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Mazda Motor Corp.  
ELIY Power Co., Ltd.  
Ube Industries, Ltd.

**Mazda, ELIY Power and Ube Industries Agree to Jointly Develop 12-Volt  
Lithium-ion Starter Batteries for Vehicles**

*Developing Safe, Durable Lithium-ion Batteries to Replace Lead-Acid Batteries*

**HIROSHIMA, Japan**—Mazda Motor Corporation, ELIY Power Co., Ltd. and Ube Industries, Ltd. have agreed to jointly develop lithium-ion batteries for use in automobiles. The three companies will work together to develop durable, heat- and impact-resistant 12-Volt lithium-ion batteries as a viable replacement for lead-acid starter batteries in motor vehicles by 2021.

Lithium-ion batteries offer a promising alternative to conventional lead-acid car batteries, as environmental regulations in some regions restrict the use of lead and engineers aim to reduce vehicle weight for improved fuel economy. But their application in motor vehicles so far has been limited due to the need for car batteries to withstand the high temperatures of the engine room and the potential impact forces of a collision. With this new project, Mazda, ELIY Power and Ube Industries will combine their technical strengths to overcome such issues.

Making use of the industry-leading computer-aided model-based development techniques it honed while developing SKYACTIV Technology, Mazda will conduct model-based research of the chemical reactions that occur inside batteries, develop technologies to manage high-performance batteries from a vehicle-total perspective and develop a general purpose model for their use.

ELIY Power makes high-quality stationary batteries and starter batteries for motorcycles. The safety and performance of its lithium-ion starter batteries for motorcycles is widely recognized, and the company started supplying them to a major Japanese motorcycle manufacturer in 2016. ELIY Power will leverage its experience in developing safe, water-proof, impact-resistant battery technologies with excellent cold-weather performance to lead design and development of the basic battery unit.

As a leader in the development of key components such as electrolytes and separators, Ube Industries has made significant contributions to improving the performance of lithium-ion batteries and expanding their range of applications. Its functional electrolytes have brought improvements in battery safety and longevity, and enabled higher capacity for higher voltage batteries. The company will use its accumulated expertise and engineering prowess to develop an electrolyte with a higher flash point and better heat resistance.

In light of global trends in environmental regulations, the joint development project aims to make a next-generation battery for widespread use in place of conventional lead-acid starter batteries and contribute to the realization of a safe and stress-free motorized society. In addition, the three companies will assess prospects for further collaboration in a range of fields, including using the technologies that result from this project as base for other low-voltage lithium-ion batteries applicable to vehicle electrification technologies other than starter batteries.

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■ELIY Power Co., Ltd.

Since its founding in 2006, ELIY Power has played the leading role in the market with its large-sized lithium-ion batteries for stationary use, achieving high levels of safety, long service life and wide-ranging operating temperature characteristics. ELIY Power battery cells eliminate the risk of thermal runaway and do not catch fire even when pierced with nails, etc., (i.e. internal shorting), crushed or overcharged. They are also the first of their kind in the world to have obtained safety standard certification\* from an international certification body.

With the recognition of the high-level safety of its batteries, since 2015, ELIY Power—in collaboration with a major Japanese motorcycle manufacturer—has developed motorcycle starter batteries which are enable to replace with conventional lead acid batteries. These batteries are now being sequentially adopted for use in mass-produced motorcycles as the official standard batteries.

ELIY Power has also developed lithium-ion batteries with safety, storage capacity and energy density features improved. New technology in these batteries helps to suppress increases in internal pressure when the batteries are overcharged, curbing safety valve operation, and thereby increasing overall safety and preventing secondary damage due to electrolyte spurting out of the batteries when they are overcharged.

\* A safety standard certification issued by international third-party testing and accreditation house TUV Rheinland Japan Ltd. (tests conducted in accordance with Lithium-ion Cell Extreme Condition Testing Manual v.2:2011)

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