

Innovation to Shape the Future



In order to respond to social challenges, potential problems, and changes in the market environment that have become apparent, the Advanced Technology Division and the New Business Creation Division have classified the target markets into the following three categories: “existing market,” “new market,” and “next-generation market,” and are devoting resources to research & development and commercialization for each category. When it is difficult to find solutions on our own, we actively promote open innovation through alliances with venture companies, universities, research institutes, and other organizations, both in Japan and overseas.

We incorporate the concept of “Creating Shared Value (CSV),” deepen communication with our stakeholders, and work on development that can realize the creation of shared value between the Toyal Group and society. We also aim to lead the world with new ideas, being based on aluminum, but not limited to it.



Strengthening open innovation and interaction with business divisions. Taking on new themes that can contribute to social issues and creating the future of the Toyal Group

SDGs and solutions to social issues are an important aspect of manufacturing. With that in mind, we believe that our mission is to improve people’s lives by developing products that can help protect our environment.

In fiscal 2022, we stepped up the businesses we planted in fiscal 2021 to solve social issues. Mass production began of powder laminated foil (winding type) used in aluminum electrolytic capacitors, and the product is now ready for market. In partnership with 24M Technologies, Inc., a battery technology venture company in the US, we are developing next-generation EV batteries and are working to further improve the performance of battery components. In addition, the research of the Toyo Aluminium Joint Research Course on Semiconductors, established with Osaka University, was selected as a “Leading Research Program on New Energy and Environmental Technologies” by NEDO (New Energy and Industrial Technology Development Organization), and progress has been made toward practical application.

In addition, joint research with universities on tritium decontamination technology for ALPS treated water^{*1} has passed secondary evaluation, and is now entering the feasibility study^{*2} stage for evaluation and consideration for practical applications.

In fiscal 2023, we will further advance the results of fiscal 2022. Specifically, we will devote human capital and concentrate our efforts on commercializing foil for aluminum electrolytic capacitors and battery components for electric vehicles, as well as to carry out demonstration tests for tritium decontamination technology. We are also pursuing new initiatives, such as research into low-temperature cured silver paste, which will contribute to a significant increase in the conversion efficiency of solar cells.

On top of that, as one solution to the environmental issues for which market

demand is high, we will focus on the development of biodegradable plastic packaging materials that can prevent marine pollution.

Development of human capital is important to promote this research & development. The Advanced Technology Division will utilize women and foreign nationals and foster development-based human capital through open innovation. At the same time, we will contribute to society by strengthening interactions with business divisions to share the growing environmental awareness of end users and developing products and new technologies that will help solve environmental and other social issues.

^{*1} ALPS treated water: Water containing radioactive material from the buildings of the Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi Nuclear Power Plant has been purified, removing the radioactive material other than tritium to meet safety standards (Source: Ministry of Economy, Trade and Industry's "Let's get to know and understand about ALPS treated water." https://www.meti.go.jp/earthquake/nuclear/hairo_osensui/s_hirou_alps.html)
^{*2} Feasibility study: A verification of practical suitability based on specific conditions



• Sensor that detects using frictional power generation

In recent years, a technology called “energy harvesting,” in which small amounts of environmental energy such as the heat and vibration around us are collected and used, has attracted much attention. In collaboration with Kansai University, we are currently developing a detection sensor that uses friction energy generated when a person passes by for wireless communication. This technology makes it possible to use energy effectively by eliminating sensor batteries.



The sensor communicates wirelessly to a PC using electricity generated when a person passes by

• Reducing food loss with “LOTUS · FLOW BOTTLE®”

Inspired by the water repellency of lotus leaves, a unique surface treatment has been applied to the inside of the bottle. This makes it difficult for the contents to stick to the bottle, allowing for every last drop to be used. This product, developed in collaboration with Kyoraku, aims to contribute to a sustainable society by reducing food loss, while at the same time enhancing consumer convenience and enriching lives.



• Pest repellent products that are friendly to humans, animals, and the earth

We have developed a pest repellent product that uses highly safe biodegradable resins and natural ingredients. The damage to health caused by blood-sucking pests can be a big problem for both people and animals. By using ingredients that are safe to eat, this product can be safely used in nurseries, nursing homes, for livestock and in zoos, etc., to prevent health hazards caused by blood-sucking pests. In addition, the raw material resin used is biodegradable resin that decomposes naturally in the soil, making it an insect repellent with little impact on the environment.



Pellets for pest repellent products

• Silver paste for next-generation perovskite tandem solar cells

Expanding renewable energy is one of the major challenges in preventing global warming. Next-generation perovskite tandem solar cells have been reported to have a high conversion efficiency of more than 30%, but the technology for forming electrodes to extract electricity industrially has not yet been established. We are collaborating with research institutions around the world to develop silver paste as an electrode-forming material that can be commercialized. Next-generation solar cells using this technology are expected to be deployed in mobility applications such as automobiles and drones, where the mounting area is limited.



Image of solar cell use

Link to solar cell introduction page

