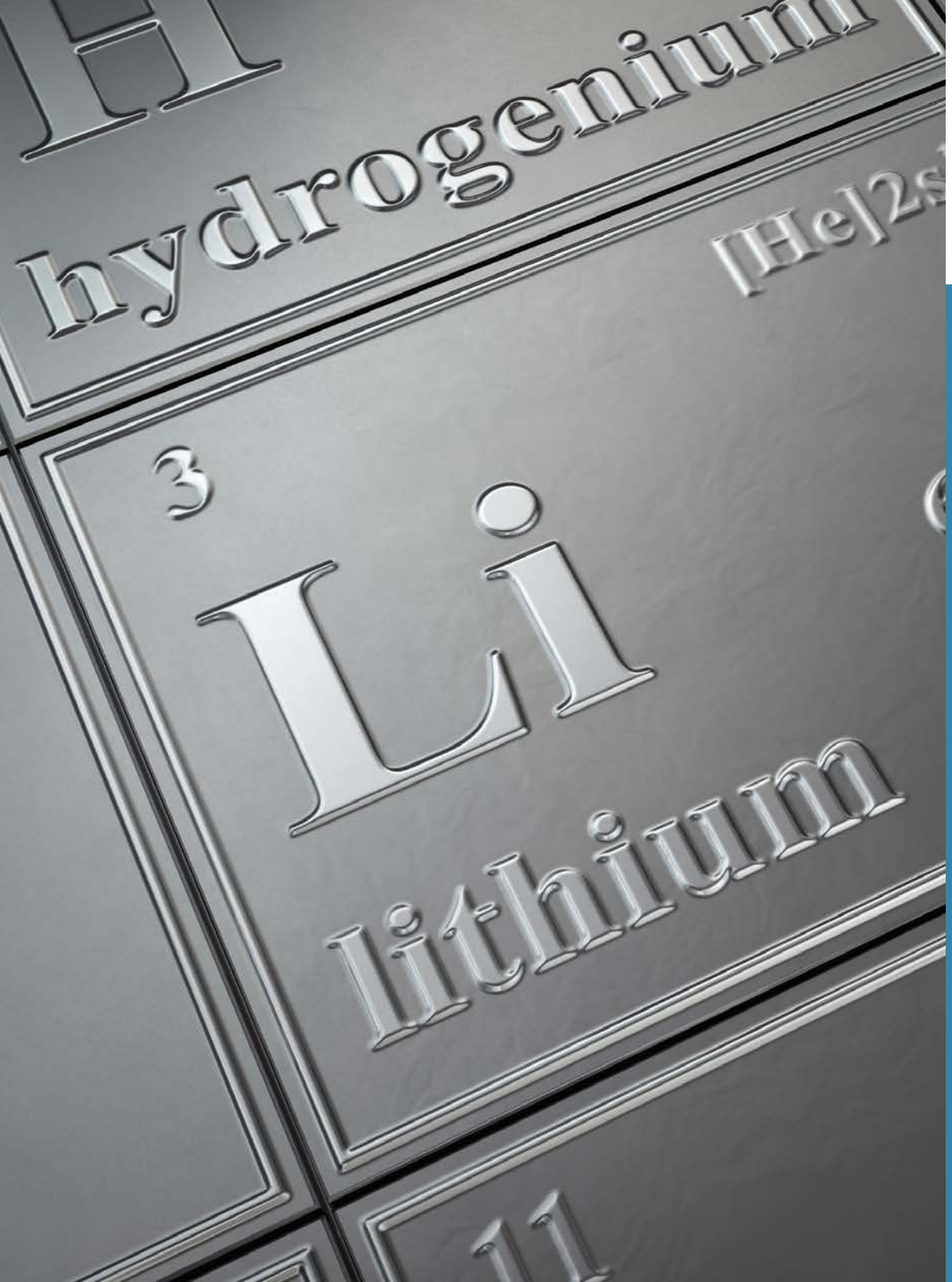


αlpha-En

Nano Engineered Li-M Anodes

NEXT GENERATION BATTERY TECHNOLOGY

- PRE-LITHIATION -

FALL 2021

SAFE HARBOR STATEMENT

This presentation is for informational purposes only and does not constitute an offer to sell, or the solicitation of an offer to buy, any securities of the αlpha-En Corporation or its subsidiary, Clean Lithium Corporation; or a promise or representation that any such offer will be made to the recipient or any other party.

This presentation contains “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements can be identified by words such as: “expect,” “anticipate,” “intend,” “plan,” “believe,” “seek,” “estimate,” “project,” “goal,” “may,” “should,” “will” and similar expressions that concern our prospects, objectives, strategies, plans or intentions. Forward-looking statements are neither historical facts nor assurances of future performance. They are based on current beliefs, expectations and assumptions that are subject to inherent risks and uncertainties and our actual results and financial condition may differ materially from those indicated in the forward-looking statements. Therefore, you should not place undue reliance on any forward-looking statements. Important factors that could cause our actual results and financial condition to differ materially from those indicated in forward-looking statements include unfavorable changes in general economic and financial conditions; our lack of relevant operating history and revenues; competition and technical alternatives in the overall battery market; government regulation; our ability to attract and retain key personnel; our ability to successfully collaborate with partners; the availability of financing; marketplace acceptance of our technology; and such other factors discussed in our filings with the Securities and Exchange Commission. Any forward-looking statement speaks only as of the date on which it is made. We undertake no obligation to publicly update any forward-looking statement, whether written or oral, whether as a result of new information, future developments or otherwise.

THE PROBLEM

THE PROBLEM

Every lithium-ion battery loses a certain amount of lithium when it is charged for the first time in chemical reactions leading to the irreversible first cycle loss. The lithium sits on the cathode and travels to the anode and then back. On the first charge the lithium encounters the electrolyte for the first time which leads to chemical reactions that consume some of the lithium. That loss is typically 10-15% with graphite anodes which is the most common used anode material today. The industry has learned to accept that loss and chose to live with it. 722 875 3169

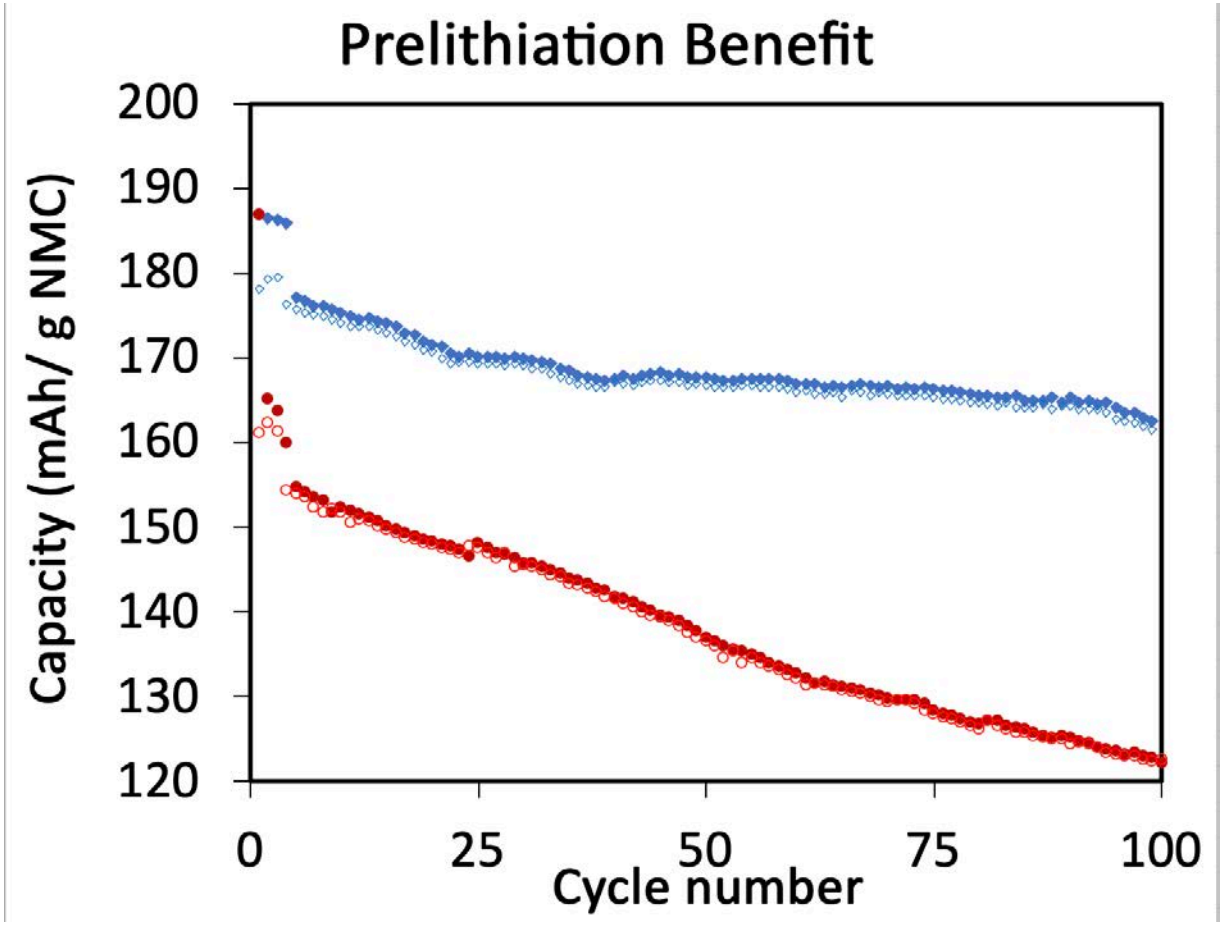
Over the last few years however a notable shift to silicon as a new anode material has begun to take place. Silicon has up to ten times the capacity to absorb lithium compared to graphite so that makes it attractive, however, the irreversible first cycle loss can be as high as 40%, so this presents a material and fast-growing problem for the industry. The silicon anode market is growing at 66% p.a. and that growth rate is expected to accelerate once a solution for the first cycle loss has been adopted.

THE SOLUTION

The alpha En technology is a clever way to compensate for the first cycle loss described above by intercalating (also known as doping) additional lithium on the anode. This "pre-lithiation" means that more lithium is available for cycling back and forth and that means better performance and a longer life span for the battery. The process is green, emission free, cheap and patent protected.

THE OUTCOME: PRE-LITHIATED GRAPHITE ANODE SHOWS A CAPACITY OF 98% AFTER 100 CYCLES

With only a 10% Pre-Lithiation of the graphite anode, we show a 32.8% improvement of the energy capacity of the battery after 100 cycles.



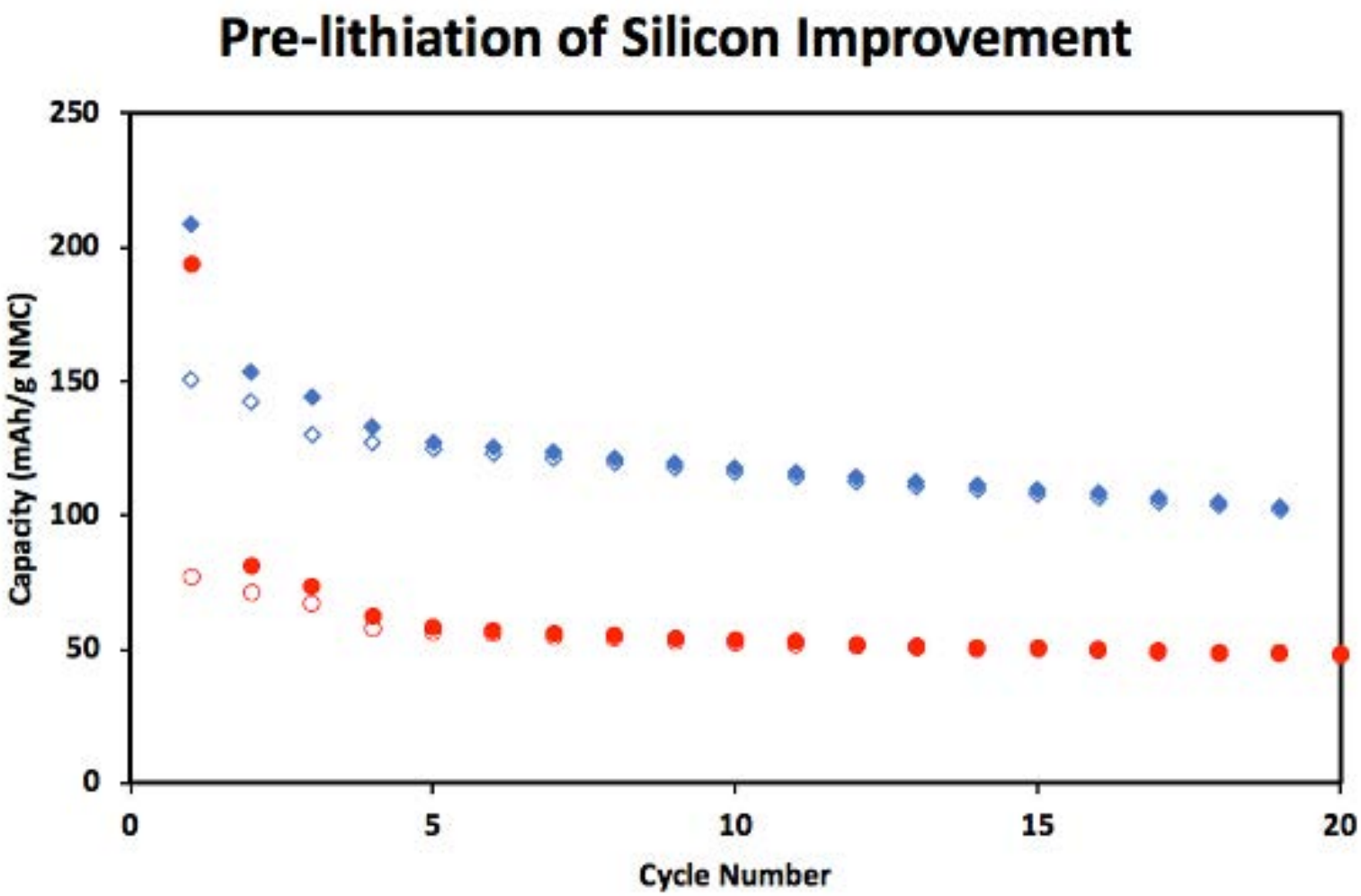
Blue Line = Pre-Lithiated Graphite Anode.
Red Line = Basic Graphite Anode

Mutiple Pre-Lithiation levels are currently being tested for even greater optimization.

- Capacity retention extended due to lithium reservoir as well as ex-situ SEI formation.
- SEI formation can be customized with additive/salts in the pre-lithiation electrolyte.

THE OUTCOME: PRE-LITHIATED SILICON ANODE SHOWS A FIRST CYCLE EFFICIENCY INCREASE OF 100%

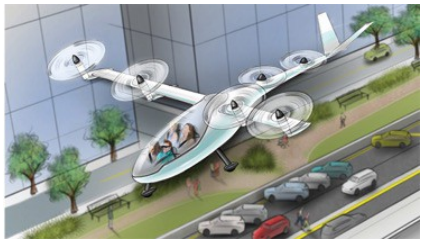
Blue Line = Pre-lithiated
Red Line = Control



- Pre-lithiation of Silicon-graphite reduces 1st cycle loss from 50% to 0%.
- Further cycling tests being carried out with multiple pre-lithiation levels.

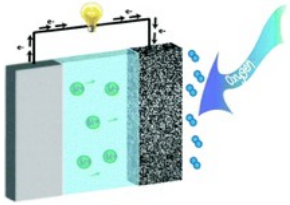
ALPHA-EN'S TARGET MARKET

INDUSTRY EVOLUTION (LI BATTERIES)

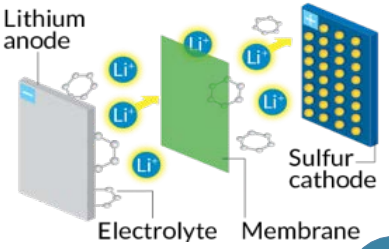


- Li Ion technology is 30 years old
- Next generation technology under development and expected to commercialize over next several years
- Could lead to a “quantum leap” in battery efficiency

Lithium Air



Lithium Sulphur



~10 X Improvement

Increased Range

Solid State

LAST ~ 30 YEARS

ALPE Li-M Anode

TRANSFORMING SOCIETY

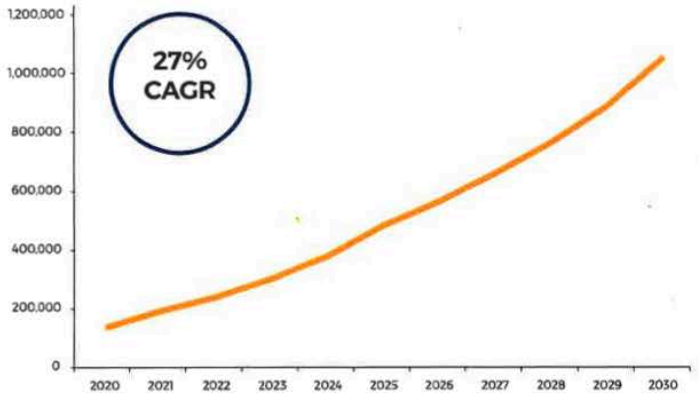
Tomorrow

1990 2000 2010 Today

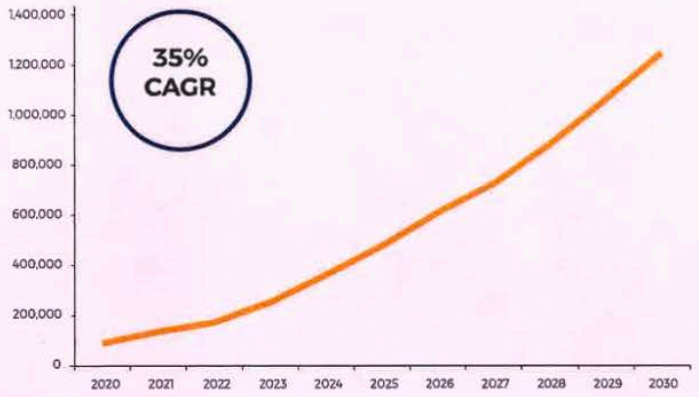
SILICON MARKET GROWTH

Using data from Benchmark's Lithium ion Battery Database we compare the demand growth rates of the three main anode battery materials: synthetic graphite, natural flake graphite, and silicon.

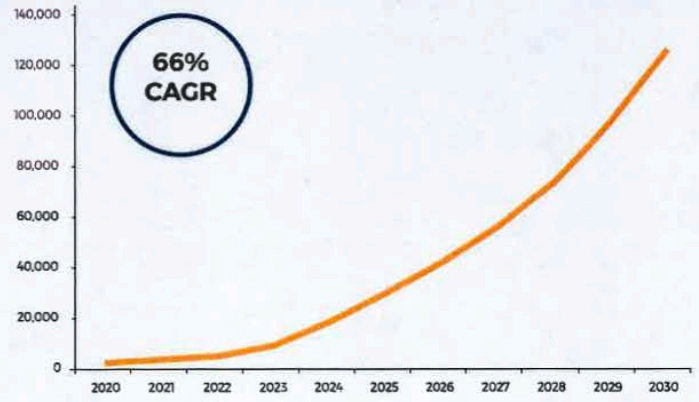
Synthetic graphite demand (MWh)
In 2021 synthetic graphite has a market share of 56% according to data from **Benchmark's Synthetic Graphite Forecast**. However, synthetic graphite's position as the dominant anode material is set to diminish through the 2020s as demand for natural flake graphite and silicon materials grows at a faster pace.



Natural graphite demand (MWh)
Benchmark forecasts natural flake graphite to account for 40% of the anode market in 2021. But by 2025, natural flake graphite will become the predominant anode material, with a 49% market share driven by automakers outside of China preferring the material to synthetic graphite and the increased use of natural and synthetic graphite anode blends.



Silicon demand (MWh)
Of all anode materials silicon has the greatest growth prospects ahead as this chart illustrates. Benchmark forecasts silicon anode demand to grow at an average rate of 66% per year between 2020 and 2030, which will see its market share increase almost tenfold from 0.6% to 5%. While silicon dominant anode materials are not yet on the horizon, its growing use as an additive material in battery anodes will drive this growth.



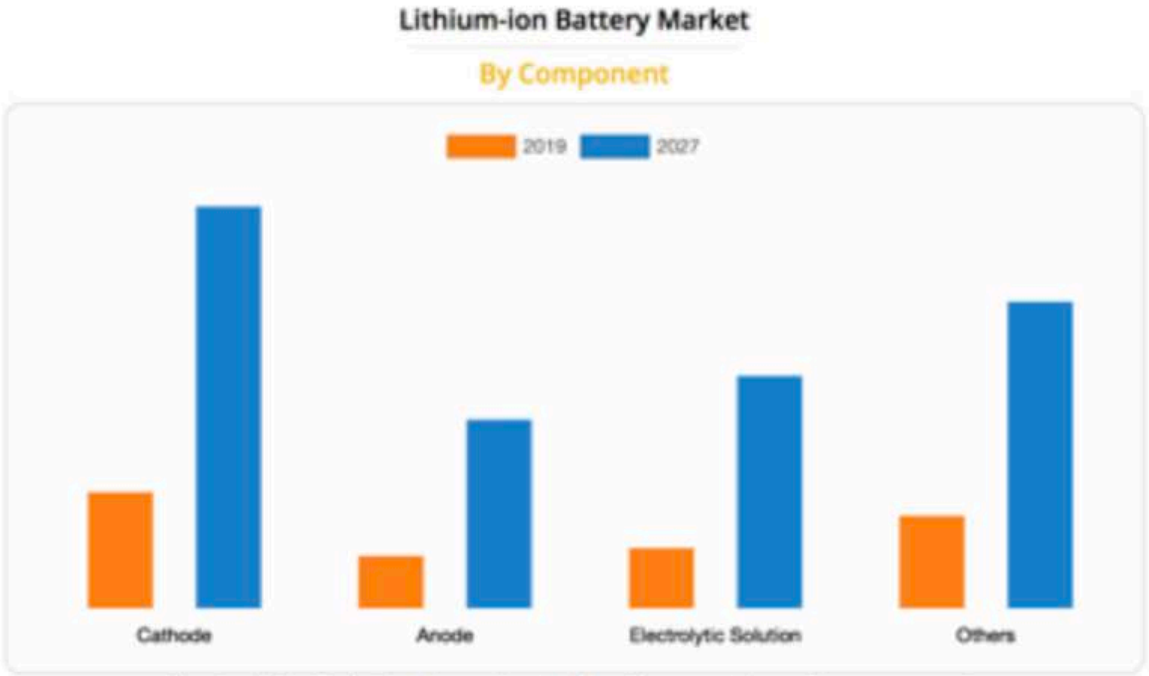
Source: Benchmark Mineral Intelligence

SECTOR VERTICALS

North America is expected to grow with a CAGR of 18.7% during the forecast period.

Get more information on this report :

Asia-Pacific grows at a significant rate in the lithium-ion battery market analysis. This is attributed to the fact that China is expected to lead in the adoption of lithium-ion batteries to control increasing pollution in its cities. The Chinese Government further focuses on hybrid vehicles with pure electric drives. Furthermore, electrification of delivery vehicles and pickups is expected to raise the demand for these batteries. Major automakers in the commercial vehicle segment focus on hybrid drive systems across different model ranges. Therefore, the growth of the electric vehicles/plug-in hybrid vehicles is anticipated to eventually drive the market for lithium-ion batteries.



Electrolytic Solution is projected as the most lucrative segment.

MARKET GROWTH

Lithium-ion Battery Market Outlook- 2027

- The global lithium-ion battery market was valued $36.7 billion in 2019, and is projected to hit $129.3 billion by 2027, at a CAGR of 18.0% from 2020 to 2027. A lithium-ion (Li-ion) battery is a rechargeable battery, which utilizes lithium ions as the essential components of its electrochemistry. Lithium-ion battery find its major application in laptops, PDAs, cell phones, and iPods.
- The lithium-ion battery market growth is driven by surge in need for smartphones and other electronics devices and increase in electric vehicles are some of the key factors that significantly drive the growth of the global lithium-ion battery market. Implementation of stringent government regulations to control increasing pollution levels is further expected to augment the market growth. However, high price of lithium-ion batteries is anticipated to restrain the market growth. On the contrary, higher energy efficiency requirements in technologically updated consumer gadgets are expected to provide expanding lithium-ion batteries market opportunity to the key players.

ALPHA-EN'S ROADMAP TO COMMERCIALIZATION

αlpha-En's COMMERCIAL ROADMAP

Manufacturing Pure Li-M Anodes

Primary mandate

- Scalable production of Li-M anodes. Li-M plating of 5 to 50 microns on copper substrates (or other conductive substrate)

Pre-lithiated Anodes

- The concept of pre-lithiation is simple in the context of lithium-ion batteries (LIBs). In plain terms, it involves loading LIB anodes with active lithium prior to cell assembly to offset the considerable first cycle irreversible capacity (IRC) loss that lowers the deliverable energy density substantially (as high as 40% in some chemistries).

Recycling of Li batteries

Successfully tested, under review for investment

- αlpha-En is adapting its technology to meet anticipated government regulations for recycling of Li batteries. Our technology would be inserted into existing process streams to recover LiM that is currently discarded by the recyclers

Battery Development

Extending current capability

- αlpha-En is pursuing development of next generation batteries with its Li-M anode and various electrolyte and cathode chemistries, and cell configurations

FAQ: WHAT STAGE IS THE DEVELOPMENT EFFORT AT ALPHA EN

- The R&D effort has been focused on multiple dual chamber – electrodeposition plating cells.
  - Samples are typically 3 x 3 or 4 x 5 cm
  - A new semi-automated 7 x 7 cm plating unit is presently being validated
  - Sample quality and performance is confirmed by SEM imaging and testing in 2032 coin cells.
- Development will be focused on designed experiments, consistent with end user feedback and fundamental optimization
- Concepts will focus on increased productivity, cost reduction, and a robust process window
- R&D efforts are supported by NYSERDA and NSF grants as well as corporate partnerships.

αlpha-En's RANGE OF APPLICATIONS

αlpha-En'S PATENTED PROCESS

αlpha-En has developed a patented process to refine naturally occurring lithium compounds into:

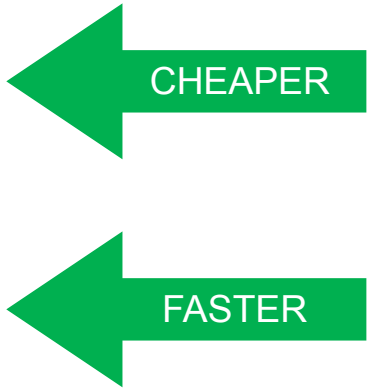
- Pure lithium with a highly consistent morphology
- Very thin films (< 10 microns)

Using a scalable green production technology

αlpha-En'S PROCESS	EXISTING PROCESS
Higher Purity 99.996%	**Lower Purity** 99.90%
LiM Produced at Room Temperature Process conducted at 20°-30°C	**Li-M Produced at Very High Temperatures** Electrolysis of molten salts at ~450°C
Chlorine Gas Free No toxic byproduct	**Chloride Process Step** Chlorine gas byproduct adds cost
Feedstock Flexibility Uses Low Grades of Lithium Carbonate	Requires battery grade feedstock Higher raw material cost

ELECTRO-DEPOSITION VS VACUUM DEPOSITION

Electrochemical deposition is a process by which a thin and tightly adherent desired coating of metal, oxide, can be **deposited** onto the surface of a conductor substrate by simple electrolysis of a solution containing the desired metal ion or its chemical complex.



Vacuum deposition is a family of processes used to deposit layers of material atom-by-atom or molecule-by-molecule on a solid surface. These processes operate at pressures well below atmospheric pressure (i.e., vacuum). The deposited layers can range from a thickness of one atom up to millimeters, forming freestanding structures. Multiple layers of different materials can be used, for example to form optical coatings. The process can be qualified based on the vapor source; physical vapor deposition uses a liquid or solid source and chemical vapor deposition uses a chemical vapor.

αlpha-En'S R&D PARTNERSHIPS

αlpha-En's Partners

From 2014 through 2018 αlpha-En partnered with several universities and labs to develop its process.

- αlpha-En's own laboratory in its 8,000 sq. foot facility in Yonkers, NY began operations on May 31, 2018
- αlpha-En's state of the art research laboratory includes equipment for Li-M anode fabrication and testing
- αlpha-En's own staff of scientists and lab technicians now conduct almost all of its R&D activities.

αlpha-En’s TEAM

SENIOR MANAGEMENT

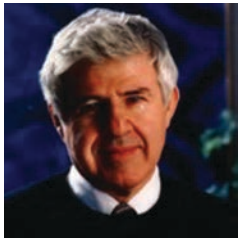
Lawrence Swonger, Inventor
Mechanical engr. with over 20 yrs of process design and automation experience

Tom Suppanz, CFO
Former Investment Banker on Wall Street with over 30 yrs exp. in capital formation for small & micro-cap companies

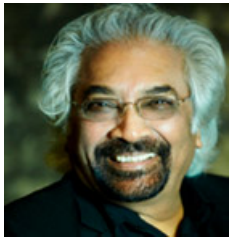
Kyra Paris, Managing Director/Director of Military Affairs
As Managing Director Kyra Paris is responsible for all customer interactions including Government agencies and The Department of Defense.

Daniel Lyons, PHD Chief Scientist & Lab Manager
Electrochemist working on bringing Alpha-En's pure lithium metal and pre-lithiation processes to the market. He obtained a BS in Chemistry from the University of Dallas in 2012 and an MS and PhD from the Ohio State University in 2016 and 2020. Daniel joined alpha-En in 2021.

BOARD OF DIRECTORS



Jerome I. Feldman,
Chairman Emeritus
Founder of alpha-En
Founder of National Patent Development and developer of technologies including soft contact lenses and surgical staples

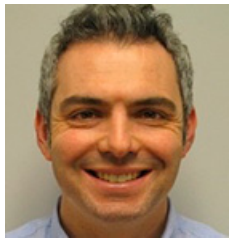


Sam Pitroda, Chairman & CEO
Founder of various technology companies, former Cabinet Minister and Chairman of the Smart Grid task force of the government of India

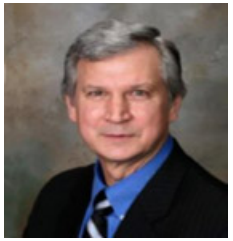
SCIENTIFIC ADVISORS

Prof. Roald Hoffmann, Chair
Cornell University, Nobel Laureate

Prof. Stephen O'Brien
City University of New York



Prof. Dan Steingart
Columbia University



Jack Marple
Former Technology Fellow at Energizer Battery

Prof. Hector Abrunã
Cornell University

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