

January 26, 2022

Institute of Industrial Science, The University of Tokyo

Prime Planet Energy & Solutions, Inc.

Energy Company, Panasonic Corporation

Toyota Tsusho Corporation

Institute of Industrial Science, The University of Tokyo, Prime Planet Energy & Solutions Inc., Panasonic Corporation, Toyota Tsusho Corporation commences industry-university collaborative research on battery resources and recycling

Institute of Industrial Science, The University of Tokyo (UTokyo-IIS), Prime Planet Energy & Solutions Inc. (PPES), Energy Company, Panasonic Corporation (Panasonic), and Toyota Tsusho Corporation (TTC) announced the start of joint research on battery resources and recycling with the aim of contributing to a more sustainable society.

The joint research will focus on the development and manufacturing process of battery materials using resources and recycled materials found in lithium-ion batteries. The project's aim is the realization of carbon neutrality and a significant reduction in production costs throughout the entire battery supply chain through the creation of an innovative new manufacturing process.

Specifically, we will conduct joint research on the following topics:

(1) Development of new processes in an integrated manner, ranging from resource development to battery material development and manufacturing

By reviewing existing processes from the development of nickel, lithium, and cobalt metal resources and refining these in the development and manufacturing of battery materials, we aim to solve issues such as reducing CO₂ emissions, lowering production costs, and shortening the lead time for material production by developing new optimal processes that are more specialized for battery applications. The joint research aims to solve issues such as reduction of CO₂ emissions, reduction of production costs, and shortening of lead time for material production. The research will not only focus on the development of elemental technologies but

will also examine ways to speedily utilize the development results in commercial applications.

(2) Development of new processes for recycling of battery waste materials and used batteries

With the aim of further improving the recycling rate of batteries, we will promote the development of technologies for efficient and waste-free recycling of leftover materials from battery manufacturing and used batteries. By combining the knowledge of four parties - battery manufacturers, trading companies that oversee recycling, collection, and processing, and universities that possess comprehensive rare metal refining technologies - and creating an optimal process, we will be able to reduce CO2 emissions and recycling costs, which are currently issues in the recycling process. By combining the knowledge of these groups, we aim to significantly reduce CO2 emissions and recycling costs.

UTokyo-IIS, PPES, Panasonic, and TTC will work on technological innovation and social implementation of lithium-ion batteries, whose market is expected to further expand in the future, to ensure a more stable supply, reduce CO2 emissions over the entire battery life cycle, and lower costs.

Based on the common aspiration of contributing to the realization of a carbon-neutral and environmentally friendly recycling-focused society, the four companies will take on the challenge of developing and strengthening the foundation of the battery industry as a single team of experts from industry, academia, and beyond the traditional boundaries of business.

Based on the above, the four parties signed an "Industry-Academia Collaboration and Research Cooperation Agreement" on January 26 to promote mutual collaboration and active promotion.

Comments from the UTokyo-IIS and representatives of each company

Toru H. Okabe, Director General, Institute of Industrial Science, The University of Tokyo

"Through this new style of flexible industry-academia collaboration, we will not only develop excellent human resources in this field, but also contribute to the realization of a sustainable recycling society by leading the world in the development of new technologies with a specific focus on social implementation through wide-ranging initiatives that extend all the way to the source of the supply chain."

Hiroaki Koda, President, Prime Planet Energy & Solutions, Inc.

"We are honored to have formed a very strong partnership for the growth and development of the battery industry. Through this initiative, we will contribute to a decarbonized society by accelerating the creation of an environmentally friendly and competitive battery supply chain, and at the same time, we will strive to utilize our knowledge as a battery specialist for the benefit of the world at large."

Shoichiro Watanabe, Vice President & CTO, Energy Company, Panasonic Corporation

"We are privileged to participate in the effort to realize a carbon-neutral society through a strong partnership in industry-academia collaborative research. We will make extensive use of our knowledge as a battery manufacturer, including the clarification of raw material standards for the application of batteries, and contribute to the construction of social systems such as supply chain resilience and recycling."

Masaharu Katayama, COO for Metals Division, Toyota Tsusho Corporation

"We are honored to be able to contribute to a carbon-neutral society by building a competitive supply chain with Japan's leading players. We will not only supply battery materials, but also contribute to the reduction of environmental impact and the formation of a recycling-oriented society by promoting recycling, making use of our knowledge in the recycling-oriented venous business."

Reference

- Institute of Industrial Science, The University of Tokyo

Institute of Industrial Science, The University of Tokyo (UTokyo-IIS) is one of the largest university-attached research institutes in Japan. More than 120 research laboratories, each headed by a faculty member, comprise UTokyo-IIS, with more than 1,200 members including approximately 400 staff and 800 students actively engaged in education and research. Our activities cover almost all the areas of engineering disciplines. Since its foundation in 1949, UTokyo-IIS has worked to bridge the huge gaps that exist between academic disciplines and realworld applications.

Director General: Toru H. Okabe

Website: <https://www.iis.u-tokyo.ac.jp/en/>

- Prime Planet Energy & Solutions, Inc.

Prime Planet Energy & Solutions started operations in April 2020 as a joint venture for automotive prismatic batteries (owned 51% by Toyota Motor Corporation and 49% by Panasonic Corporation).

Details of Business: Development, manufacturing and sale of automotive prismatic lithium-ion batteries.

Head office: Chuo-ku, Tokyo

President: Hiroaki Koda

Website: <https://www.p2enesol.com/en/>

- Energy Company, Panasonic Corporation

Engaged in the global B to B business of dry cell batteries that support convenient and comfortable daily life, industrial batteries that support social infrastructure in a wide range of fields, and automotive batteries, etc. On April 1, 2022, the company will become "Panasonic Energy Co., Ltd."

Main businesses: Lithium-ion batteries, energy storage modules, energy storage systems, dry batteries, lithium primary batteries, nickel-metal hydride batteries

Development, production, and sales of lithium primary batteries and nickel metal hydride batteries.

Head office: Moriguchi City, Osaka Prefecture

President: Kazuo Tadanobu

Website: <https://www.panasonic.com/global/corporate/energy.html>

- Toyota Tsusho Corporation

Toyota Tsusho was founded in 1948 as the trading company of the Toyota Group. The company has seven operating divisions (Metals/ Global Parts & Logistics/ Automotive/ Machinery, Energy & Plant Project/ Chemicals & Electronics/ Food & Consumer Services/ Africa), with approximately 64,000 group employees engaged in business in about 120 countries around the world.

Main businesses: Domestic trading of various goods, import/export trading, foreign trade, construction contracting, insurance agency services, etc.

Head office: Nagoya City, Aichi Prefecture

President and CEO: Ichiro Kashitani



Website: [Toyota Tsusho Corporation \(toyota-tsusho.com\)](http://toyota-tsusho.com)