News Release

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Hitachi Zosen Corporation

February 27, 2024

Recent Developments of All-Solid-State Lithium-Ion Battery AS-LiB®.

- **First commercial order from a semiconductor-manufacturing equipment manufacturer**
- **Space AS-LiB returns from space and receives JAXA's Certificate of Space Flight**

Hitachi Zosen Corporation has received an order for 1 lot (12 units) of its all-solid-state lithium-ion battery AS-LiB® (140mAh type) from a semiconductor manufacturing equipment manufacturer. Future orders from the company are also expected.

As for AS-LiB®, we have received orders from a variety of industries for sample use purpose so far. However, this is the first commercial order which is to be used as a part of actual product.

AS-LiB® has unique features of wide operating temperature range and variety of usable environments, and is capable of charging and discharging under the environments of low and high temperature, vacuum, etc. The samples have been offered mainly for use in space, for semiconductor related equipment and other environments where usual batteries cannot be used.

Besides, in a joint demonstration study with Japan Aerospace Exploration Agency (JAXA) which was launched in March 2022, we installed "Space AS-LiB", an all-solid-state lithium-ion battery in-orbit demonstration equipment based on AS-LiB® (140mAh type) on the "Outboard Small Payload Support Device (SPySE)" installed on the extravehicular Experimental platform of the "Kibo" Japanese Experiment Building, which constitutes the International Space Station (ISS). Then, the world's first charge and discharge in space exposure as well as a long-term charge/discharge cycling operation for more than a year were confirmed.

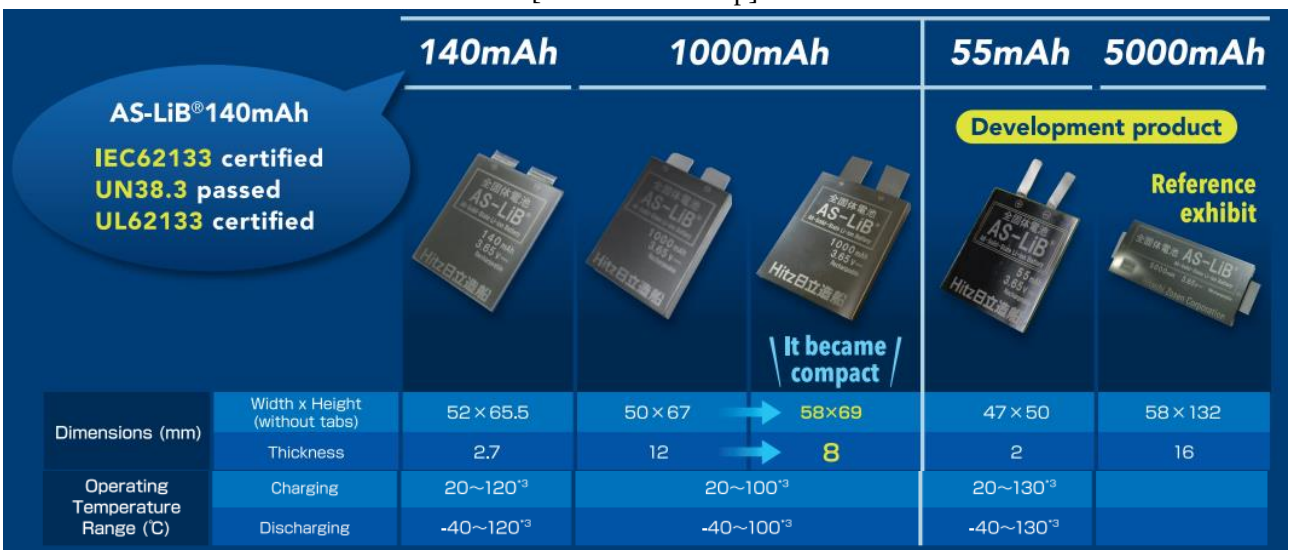
Space AS-LiB has returned to the coast of Florida on December 23, 2023 by SpX-29` (Note) of the NASA, and arrived at the Tsukuba Space Centre of JAXA on January 26, 2024. We receive the Space Flight Certificate (Certificate of Space Flight) from JAXA. We will conduct dismantling analyses and evaluations upon its return our technical research laboratory (Osaka City) in early March (scheduled).

[Space Flight Certificate]

[AS-LiB returned from space]

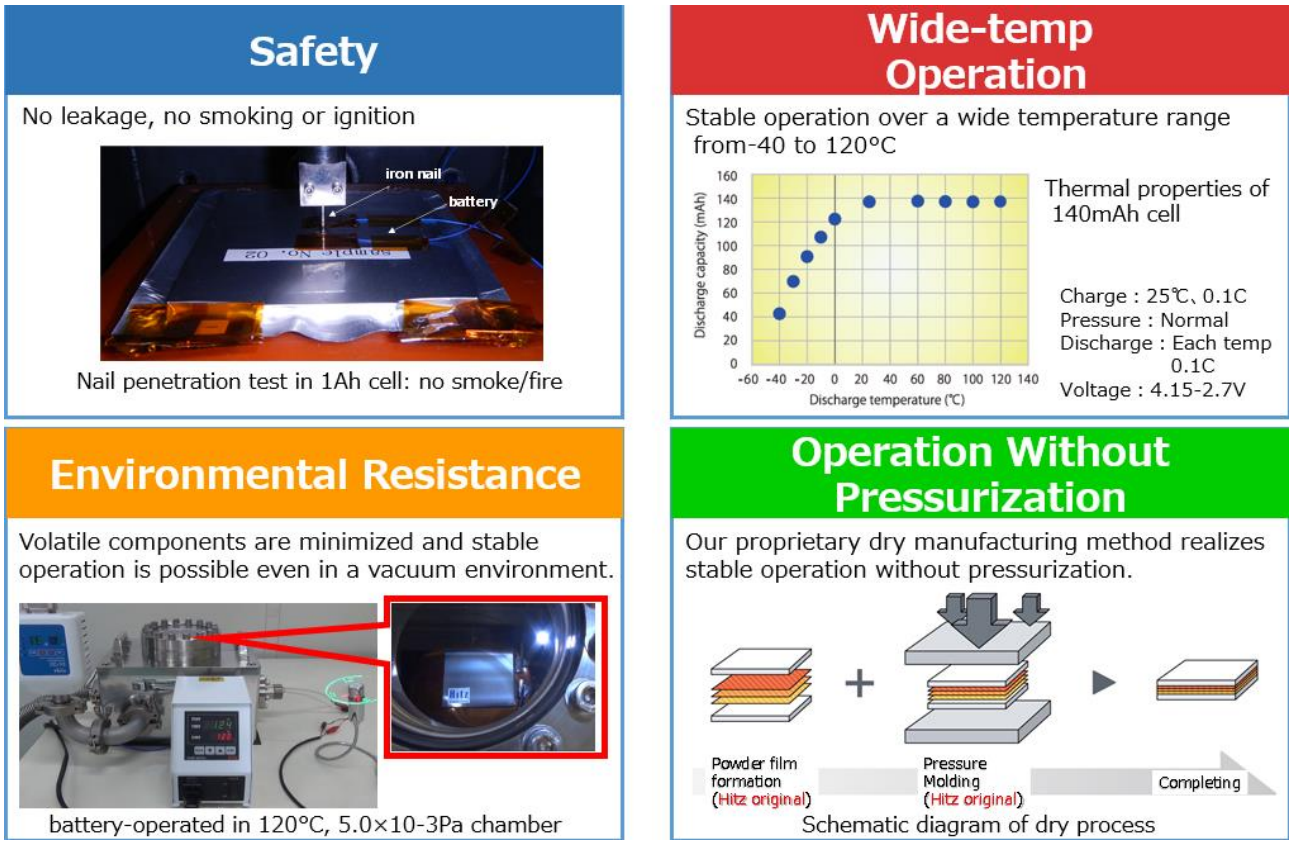
(Note) Dragon Refueling Vessel Operation Unit 29 (SpX-29) mission. The 29th mission (SpaceX CRS-29:SpX-29) of the Commercial Goods Transportation Services, in which NASA entrusts the transportation of goods, etc. to ISS to private companies.

[AS-LiB® Line-up]



		140mAh	1000mAh	55mAh	5000mAh
Dimensions (mm)	Width x Height (without tabs)	52×65.5	50×67 → 58×69	47×50	58×132
	Thickness	2.7	12 → 8	2	16
Operating Temperature Range (℃)	Charging	20~120*3	20~100*3	20~130*3	
	Discharging	-40~120*3	-40~100*3	-40~130*3	

[AS-LiB® Main Features]



The outline of this case is as follows.

1. About the commercial order

①Client : Semiconductor manufacturing equipment manufacturer

②Product : AS-LiB® solid-state lithium-ion battery (140mAh)

③Number of orders receiveds: 1 lot (12 batteru unites)

④Delivery date : End of February 2024

2. About space demonstration

①Implementer : JAXA and Hitachi Zosen Corporation

②Period : February 2022 to November 2023

③Timing of return : December 23, 2023