

## China's Pure Electric Vehicle Patents are Chasing Japan's

In the field of pure electric vehicle technology such as thermal management, Chinese companies are on the offensive. Among the patents related to pure electric vehicles applied by companies in 5 major countries, China has reached 25% in terms of the cumulative number share of each country as of 2021, and is chasing Japan (36%), which currently ranks first. Judging from the number of applications in a single year, China has already ranked first in the world, and its presence has increased year by year. Overseas companies are actively pursuing mergers and acquisitions (M&A) of companies with potential technologies, and Japanese companies may also be at a disadvantage in the future.

Japanese research firm Patent Result and Nikkei Sangyo Shimbun jointly investigated patents related to pure electric vehicles. The results show that the cumulative number of patent applications in China has increased to 16 times that of 2011, and the share has risen by 19 percentage points. On the contrary, Japan's share fell by 20%. In 2021, Germany's share is 16%, the US 12%, and South Korea's 11%, all only about 1% change from 2011.

Judging from the share of each country's single-year patent application volume (basically a definite value) in 2020, China is 46%, far ahead of countries such as Japan (19%) and Germany (15%). Judging from the single-year data, after China surpassed Japan in 2016, the number of applications reached more than twice that of Japan, and the cumulative number of applications is also catching up. With the Chinese government supporting the production and sale of pure electric vehicles, China is also launching an offensive on intellectual property, a source of technological capabilities.

However, by company, Toyota tops the list with 7,236 patents. Among the top 15 companies, Japan has the largest number with six, followed by Germany with four and the United States and South Korea each with two. The only Chinese company is BYD, a major pure electric vehicle company.

China has a large number of patent applications, but it ranks low in the number of companies ranked because there are too many companies with patents related to pure electric vehicles. There are more than 10,000 Chinese companies, three times that of the United States and seven times that of Japan. The average number of applications per Chinese company is only 4, less than 1/10 of that in Japan.

The characteristic of Chinese enterprises is that 70% of the patents are applied in China. From the perspective of patents related to the structure of charging piles, China has 3,192 patents, which is 5 times that of Germany and 8 times that of Japan. China has advantages in vehicle battery and charging technology.

According to the scores of the patents applied for in the United States, and the ranking of the applicants, Toyota ranked first, Ford ranked second, Honda ranked third, Japan, the United States, and Europe. , Korean companies occupy the top 15 seats. However, there are only two Chinese companies, BYD, which ranks 30th, and Shanghai Weilai Automobile (NIO), which ranks 50th. There is still a gap in the competitiveness of patent content itself.

In the field of thermal management technology, which is considered to be more and more important for improving the performance of pure electric vehicles in the future, Japanese and European and American companies are also in a leading position. Statistics from Japan's Global

Information and India's Markets and Markets show that in terms of the global share of thermal management systems, Japan's Denso ranks first with a 35% share, followed by South Korea's Hanon Systems (18%) and France's Valeo Group (Valeo, 14%). Although there are no Chinese companies in sight, Chinese companies are aiming at the expanding use of pure electric vehicles and steadily accumulating strength.

**Related Reading**

The thermal management system combines heat pump air conditioners and [electric air conditioning compressors](#) that do not require electricity to minimize battery degradation. It also makes full use of the heat of the outdoor air to heat the air conditioner.