

## Partnership agreement signed with Saudi Aramco, the world's largest energy company

~ Discussing joint development to realize the global deployment of  
next-generation "All Polymer Battery" ~

On March 15, 2023, APB Corporation (Headquarters: Echizen-shi, Fukui, Representative Director: Hideaki Horie, Henceforth: APB) entered into a partnership agreement with Saudi Arabian Oil Company (Headquarters: Saudi Arabia, President & CEO: Amin H. Nasser, Henceforth: Saudi Aramco) to collaborate in jointly developing All Polymer Battery materials.

APB has finished establishing the technology for the All Polymer Battery in preparation for large-scale mass production starting in 2026 and is already constructing a pilot high-speed manufacturing line at its plant in Fukui Prefecture. Through this agreement, APB will further innovate the technology of polymer materials and accelerate the expansion of the scale of its production systems via joint development with the global company Saudi Aramco, promoting the development of the All Polymer Battery, which many call the "Ultimate battery".



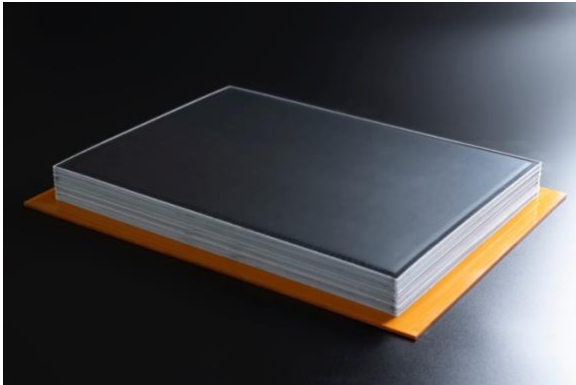
### ■ All Polymer Battery, the Key to Achieving Carbon Neutrality by 2050

The development and spread of the next generation of lithium-ion batteries are major keys to achieving a decarbonized society, a goal many countries worldwide are working toward. Lithium-ion batteries stand out due to their naturally high energy density per unit of weight or volume. As a result, they are widely used in products that require light weight and compactness (such as smartphones and notebook PCs) and products that require electrical capacity (such as storage batteries for renewable energy and EV vehicles). Research organizations predict that global demand for lithium batteries will surge more than fivefold by 2030.

However, such batteries face major issues concerning "Safety" (the risk of ignition due to the

heat generated by a short circuit caused by the high energy density), "Price" (increased manufacturing costs due to the use of rare-earth metals and advanced safety measures), and "Environmental pollution" (the enormous CO2 emissions accompanying the manufacturing process).

APB's All Polymer Battery solves these three issues using unique Japanese technology.



"All Polymer Battery" developed by APB



Representative director, Hideaki Horie

## ■ The World's First All Polymer Battery

### - Construction of Manufacturing Lines for Large-Scale Mass Production in 2026

Hideaki Horie, the representative and chief architect of APB, originally worked for Nissan Motor Co., Ltd. as an engineer who developed the battery system for the world's first lithium-ion battery-equipped EV car "Nissan LEAF". Nissan LEAF has sold more than 590,000 globally, has been called the "safest battery system in the world" because there have been no cases of lithium-ion batteries ignition.

APB's All Polymer Battery was born in 2018 by utilizing the development capabilities of Horie, who holds hundreds of patents as a top engineer in the world's storage battery industry.

All Polymer Battery replaces all the metal parts used in the current collectors of conventional lithium-ion batteries with polymer. It is safe due to the extremely low risk of ignition, is more compact than conventional products and has more than twice the volumetric energy density.

Furthermore, some of the materials can be recycled, which helps to protect the environment. In addition, by greatly simplifying and speeding up the manufacturing process of conventional lithium-ion batteries, manufacturing costs can be greatly reduced.



Pilot version of a high-speed production line for "All Polymer Battery" (APB Takefu factory)



Sample product of "All Polymer Battery"

Furthermore, APB has raised over about 8.8 billion JPY in funding and is testing a high-speed manufacturing line for large-scale mass production in FY2026. APB has already constructed a pilot version of a fully automated manufacturing line capable of producing the All Polymer Battery at low cost, high speed, and large quantities at its main plant in Takefu City, Fukui Prefecture, and is in the process of conducting repeated operational tests. APB aims to complete the high-speed manufacturing line after further fundraising and then develop a business model which provides the product per manufacturing line worldwide.

#### ■ Global strategy with Saudi Aramco

Saudi Aramco, the company APB is entering into a partnership agreement with, is the world's largest integrated energy company (Its market capitalization is 1.8 trillion USD. This is about 248 trillion Japanese yen, making it the second largest company in the world after Apple Inc. in the US.). As a state-owned company of Saudi Arabia, Saudi Aramco boasts the world's largest crude oil production capacity. It also aims to realize a decarbonized (Carbon Neutral) society in the future, promoting the implementation of solar-energy-centric renewable energy and actively investing in the field of storage batteries for storing that power.

During Saudi Aramco's search for next-generation storage batteries, which are the key to spreading renewable energy, it found APB's All Polymer Battery Technology, which is

renowned worldwide as the "Ultimate battery". As a result, both companies entered into a partnership agreement for joint development.

APB, aside from advancing the large-scale mass production of All Polymer Battery (completing a high-speed production line), is also planning to consider collaborating in developing an improved, next-generation All Polymer Battery with Saudi Aramco.

■ Company overview of APB Corporation

Representatives: Representative Director Hideaki Horie

Corporate Headquarter: 31-1-5 Shodencho, Echizen, Fukui 915-0043, JAPAN

Established: October 2018

The capital: 100 million yen

Businesses: Research, development, manufacturing, and sales of lithium-ion batteries

Website: <https://apb.co.jp/>

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