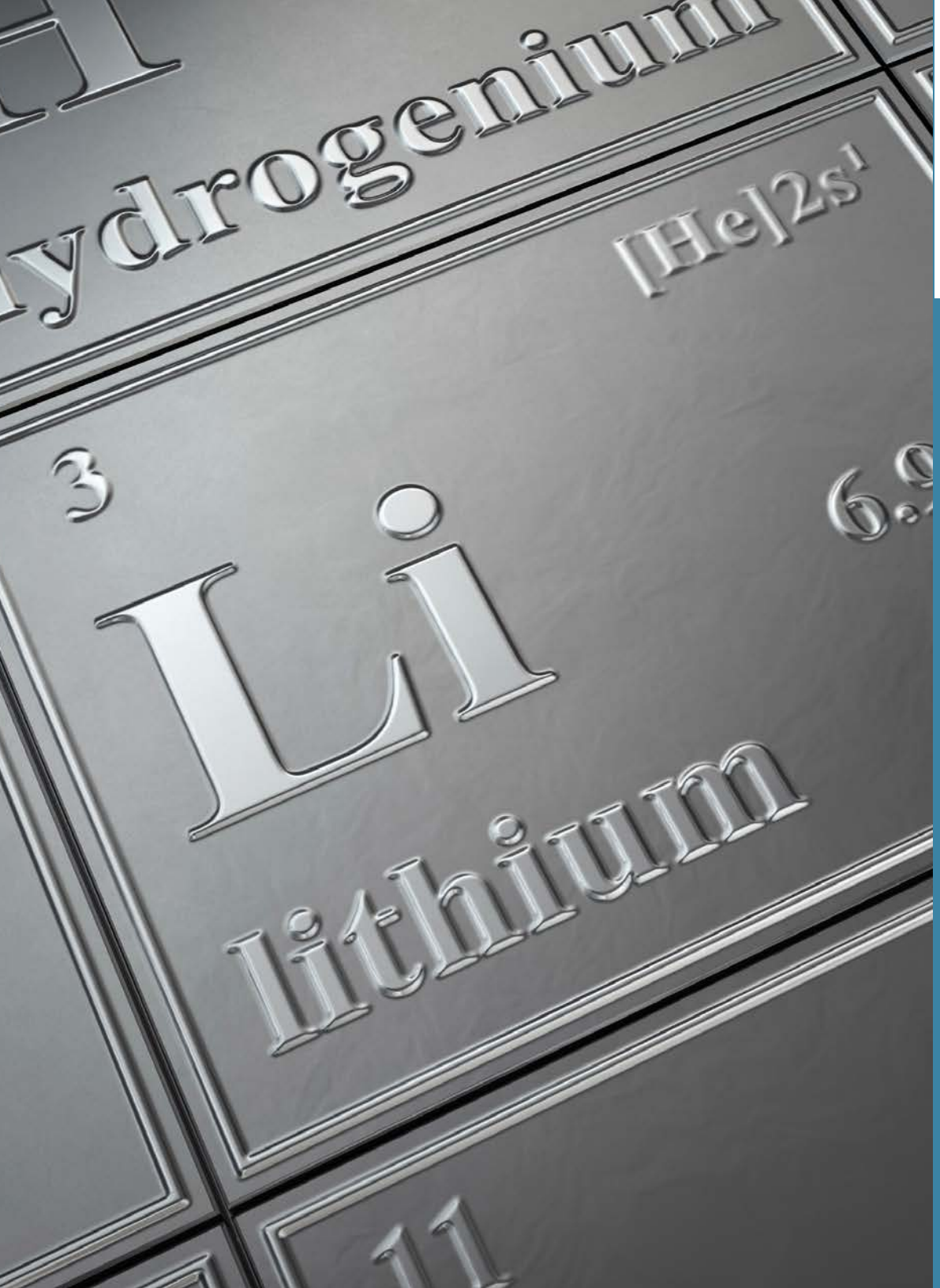


αlpha-En

Nano Engineered Li-M Anodes

ENABLING NEXT GENERATION BATTERIES

Fall 2020

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.

αlpha-En's TECHNOLOGY

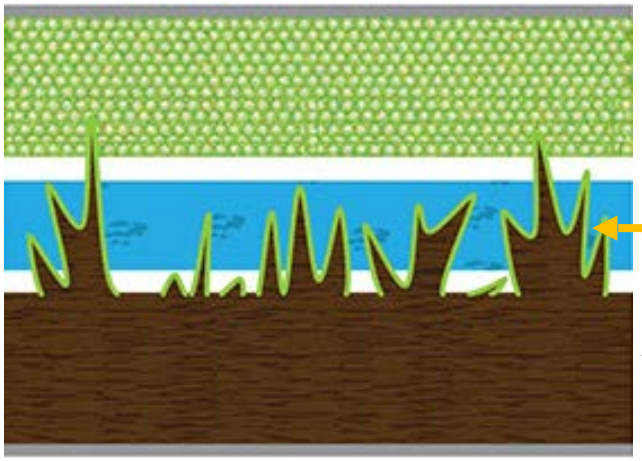
αlpha-En'S NANO ENGINEERED LI-M ANODES

Could be a critical component in next generation batteries:

- Thin Li layers could allow for more precise and efficient battery configurations
- Low temperature and environmentally friendly production process could lower costs
- Purity of Li could improve battery performance and life

PURITY - WHY IT MATTERS

dendrite /ˈdendrīt/, a crystal or crystalline mass with a branching, treelike structure. From Greek dendritēs ‘treelike,’ from dendron ‘tree.*
* Google.



Actual lithium dendrites growing from an anode surface. Image from: R.R. Chianelli, J. Cryst. Growth, 1976, 34, 239-244. **

- Other non-lithium elements (e.g., K, Na, Ca, N) are found in existing battery-grade lithium metal.
  SLAC National Accelerator Laboratory *
- Formation of dendrites, which are microscopic fibers that can expand into the electrolyte, in some instances short-circuit the battery causing premature failure or “thermal runaway”.
- Lawrence Livermore National Lab researchers report dendrites nucleate inside a Li-M electrode at the site of impurities. ***
- Reduction of other metallic elements in Li-M may enhance Li-M anodes for advanced batteries.

* HTTP://ein.iconnect007.com/index.php/article/90840/next-gen-lithium-batteries-that-prevent-fires/90843/?skin+ein
* HTTPS://areweanycloser.wordpress.com/2013/06/21/dendritic-lithium-and-battery-fires/
* Dendrites of Substance structures underneath dendrites formed on cycled lithium metal electrodes, Nitash P Balsata et. al. Nature Material published online
* 24 November 2013.

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:

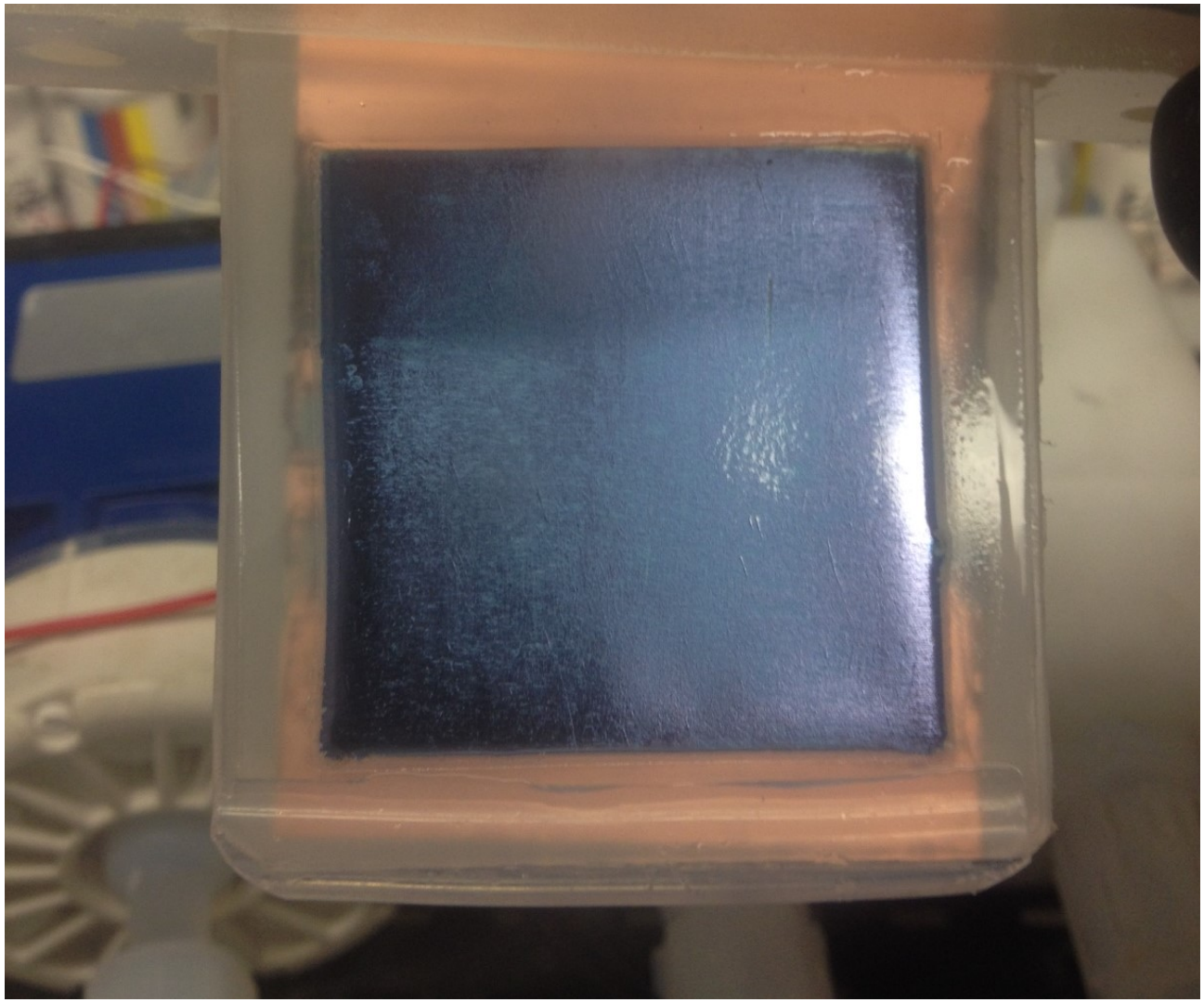
- Pure lithium with a highly consistent morphology
- In very thin films (< 10 microns)
- Using a scalable green production technology

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

αlpha-En's PRODUCT

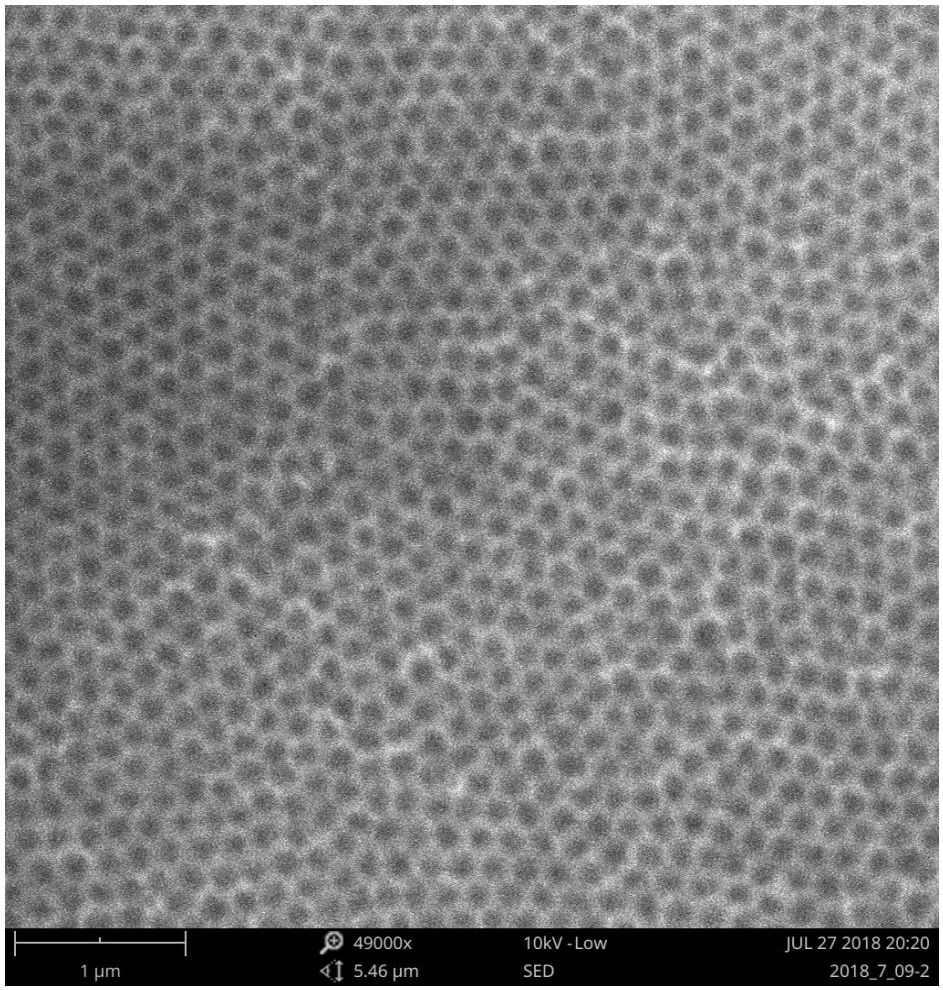
αlpha-En'S INITIAL PRODUCT

A Key Application of αlpha-En's process is to produce nano-engineered Li Metal anodes

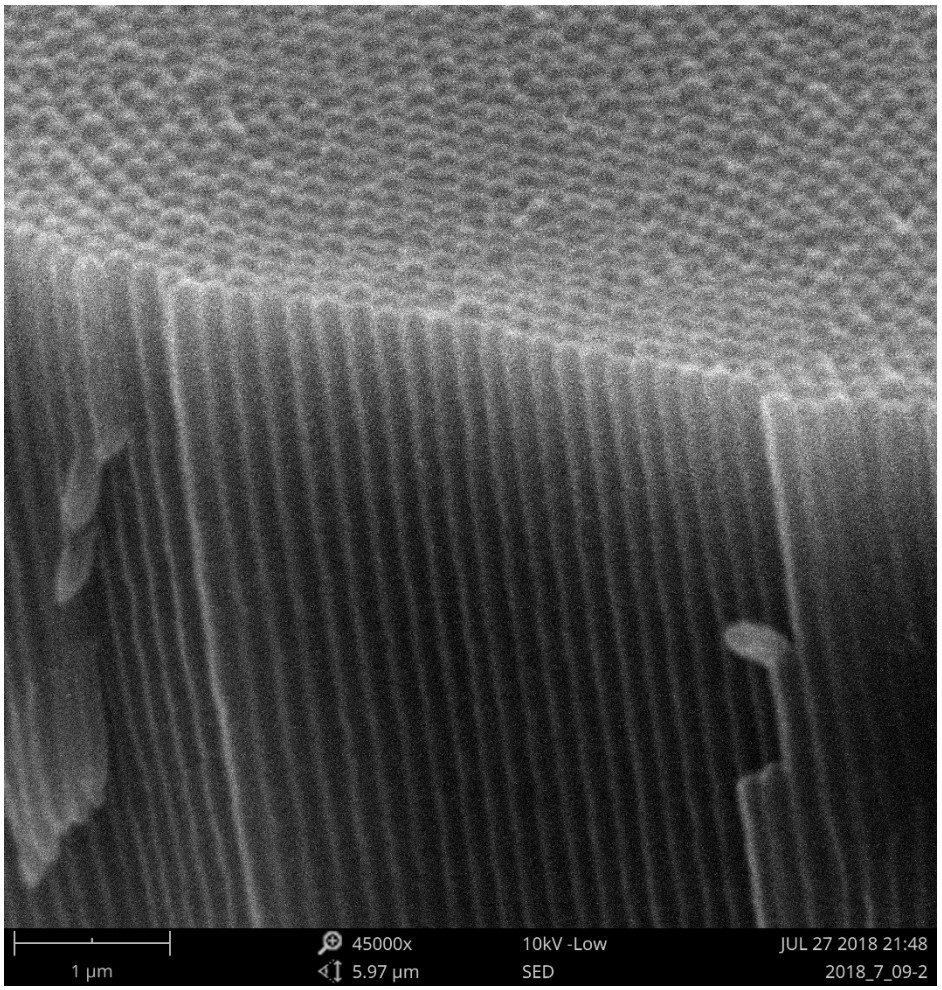


4cm x 4cm Li-M anode on a copper substrate

αlpha-En'S NANO-ENGINEERED LI-M ANODES



Top view at 49000x

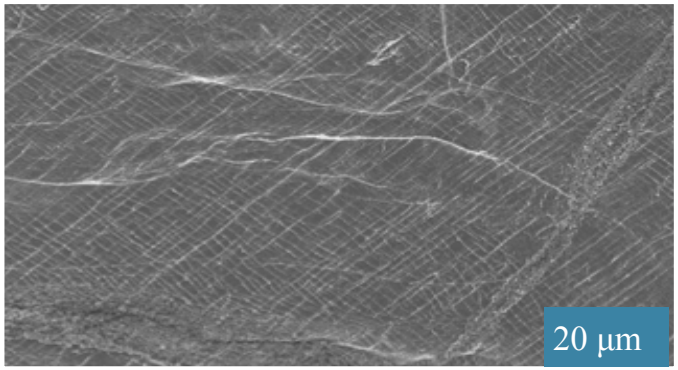


Side view at 45000x

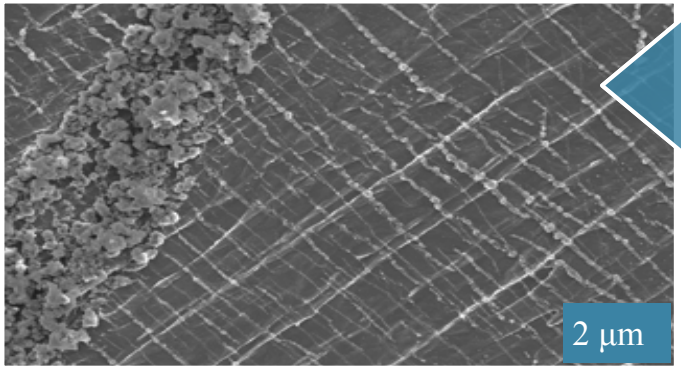
MORPHOLOGY OF EXISTING Li FOILS VS αlpha-En's Li-M

Commercially available lithium foils

αlpha-En's Li-M on copper

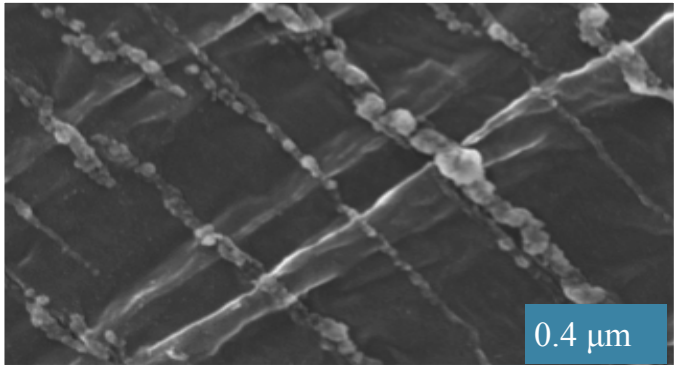


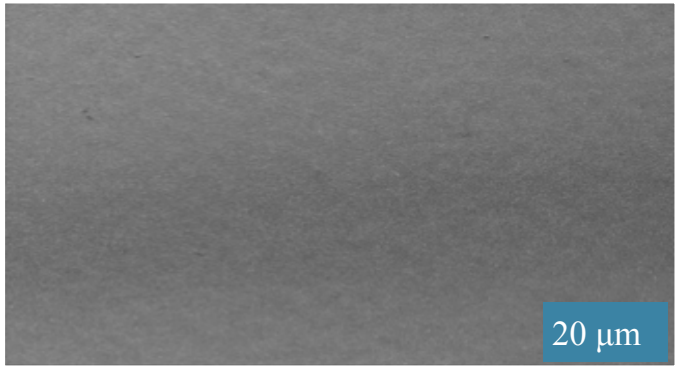
99.90%
750 µm thick

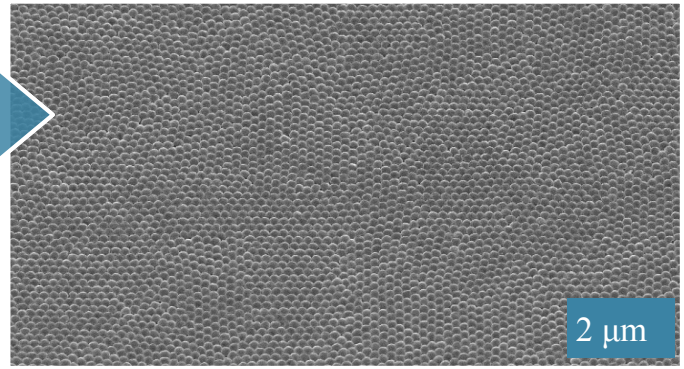


COMMERCIAL

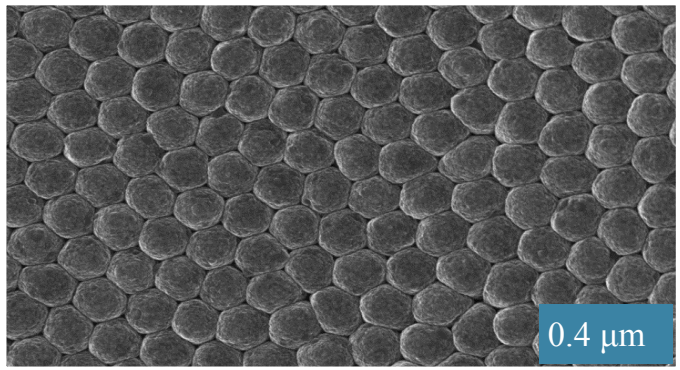
αlpha-En







99.996%
10 µm thick



αlpha-En's DEVELOPMENT

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 TECHNICAL ROADMAP (short-term)

➢ Anode Development

- Currently developing LiM anodes up to 70mm x 70mm, Intermediate goal to pioneer100mm X 100mm deposition
- Li thickness: focusing on thin lithium films from 1um to 35 um
- Uniformity – typically for a 20 um thick film ~ 15%
- Dual sided Li-M Anodes
- Dev on Li-ion anode replacement, Li-metal w/ solid electrolyte and Li-Sulphur battery technologies with partners

➢ Electrolyte Improvement

- Trying with different electrolytes for faster deposition – Currently 5-12 um/hr
- Morphologies – exclusive control over morphology (rods, etc) of the deposited Lithium
- Surface chemistry/composition control - SEI layers
- Trying new additives with existing electrolytes during deposition and cell cycling
- Add electrolyte monitoring for electrolyte maintenance

➢ Substrates

- Different substrates: current dev with copper, graphite, graphene, silicon – copper mesh, nickel and others are slated for dev. work.
- Improvements to (and streamlining of) copper cutting and pre-cleaning processes – plasma pretreat

αlpha-En's SCALE-UP ROADMAP

➢ Lab scale automated deposition (Phase1 - funded) (next 3-5 months)

- Produce LiM anodes up to 7.5 sq in (49 sq cm - 70mm x 70mm) using automated production method
- Small robotic system for deposition to increase to 1000 anodes / month for sample production in research phase
- Key focus on improving deposition with large format, dual sided and multi-cell setup

➢ Second phase of scale-up is fully automated batch system (9-12-month execution to commission)

- Key focus on end to end automation which includes substrate preparation, deposition, dry and prep before packaging for storage and shipment OR use in an inline production
- Variable width capability
- providing higher capacity to support current development projects with partner battery development programs for goals to 1.5-2M anodes / year (~ 5cm sq./ 10m/ 5 12-cells)
- Seeking $5M project in project funding
- Modular system could be replicated for increased capacity

➢ Third phase scale-up to a roll-to-roll system , this will enable full-rate production

- Under review, Development budget of $2M

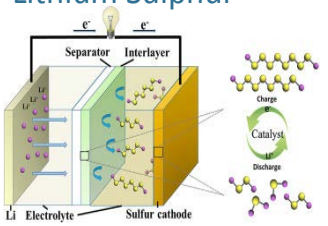
αlpha-En's MARKET

INDUSTRY EVOLUTION (LI BATTERIES)

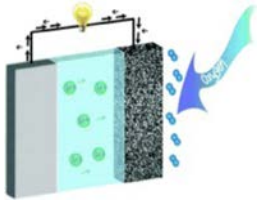
- Next generation technology under development and expected to commercialize over next several years
- Could lead to a “quantum leap” in battery efficiency
- Recycling of lithium ion batteries is synergistic with alphaEn’s technology

Increased Range

Solid state



Lithium Sulphur



Lithium Air

~ 10 X Improvement

1. ALPE Li-M anode

2. ALPE Pre-lithiation

3. ALPE Recycling

LAST ~ 30 YEARS

Green Recycling of Li, Transition metals

TRANSFORMING SOCIETY

1990 2000 2010 Today Tomorrow

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 (up to 20%).

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


αlpha-En’s DIRECTION

αlpha-En'S BUSINESS MODEL

Revenues

- To date, αlpha-En has focused on researching and developing its process and has had no revenues
- During 2020, aplha-En would expect to begin generating revenues from:
  - ✓Sale of batch-produced Li-M anodes
  - ✓Contract R&D for bespoke applications of its process
- Over the long-term, αlpha-En anticipates a mix of revenues from:
  - ✓Licensing its process and receiving royalty payments
  - ✓Partnerships and JVs to manufacture Li-M anodes and other products using αlpha-En's process

Expenses

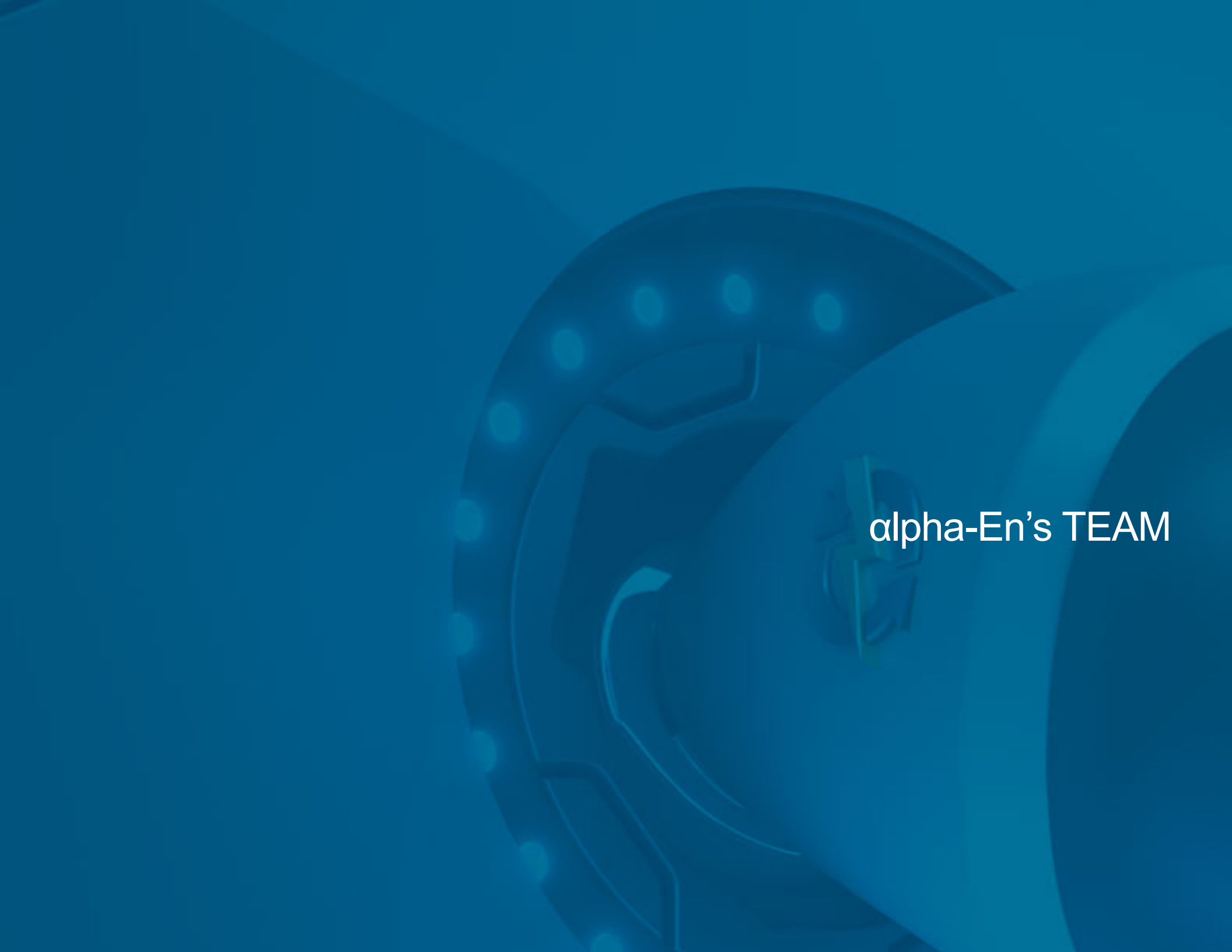
- αlpha-En's operating cash flow (cash burn) for the 12 months ended June 30, 2019 was $2.1 Million or approximately $175,000 per month.

INTELLECTUAL PROPERTY

- In January 2019, the US Patent Office granted αlpha-En a patent on “High Purity Lithium and Associated Products and Processes” which covers αlpha-En’s process and products made from it.

- αlpha-En has filed a number of other US and foreign patent applications to cover its process and refinements and enhancements to it.

- αlpha-En continues to work with Barnes & Thornberg its IP law firm, to insure protection of its intellectual property.


αlpha-En’s TEAM

SENIOR MANAGEMENT

Lawrence Swonger, CTO

Lead Inventor

Mechanical engr. with over 20 yrs of process design and automation experience

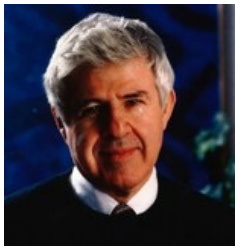
Tom Suppanz, CFO

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

Kyra Paris, Managing Director

As Managing Director **Kyra Paris** is responsible for all customer interactions with particular emphasis on The Department of Defense. Kyra works to engage with the research and development arms of next generation battery technology for the armed forces but also works closely with industrial manufacturers.

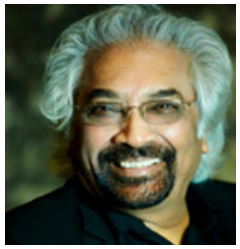
BOARD OF DIRECTORS



Jerome I. Feldman, Chairman Emeritus

Founder of αlpha-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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