic. After that, annual growth has fluctuated slightly, with a modest increase by 0.8% in 2023 and a further 0.2% rise from January through July 2024. Analysis by types of patent applications shows that invention patent applications made up the largest share of all patent filings, exceeding 70% for the first time in 2023 before dipping marginally to 69.4% in the period from January through July 2024, while utility model patent applications and design patent applications accounted for 20.3% and 10.3% of the total filings, respectively.

2. Semiconductors are the leading subject matter of invention patent applications in Taiwan.

In 2022, the top three technical fields of invention patent applications filed in Taiwan were “semiconductors” (with a share of 14.5%), “computer technology” (9%), and “electrical machinery, apparatus, energy” (6.1%), all of which are the leading fields of Taiwan’s manufacturing industry. The field of “semiconductors” saw the largest increase by 3.6% compared to 2020. Furthermore, the analysis by applicant nationality indicates that the top three technical fields for resident applications were also “semiconductors”, “computer technology”, and “electrical machinery, apparatus, energy” in that order, while the non-resident applications from Japan, the U.S., China, and South Korea were filed mostly for “semiconductors”. In addition, the applicants from Japan and the U.S. presented prominent performance in the fields like “macromolecular chemistry, polymers” and “pharmaceuticals”.

3. Non-resident applications make up more than 60% of invention patent applications filed in Taiwan

In terms of applicant nationality for invention patent applications filed in Taiwan, non-resident applicants have consistently been the majority, and the ratio between resident filings and non-resident filings is 4:6. In the period between January and July of 2024, non-resident applications accounted for 61.8% of all patent filings; Japan took the top spot with 25%, followed by the U.S. with 13.4% at No. 2, China with 6.6% at No. 3, and South Korea with 6.0% at No. 4.

4. 11%~13% of applicants of invention patents are female individuals.

Due to the facts that invention patents are technical innovation closely linked to one’s professional background and most patents are technology-focused and require expertise in science and engineering which is received as part of education by more men than women in Taiwan, gender distribution in this field is affected accordingly and that is why male individuals have consistently comprised more than 80% of invention patent applicants in recent years. However, it is notable that the percentage of women listed as inventors for 2020~2023 is 11%~13%. (Released 2024.09.16)

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03 TIPO announces draft amendment to partial provisions of Patent Act

The Patent Act of Taiwan has undergone fifteen amendments since its enactment and promulgation on May 29, 1944 and enforcement on January 1, 1949. The most recent amendment was announced on May 4, 2022 and took effect on July 1, 2022.

In response to the booming development of emerging digital industry and the increasingly applications for diverse digital graphic designs, TIPO formulated the amendment to the design patent system in order to align with international trend towards design protection and also to address local industry needs. In addition, the amendment draws on judicial practices to refine the mechanism for legitimate patent applicants to reclaim their rights through civil procedures. The amendment amends 17 articles, adds 2 articles and deletes 1 article. The key changes are summarized as follows.

1. Expansion of the scope of eligible subject matters of design patents to include image designs utilizing digital technology

This amendment loosens the restriction that image designs must be applied to “articles”, clarifies the types of implementation of the designs, and revises the scope of applications and rights. (Article 121, Article 124, and Article 136)

2. Introduction of the system allowing one single application filed for multiple similar designs

Aligning with the Hague Agreement and the practices of the EU and the U.S., this amendment introduces the system that allows the filing for multiple similar designs in a single application, with relevant provisions regarding post-grant amendments and patent invalidation being revised altogether. (Article 127, Article 129, Article 139, Article 140, and Article 141-1)

3. Extension of the grace period for design patents

According to this amendment, the grace period for design patents is extended from 6 months to 12 months. (Article 122 and Article 142)

4. Relaxation of the time limit for filing divisional applications for design patents

It is currently required that a request for division should be filed before a reexamination decision on the original patent application is rendered. Under the amendment, the time limit is extended to a period within three months after the date on which an approval decision for the original patent application or reexamination is served. Corresponding adjustments will also be made with respect to the grounds for unpatentability and for invalidation. (Article 130, Article 134, and Article 141)

5. Remedy for reinstating the legitimate owner's right to apply for a patent or patent rights

In practice, disputes over the ownership of the patent application rights or patent rights are challenging for the patent authority to conduct substantive investigation as effectively as the court, and therefore, the grounds for invalidation on such disputes will be removed under this amendment. Therefore, the amendment provides that such disputes should be resolved through civil proceedings. Corresponding provisions are added in order to align with the amendment. (Article 10, Article 35, Article 59, Article 69, Article 71, Article 119, Article 140, and Article 141)

6. Inclusion of transitional provisions

The amendment includes transitional provisions setting forth the principles for handling the invalidation actions pending before the enforcement of the amendment, the extended grace period for design patents, etc.. (Article 157-5) (Released 2024.09.11)

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04 Taiwan's Silicon photonics Industry Alliance formed

In response to the explosive development and technological innovation of global semiconductor and AI industries, SEMI (the International Semiconductor Association) worked with the government, the industry, the academia, and research institutions to officially establish the "Silicon Photonics Industry Alliance" (hereinafter the "Alliance") and announced the establishment on September 3, 2024. The formation of the Alliance aims to step up the development and application of silicon photonics technology and further to elevate Taiwan's competitiveness in the global semiconductor industry by strengthening the collaboration across the supply chain.

With the promising features of high-speed transmission, high integration capabilities, and low power consumption, Silicon photonics technology is regarded as one of the key solutions that is able to address the bottlenecks in data centers and data transmission and ultimately to keep pace with the global trend toward low carbon and energy saving solutions. Therefore, silicon photonics is anticipated to become a prominent technology in the global semiconductor industry in the future.

With the rise of the AI era, countries around the world have been striving to advance relevant research, development, and industrial positioning, while Taiwan, with its established and complete industry chains, globally leading technology, and strong IP protections, has had a well-established foundation for developing silicon photonics industry. In the future, the Ministry of Economic Affairs of Taiwan will join hands with the industry, the government, the academia, and research institutions to promote the Alliance so as to create Taiwan's silicon photonics ecosystem. In the meantime, with semiconductors as the focus of development of the "Five Trusted Industry Sectors" and with the establishment of the Alliance under the lead of TSMC, ASE Holdings, and other big enterprises, it is expected that the whole industry will unify to boost the development and commercialization of key technologies and further to stimulate the prosperity of the silicon photonics sector and vitalize Taiwan's economy with new energy. (Released 2024.09.03)

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