Enpower Successfully Develops a Record-Breaking Lithium Metal Battery

October 25, 2021

Enpower Greentech Inc., Enpower Japan Corp.

Enpower Greentech Inc. (“Enpower Greentech”), in a collaboration with Softbank Corp (“Softbank”), has developed and verified a record-breaking lithium metal battery with an ultra-high energy density of 520 Wh/kg (1100 Wh/L). The battery is an improved version of the 450 Wh/kg lithium metal battery announced by Enpower Greentech and Softbank on March 15, 2021.

The energy density was verified by several third-party organizations, including the “SoftBank Next Generation Battery Lab,” using multiple battery samples. The battery sample and its specifications were also exhibited at the Smart Energy Week 2021 International Rechargeable Battery Expo held at Tokyo Big Sight from September 29 to October 1.

Many companies and government research projects have aimed to reach a high energy density of 500 Wh/kg (1000 Wh/L) somewhere between 2025 and 2030. Enpower has pushed up the timeline. In just 7 months, it has achieved a 70 Wh/kg increase in energy density from the 450 Wh/kg announcement in March. The battery is made using Enpower’s proprietary lithium-metal-interface control and electrolyte technologies. It maintains charge/discharge stability even after a significant reduction in the usage of non-active materials.

The battery has a verified capacity of 3600 mAh, almost the same as that of current lithium-ion batteries (LIBs) inside smartphones, but boasts about half the weight and volume. That means that by using Enpower’s batteries with the same weight and volume, the smartphone’s battery life can be extended by more than two-fold on each charge. By the same logic, the battery can double the flight time of drones and the range of electric vehicles. In the coming year, Enpower Greentech plans to realize an even higher energy density of 540 Wh/kg by raising the cell capacity to 10Ah or above and maintaining the same cell chemistry. At present, Enpower Greentech is actively collaborating with its customers and partners to commercialize a 400-500 Wh/kg class lithium metal batteries.

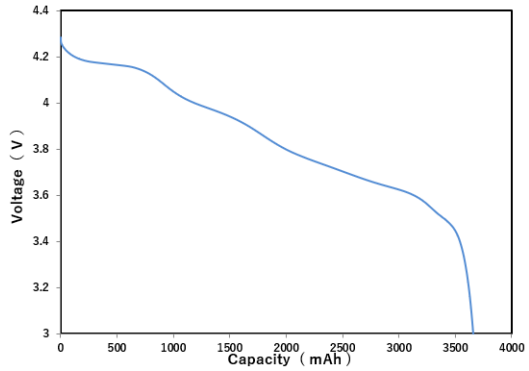
In March, Enpower Japan Corporation, a subsidiary of Enpower Greentech, presented its lithium metal anode technology at the Electrochemical Society of Japan’s Spring Meeting. From November 30 to December 2, 2021, it plans to present the prior lithium metal battery’s performance at the 62nd Battery Conference in Yokohama.

The Enpower Group ("Enpower") is a technology group that conducts research and development on next-generation batteries, including lithium metal and all-solid-state batteries, in service of a carbon-free future. It has teams of engineers based in the U.S., China, and Japan. In addition, Enpower works with a wide range of collaborations across both academia and industry, including the 2019 Nobel laureate in Chemistry Professor John Goodenough and his team at the University of Texas at Austin. Enpower also collaborates with Japanese universities, including the Tokyo Institute of Technology, and more than 20 energy-related companies.

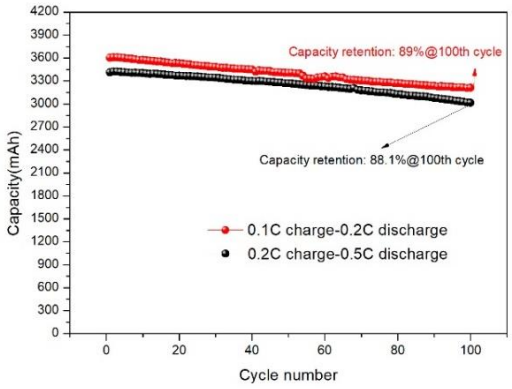
Appendix

■Enpower LMB — 3.6Ah-3.85V-520Wh/kg

■ Discharge Curve



■ Cycle Life Test



■ Measurement Results (by third-party organization)

Test Conditions: 0.1C Charge, 0.1C Discharge, between 3.0V – 4.3V, at 25ºC

Cell No.	Cell Weight (g)	Cell Volume (mL)	Average Cell Voltage (V)	Discharge Capacity (mAh)	Discharge Energy (Wh)	Gravimetric Energy Density (Wh/kg)	Volumetric Energy Density (Wh/L)
E-1	26.597	11.874	3.856	3607.4	13.910	523.00	1171.48
E-2	26.553	11.813	3.856	3607.4	13.910	523.86	1177.53
E-3	26.531	11.916	3.857	3575.2	13.790	519.75	1157.23

※Full test reports by third-party organization are available. Please contact us.

Contacts

Enpower Greentech Inc.

Tel : +1 916-2206060 E-mail : contact@enpowerus.com

Enpower Japan Corp.

Tel:+81-3-6717-4467 E-mail : contact@enpowerjp.co.jp