Start-up Perspective on reducing reliance on Chinese manufacturing and Li, Ni & Co resource constraints
“The need was apparent, and the solution required a different perspective.”

Eric Wachsman  Exec Chair & Founder

“Our core technology and manufacturing plan sets us apart from our competitors.”

Ben Chiu  CFO

“ION’s innovation breaks the ceiling of what was possible with traditional batteries.”

Elizabeth Santori  VP, R&D

“For the first time in 22 years of making batteries, I can offer customers high performance and safety with no compromise.”

Ricky Hanna  CEO

“Our design is the right way to build solid state batteries and will be the benchmark for future generations.”

Greg Hitz  CTO

“The need was apparent, and the solution required a different perspective.”

Neil Ovadia  VP, Operations

Our uniquely qualified team created a manufacturable, flexible, and extensible platform.
The global energy storage market is experiencing unprecedented growth.

<table>
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<tr>
<th>The Commercial Li-Ion Battery Market Size for 2019 was</th>
<th>Incremental Growth by 2035 is expected to exceed</th>
<th>And a compound annual revenue growth rate (CAGR) of</th>
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<td>$33\text{B}^- $</td>
<td>$546\text{B}^- $</td>
<td>14.9%</td>
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With Global energy storage demand by 2035 of over

2.5 - 4 TWh

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* Grandview Research - Li-Ion Battery Market Size, Share & Trends Analysis Report
** Lux Research – Global Energy Storage Market Forecast 2019
And there are concerns about Chinese competition in emerging tech

“many Americans still have an outdated vision of China,…”

“the United States now faces an economic and military competitor in China that is aggressively trying to close our lead in emerging technologies.”

“Unless these trends change, in the 2030s we will be competing with a country that has a bigger economy, more research and development investments, better research, wider deployment of new technologies, and stronger computing infrastructure.”
The US is falling behind due to its reliance on Chinese supply chain

Today’s Green Energy is Red
China dominates key links of the green energy supply chain

EV Sales
Wind Turbine Manufacturing
Chemical Lithium
Polysilicon
Battery Component Manufacturing
Graphite
Rare Earth Metals
Cobalt Refining
Solar Panel Manufacturing
Rare Earths Refining

As well as the availability of STEM PhDs

https://www.axios.com/2021/08/05/china-stem-phd-students
In the next decade China will overtake the US in R&D spending

U.S. and China Gross Expenditures in R&D
Source: AMACAD “The Perils of Complacency”; OECD Main Science and Technology Indicators

2000
US: $270bn
China: $30bn

2010
US: $500bn
China: $250bn

2020
US: $640bn
China: $580bn

*In billions U.S. 2020 dollars
So how does a startup compete and excel in this environment?
In the early 1990’s the US lost its investment in Li-Ion battery research due to a concerted effort by China to dominate the industrialization of Li-Ion ...  

3.5.2 Government Plan

The rechargeable lithium-ion battery is a new and important technology in the energy field and is strongly supported by the Chinese government. Since the initiation of China’s 863 Program in 1987, the Ministry of Science and Technology organized the research and development of the key materials and technologies of the NiMH battery and lithium-ion battery that shaped a large industrial-scale role for Chinese companies worldwide.

During the period of the 10th five-year-plan, China could realize the batch production and industrialization of hybrid electric automobile and build power batteries and industrial bases for related materials. Recently, the National Development and Reform Commission of China decided to support the construction of a base from which to demonstrate the industrialization of lithium-ion batteries to further promote the development of lithium-ion battery.
What can US startups do to Compete and secure market share

1. Make retaining IP through US based manufacturing a priority
2. Build highly skilled teams from varied US industries
3. Attract and foster domestic & world class talent
4. Design products that remove foreign materials reliance
5. Promote partnerships between US companies & Universities
What is ION doing to reduce reliance on Chinese manufacturing?

- **Securing Funding**
  - Ion Storage Systems Announces $30 Million Series A Funding Round Led by Clear Creek Investments, Veo Earth Ventures, and Aliso Lodge Partners

- **Establishing US Based MFG**
  - Ion Storage Systems Announces New Site of its AM HQ Manufacturing Facility

- **Working with strategic US customers**
  - Lockheed Martin

  - Ion Storage Systems Awarded $2M contract

- **Collaborations & partnerships**
  - CREB
    - Army Fanline Battery Group increases ION Storage Contract

  - ARL
    - Ion Storage Systems makes the cut in Army’s quest for advanced battery

  - News Story
    - UMD Energy Start-Up receives $5M investment
What is ION doing to reduce reliance on Chinese Li, Ni & Co resource constraints

Lithium

Cobalt

Nickel

Use sparingly

Don’t use
Our Patented Technology

Ceramic Structure
Nonflammable and low-cost materials. Thin, dense ceramic electrolyte as a separator with porous scaffold.

Lithium Metal Anode
Lithium plating within porous scaffold for high rate & low resistance at room temperature – without compression or external expansion.

Cathode-flexible platform
Compatible with existing and next generation cathodes that will further enhance energy density and power.

Simplified cell functioning
No volume expansion or compression requirement.

ION EV Battery
• 50% better utilization of Li
• No Nickel
• No Cobalt

ION Storage Battery
• No Lithium
*** ION holds world record for Sodium conduction
• No Nickel
• No Cobalt

www.ionstoragesystems.com
Defense & Aerospace
Safe & reliable, always ready for battle.
- Safe chemistry enables battery deployment for extreme uses
- Wide operating temperature allows for robust deployment
- High energy density offers significant improvement over current tech
- Made in the USA

Consumer Electronics
All day energy to keep you connected.
- Higher energy density means more power in the same packaging
- Nonflammable materials increases product safety
- Wide operating temperature increases ability of use
- No volume change allows for larger battery in same form factor
- Full device charge time reduced dramatically

Electric Vehicles
The range to get you home.
- Low cost per kWh
- Li Metal anode dramatically increases energy density extending EV range
- Achieves DOE fast charge goals for shorter wait during charges
- Wide temperature range reduces need for cooling, complexity, and mass
- Simple design removes need for compression and reduces dead space

Grid Storage
The most efficient energy storage possible.
- Low cost per kWh
- No cooling required will increase roundtrip efficiency
- Na-ion electrolyte IP to reduce cost
- Nonflammable materials increase product safety

www.ionstoragesystems.com
Thank You

ION
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