

October 13, 2022  
Toshiba Corporation

**Toshiba Ranks No. 1 in Japan, the United States and Europe in  
Patent Strength in Key Lithium-ion Battery Technology**

*- Dominates top position in oxide-based negative electrode-related technologies for lithium-ion batteries -*

TOKYO—An independent survey has once again confirmed Japan's Toshiba Corporation (TOKYO: 6502) as the clear leader in Japan, the United States and Europe for patents covering oxide-based negative electrode technology for lithium-ion batteries. Conducted in September this year by Tokyo-based Patent Result Co., Ltd. (Patent Result), the result is a repeat of a 2016 survey by the same company and underlines Toshiba's No. 1 position and strength-in-depth in this essential area.

Toshiba began R&D in oxide-based negative electrodes before 2000, with a focus on Lithium Titanate Oxide (LTO) negative electrodes. Typical lithium-ion batteries have carbon-based negative electrodes, but Toshiba recognized that LTO, an oxide-based negative electrode, offered excellent characteristics in six crucial areas: safety, long life, rapid charging, high input and output, low-temperature performance, and a wide effective state of charge. Toshiba first applied the technology in the SCiB™, the lithium-ion battery it brought to market in 2008.

Over more than 20 years, Toshiba has raised the competitiveness of its battery business and built a world-class patent portfolio by refining the results of its LTO R&D, selecting developments aligned with its business plans, and strategically filing patent applications. It has also expanded and reinforced the business by using the patents to build alliances with co-creators.

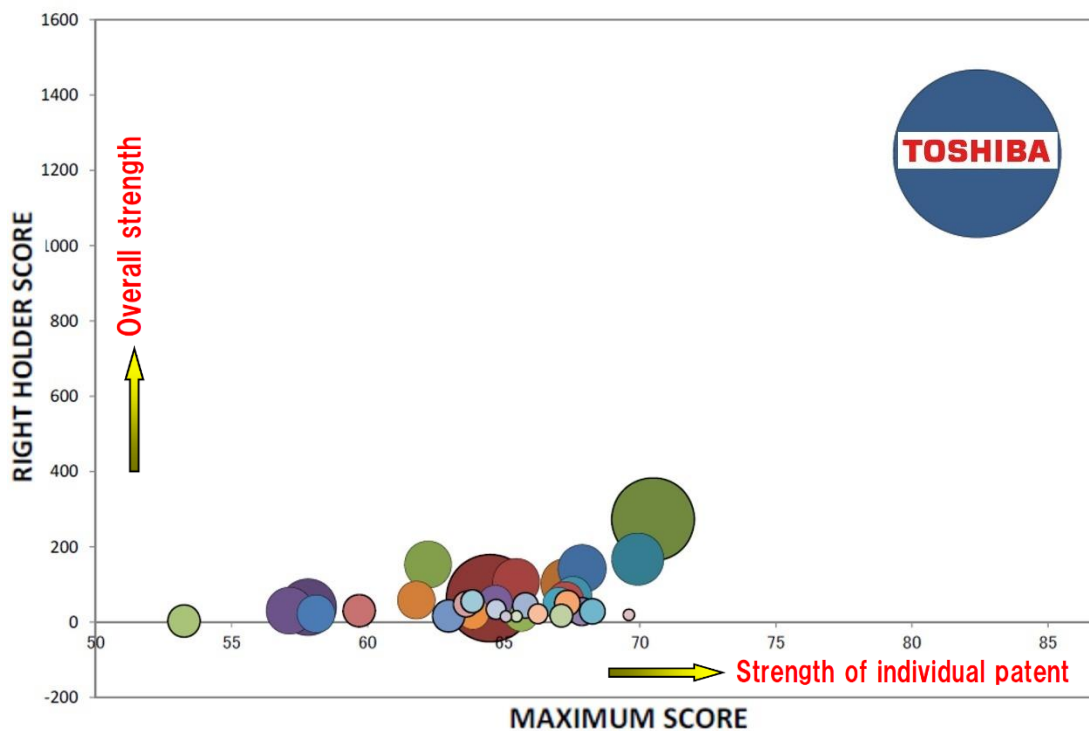
In both the 2016 and 2022 Patent Result surveys, Toshiba scored high on quantity and quality and comprehensive patent strengths, far outdistancing competitors awarded patents in Japan, the US and Europe. Toshiba attributes this No. 1 position to a research strategy that has concentrated on developing advanced technological capabilities and registering and using high quality patents acquired over the years.

The SCiB™ has won an excellent reputation for its safety, long life, and rapid charge and discharge characteristics, and has found a wide range of application in hybrid passenger cars and electric buses, rolling stock and ships, electric power management and automated guided vehicles used in industry. Its ability to help cut emissions of carbon dioxide and nitrous oxide are expected to win new applications for the SCiB™ in a world that is accelerating efforts to realize carbon neutrality.

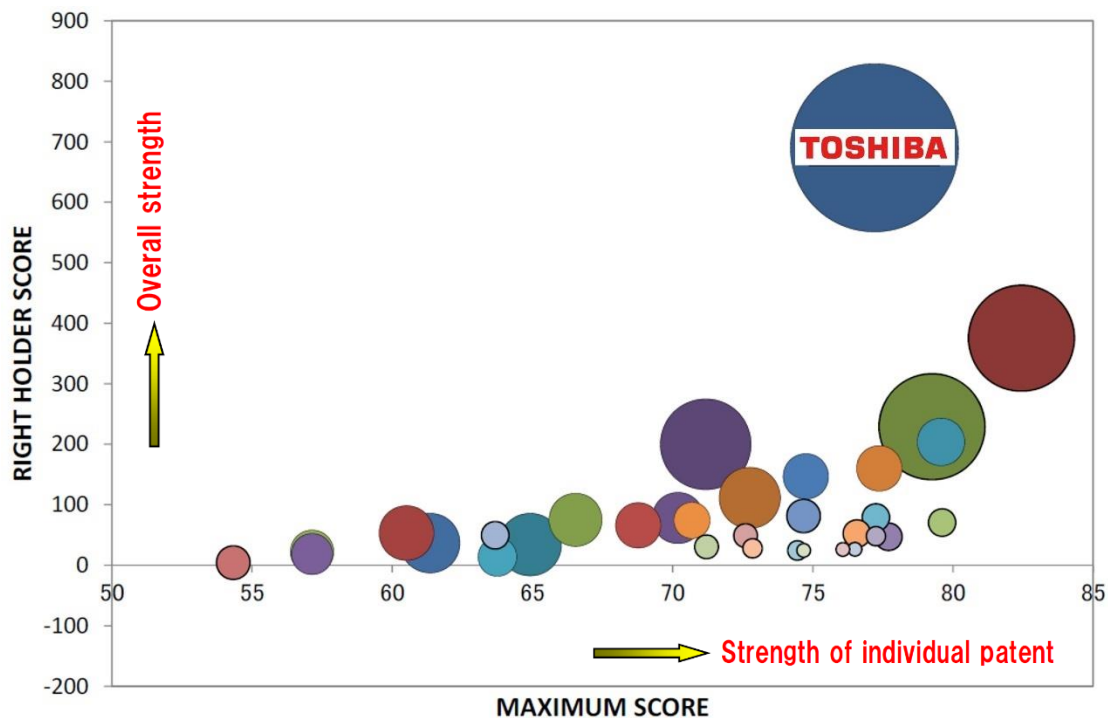
Toshiba will continue to promote research and development of battery technology that realizes safe, secure and efficient use of energy, and to support these efforts with a proactive patent strategy.



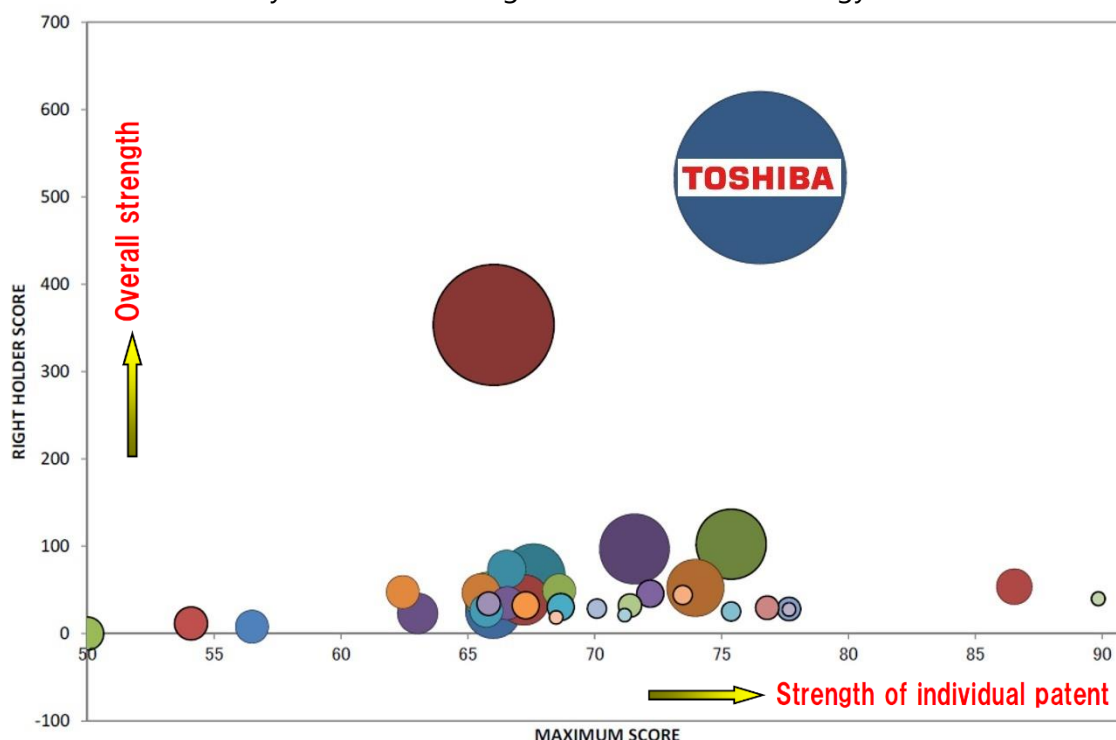
Japan: Lithium-ion Battery Oxide-based Negative Electrode Technology Patent Holder Score Map



U.S.: Lithium-ion Battery Oxide-based Negative Electrode Technology Patent Holder Score Map



## Europe: Lithium-ion Battery Oxide-based Negative Electrode Technology Patent Holder Score Map



(Taken from a report issued by Patent Result in September 2022; logo added by Toshiba)

Japanese patent search results (Patent Result website in Japanese)

<https://www.patentresult.co.jp/news/2022/09/lithiumJP.html>

U.S. patent search results (Patent Result website in Japanese)

<https://www.patentresult.co.jp/news/2022/09/lithiumUS.html>

Toshiba Rechargeable Battery SCiB™

<https://www.global.toshiba/ww/products-solutions/battery/scib.html>

### About Toshiba

Toshiba Corporation leads a global group of companies that combines knowledge and capabilities from over 140 years of experience in a wide range of businesses—from energy and social infrastructure to electronic devices—with world-class capabilities in information processing, digital and AI technologies. These distinctive strengths support Toshiba's continued evolution toward becoming an Infrastructure Services Company that promotes data utilization and digitization, and one of the world's leading cyber-physical-systems technology companies. Guided by the Basic Commitment of the Toshiba Group, "Committed to People, Committed to the Future," Toshiba contributes to society's positive development with services and solutions that lead to a better world. The Group and its 120,000 employees worldwide secured annual sales of 3.3 trillion yen (US\$27.4 billion) in fiscal year 2021.

Find out more about Toshiba at [www.global.toshiba/ww/outline/corporate.html](http://www.global.toshiba/ww/outline/corporate.html)