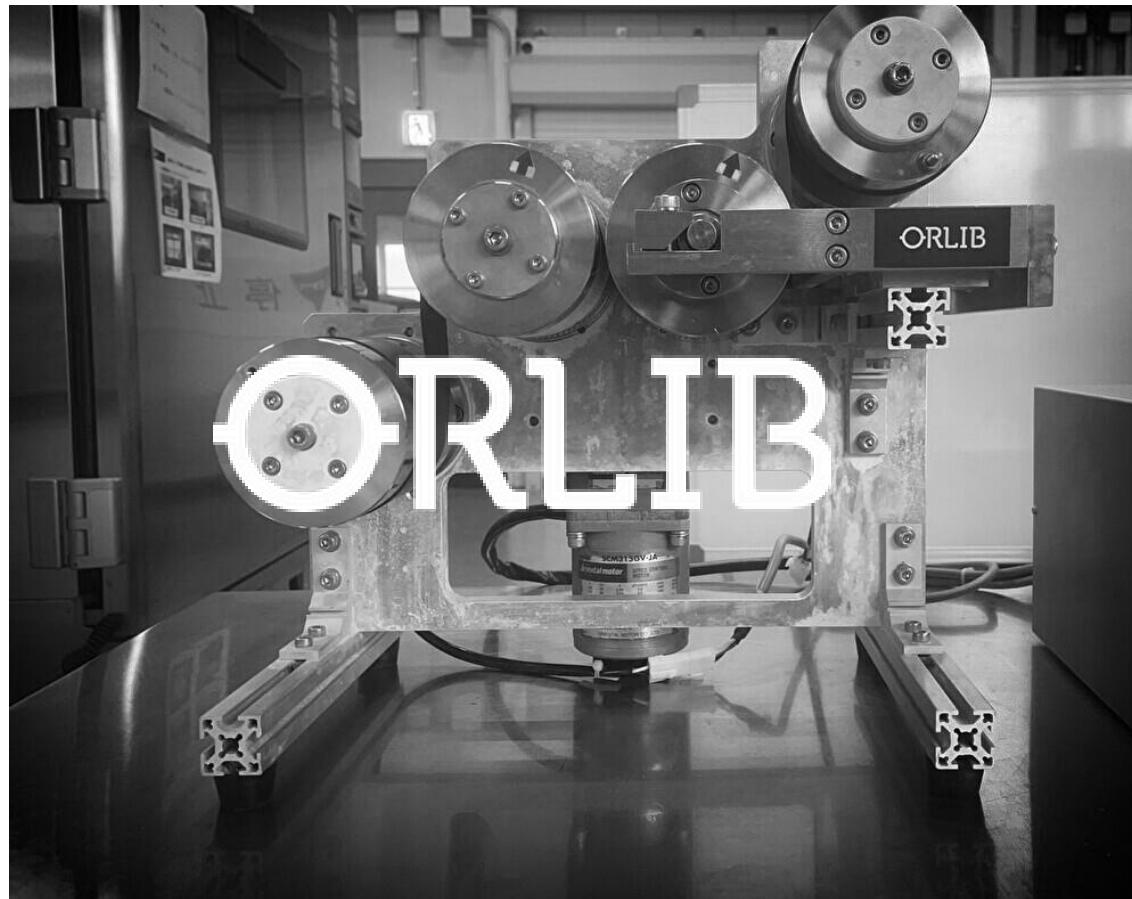


The Frontier of **【Hyper Pre-Dope】** to The Future Dimension.



ORLIB



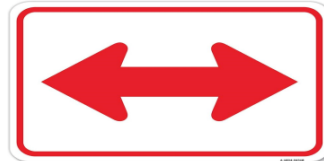
Which Do You Want to Buy???

【Current Model】

【Hyper Pre-Dope **Si**】



iPhone 15 Pro Max



Up to

29 hrs

Video playback on
iPhone 15 Pro Max¹²

Weight : 221 g

\$1199.00

Up to

58 hrs

(2 times longer)

Weight : 110.5 g

(1/2 times lighter)

\$599.50 (1/2 times cheaper)

ORLIB

Which Do You Want to Buy???

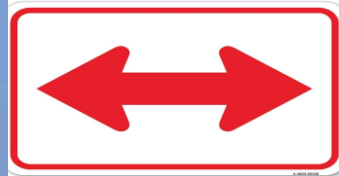
【Current Model】

【Hyper Pre-Dope **Si**】

Flight Time 10 Min

OR

Flight Time 20 Min



Which Do You Want to Buy???

Rare Metal EV

Year 2050 All Gone



【Current Model】

OR



Iron (Fe) EV

Year 2050 All OK



【LFP Hyper Pre-Dope】

Which is Better???

😭 Old Pre-dope



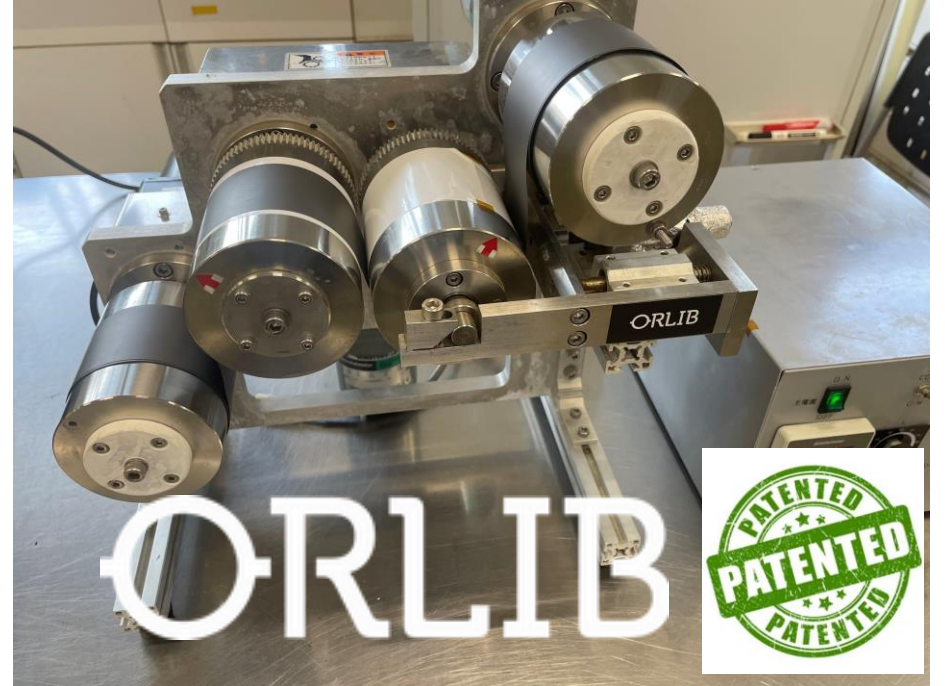
Liquid Soak 💧

NEC, KRI, Nissan, JSR, etc

【Long time Process】

Not suitable for mass production

😊 【Hyper Pre-dope】



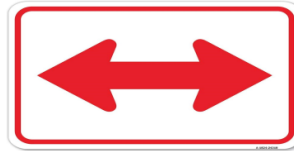
No Fluid

★ Pressure Electrochemical Pre-Doping Technology (PATENTED)

【Fastest Process】

Capable mass production for first time⁵

OR



Successfully reducing irreversible capacity

University of Tokyo succeeds in developing pressurized electrolytic pre-doping technology that enables high-capacity secondary batteries

東大、二次電池の高容量化を可能とする加圧電解プレドープ技術の開発に成功

(Electrochemical Pre-Doping of High Capacity Si Electrodes Under Pressure)

◆ In all lithium-ion batteries, side reactions occur on the negative electrode during the first charge and discharge, and it is impossible to prevent the occurrence of "irreversible capacity". This causes the capacity to be smaller than designed. The technology to reduce this capacity reduction is Hyper Pre-Dope. The formation of the solid electrolyte interface layer of the negative electrode active material, which is the cause of irreversible capacity, can be performed before the battery is assembled, so the capacity can be increased by up to about 10% for conventional graphite negative electrodes and up to about 20% for silicon-containing negative electrodes. The rate at which the capacity increases depends on the pre-doping time, but applying pressure makes it possible to increase the capacity at a practical rate. In addition, the electrolytic reaction under pressure forms a high-quality solid electrolyte interface (SEI) layer, which also extends the charge and discharge cycle life.

◆ 全てのリチウムイオン電池は初回の充放電時に、負極上で副反応が進行して「不可逆容量」の発生は防ぐ事が出来ません。この為、容量が設計より小さくなるという問題があります。この容量の低減を削減する技術がHyper Pre-Dopeです。不可逆容量の原因である負極活物質の固体電解質界面層形成を電池の組み立て前に行うことができるため、従来の黒鉛負極で最大10%程度、シリコン含有負極で最大20%程度容量が増大します。その割合、つまり容量が増加する割合はプレドープ時間に依存しますが、加圧することで実用的な速度での高容量化が可能となりました。また、加圧下での電解反応によって高品質の固体電解質界面 (SEI) 層が形成されるため、充放電サイクル寿命も長くなります。

ORLIB

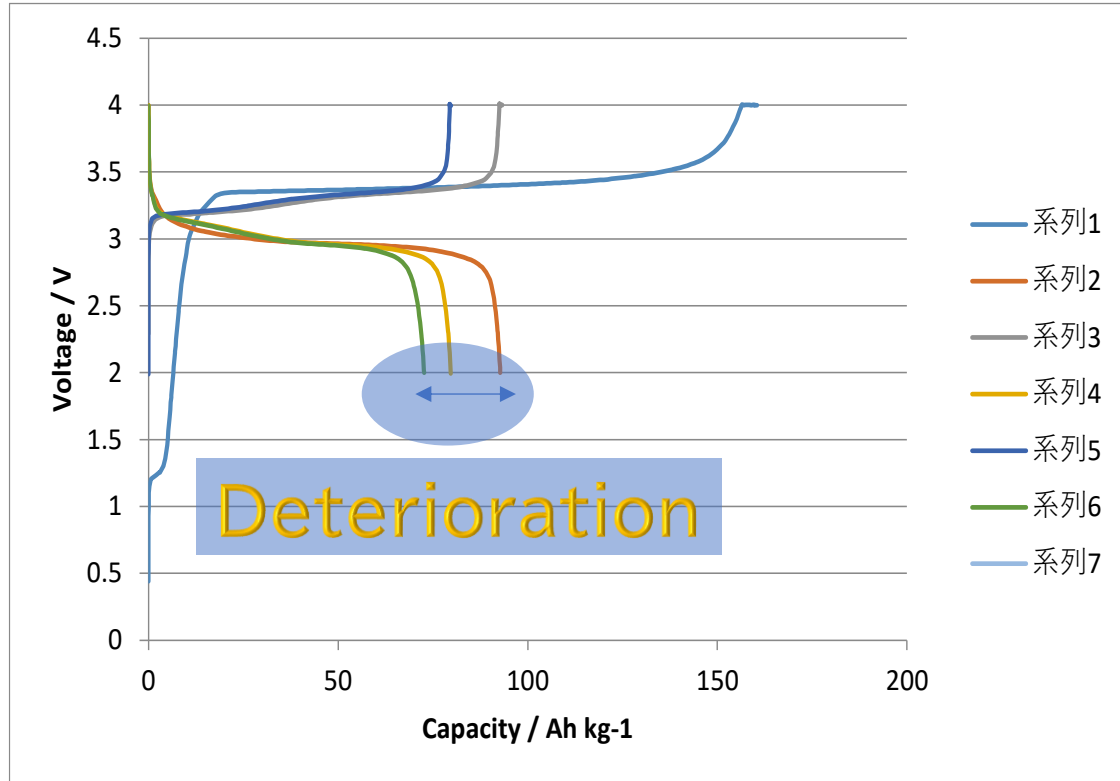


No.2プロセス

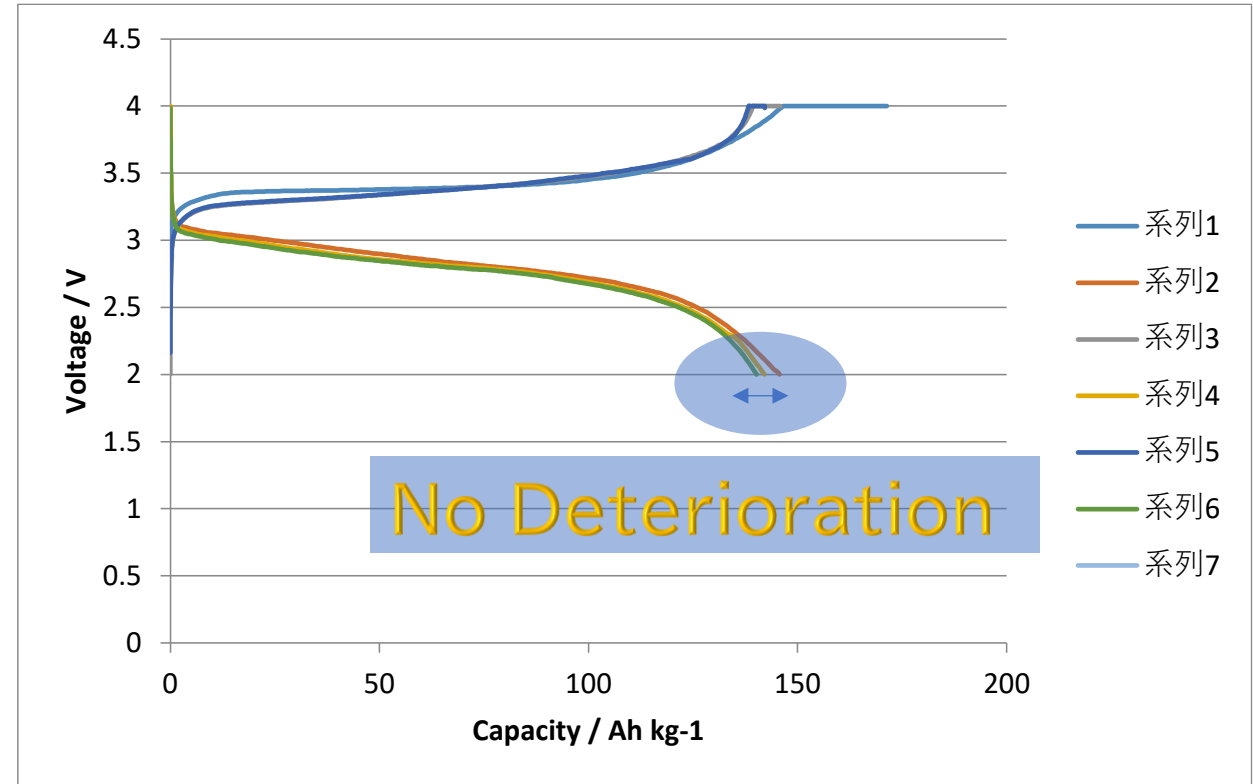
【Hyper Pre-Dope Si】

Difference Between: Charge/Discharge Operation

Normal Si



(Hyper Pre-Dope Si)



★ Longer Battery Life

High charging/discharging efficiency from the beginning.
Capacity does not decrease even after repeated use.

Cathode	Elements	Resource	Stability	Cost	Energy (Wh/kg)	
					Graphite anode	pSi anode, × 2.0
LCO	Co	Insufficient	Good	High	180	360
LMN	Mn	Insufficient	Good	Med	150	300
LNMC 	Ni, Mn, Co	Insufficient	Good	High	200	400
LFP 	Fe, P	Sufficient	Excellent	Low	140	280

Using **【p.Si】** instead of the conventional graphite anode increase energy by **2 times**.

Even LFP, which is abundant in resources, stable, and low cost, can be produce energy compatible to NMC with pSi.

What [L·F·P+ Hyper Pre-Dope] can do?

ORLIB

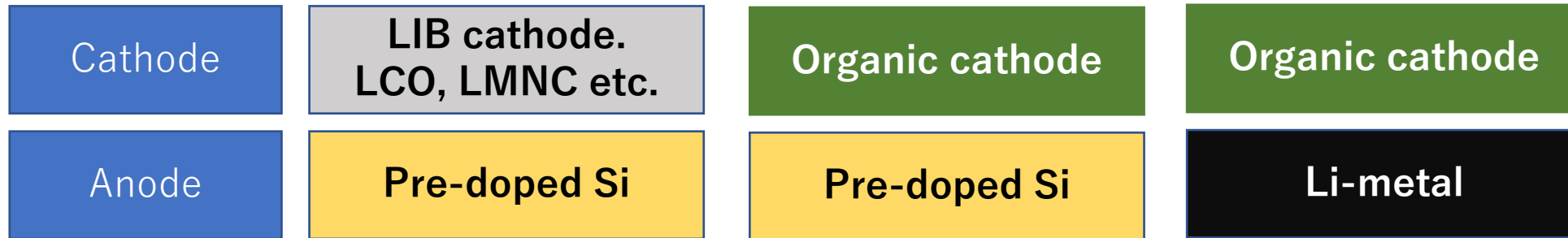
(Rare Metal Free) ORLIB'S AMAZING TECHNOLOGY


- ※ Possible to gain **More Power** than Rare Metals (LNMC).
- ※ Possible to **WORK** under the Severe Low Temperature
- ※ **Rare Metal Free Society** for the first time!
- ※ Even Rare Metal **Runs Out**, Irons sufficient!
- ※ Irons are **CHEAP**, more cost saving!
- ※ No more **Global Warming!**
- ※ **Revolutionary Change** in the automotive history!
- ※ Not Only automotive but many other way for **alternatives!**



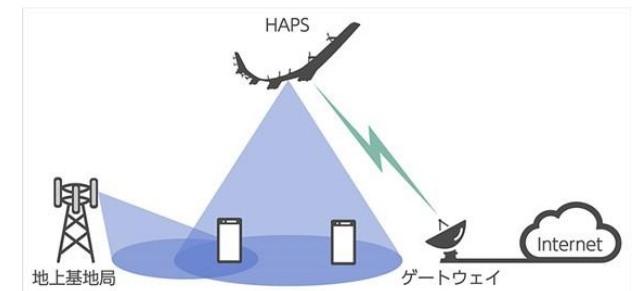
AND MORE OF KEY ELEMENTS

ORLIB has high demands for all the custom needs in every kinds of any batteries.




 Drone battery, LCO/ 【p.Si】
 EV and ESS with LFP/ 【p.Si】

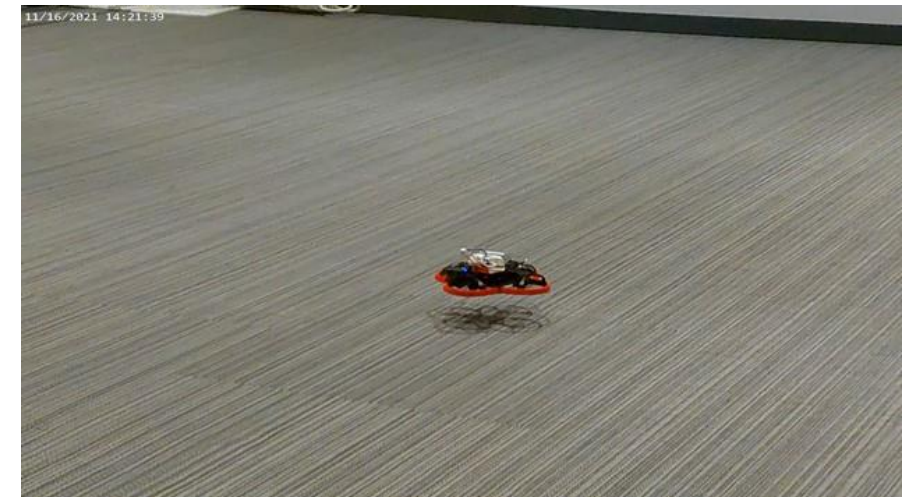
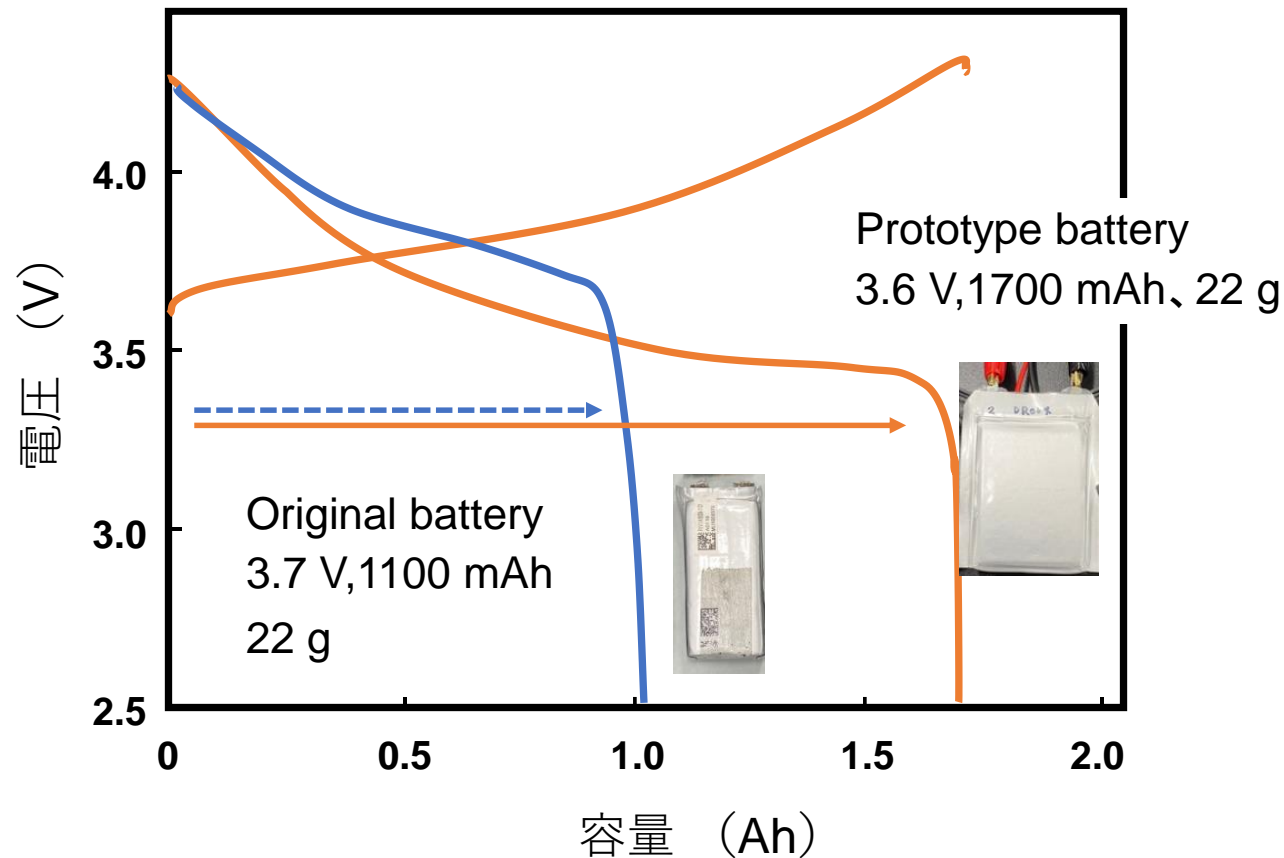
HAPS Battery, Softbank etc.



Drone Project Result

【Hyper Pre-Dope Si 3yrs Ago】

Energy increased $\times 1.7$ by using Si anode

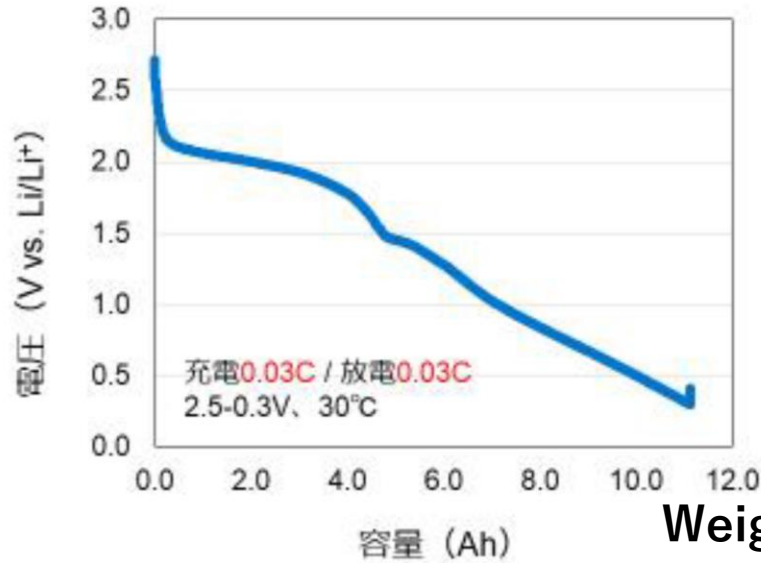


Demonstrate extended flight time with cells of the same weight
Nov.16, 2021 at MIRAIKAN

Flight time
Original battery: 9min13sec
Developed battery: 15min50sec ($\times 1.7$)

Sulfur-Modified PMMA

Nikkei News Paper 日経新聞



Weight energy density:

535.8Wh/Kg

Initial discharge capacity: 11.121 Ah
Light metal voltage: 1.354V
Cell weight (including parts): 28.1g

テクノロジストの時代

蓄電量、世界最高水準に

東京大学大学院アツプ・ORLIB(東京・文京)は独自の電機材料でリチウムイオン電池の蓄電量を世界最高レベルを達成した。社長の佐藤正春氏は花王やNEC、大学などで研究を続け、64歳で同社を立ち上げた。「日本の電池業界が再浮揚するきっかけにしたい」と意気込む。

電気自動車(EV)やスマートフォンなどに幅広く使われるリチウムイオン電池の性能を高める開発競争が国際的に進む。蓄電池の性能は電極などの材料の組み合わせ

ORLIB社長
佐藤 正春氏

さとう・まさはる 1981年東京農工大学修士課程修了。同年花王入社。91年NEC入社、95年に大阪大学で博士号取得。村田製作所や山形大学、東京大学特任研究員を経て2020年から現職。67歳。

3月にソフトバンクや住友ゴムと蓄電量を世界最高レベルの1.5kWhあたりの材料開発を命じられ、5.3倍の蓄電量を開発した。それをきっかけに電機メーカーが事業化を目指す。通信基地局となる無人航空機(空飛ぶ基地局)や村田製作所、東京大学(APC)の電線としてのなど、コンパサート実用化を目指す。

蓄電量は資源も豊富で製造コストを抑える。成果を実用化するまでにORLIBを立ち上げた。市街地が大きな電池の開発に取り組み、成果を実用化するまでにORLIBを立ち上げた。結果が出るまでに数日かかるとも、金曜日に任せて、月曜に素晴らしい成果が出るのを楽しみにしながら週末を過ごすのが何よりの楽しみ」と語る。

「(陣勇気) 一時掲載

ORLIB

Say Good Bye for “Rare Metals”
by The Alternative Pre-Doping New Concept [p.Si]
Future Tech For The Highest Energy Batteries

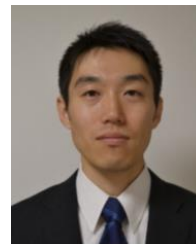


CEO Satoh Masaharu, Ph.D.
Battery Researcher
Previous: NEC, & Murata Manufacturing

Advisor Nishihara Hiroshi, Ph.D.
Authority of Electrochemistry
Professor, The Univ. of Tokyo
President of the Electrochemical Society, 2016



CMO Nobukazu Tanaka
International Marketing
Previous: Toyota Tsusho America, Sumisho Oil,



Project Manager Saitoh Shunsuke
Leading the Latest Battery Technology
Previous: SONY, SAMSUNG



Q1.What’s “**O·R·L·I·B**” Stands for?
A1.It is from “**Organic**” and “**Lithium-Ion Battery**”.

【The University of Tokyo】 launched venture since May 15th 2020.
As The Highest Energy Battery Developed Manufacture

- Laboratory: Yokohama Hardtech Hub in Mitsubishi Heavy Industry
- Chairperson: Prof. Nishihara Hiroshi, Ph.D,
CEO: Satoh Masaharu, Ph.D,
Researchers 2, Assistants 4

Presented By, ORLIB Limited

For Real World Solution

<https://www.orlib.jp>

Our Future Goal

ORLIB realizes a sustainable, vibrant and prosperous society with new high-energy batteries!!!

【ORLIBは新しい高エネルギー電池で持続可能で活気に満ちた豊かな社会を実現します!!!】

Thank you!

