

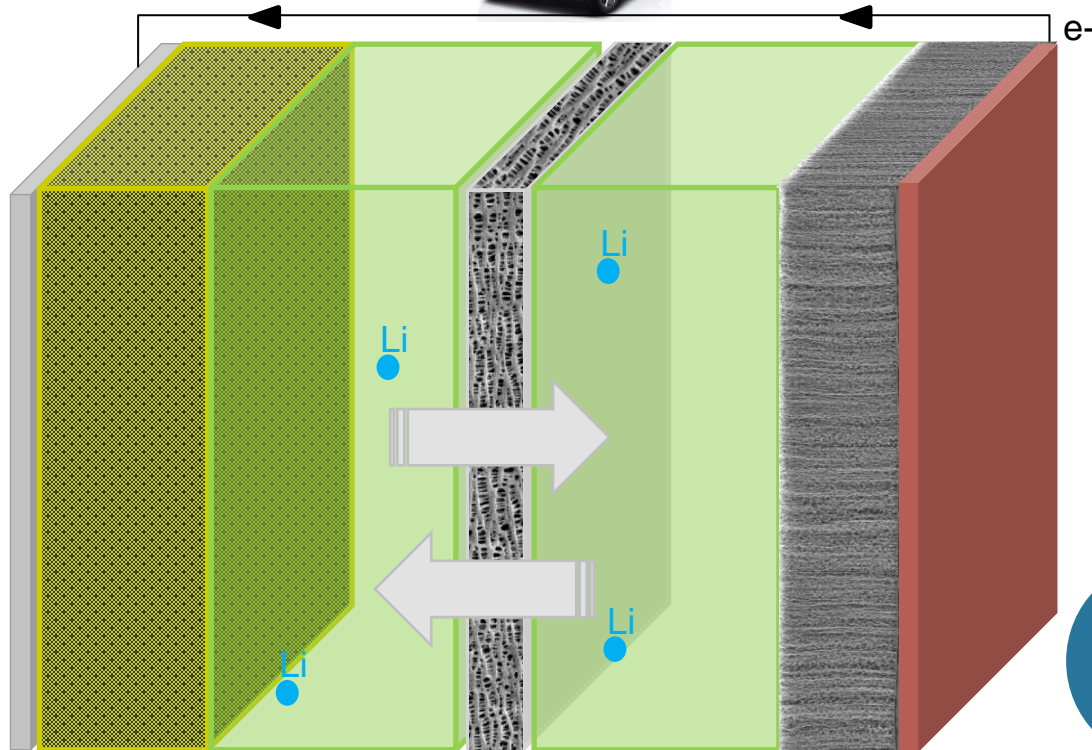


Zeta Energy Technology



For Auto:

- High Performance Cells
- Very High-Volume Cells



Patented Sulfurized Carbon Cathode

→ Sulfur with no polysulfide shuttle effect

450 Wh/kg

>> 5 C

Patented Carbon Nanotube Lithium Anode

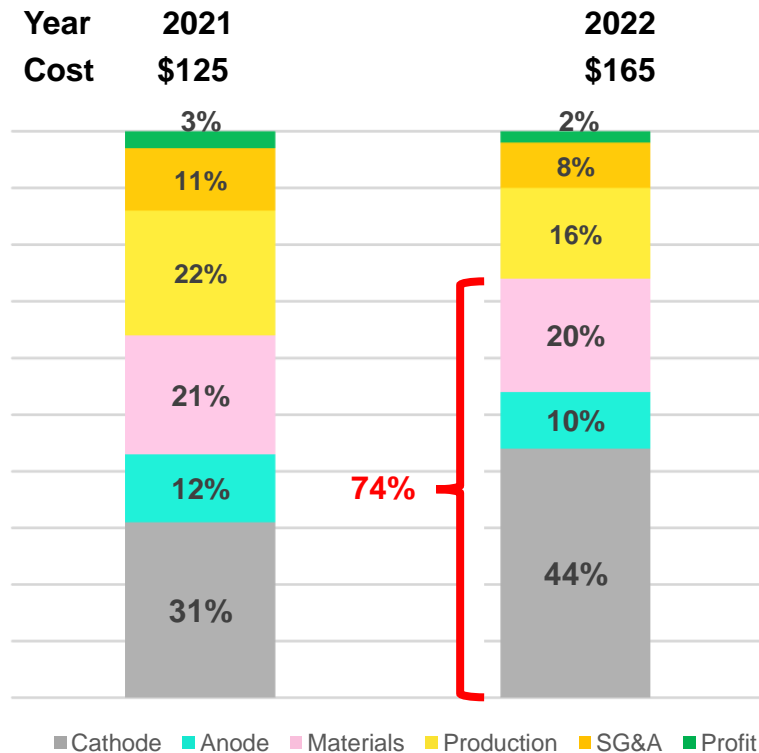
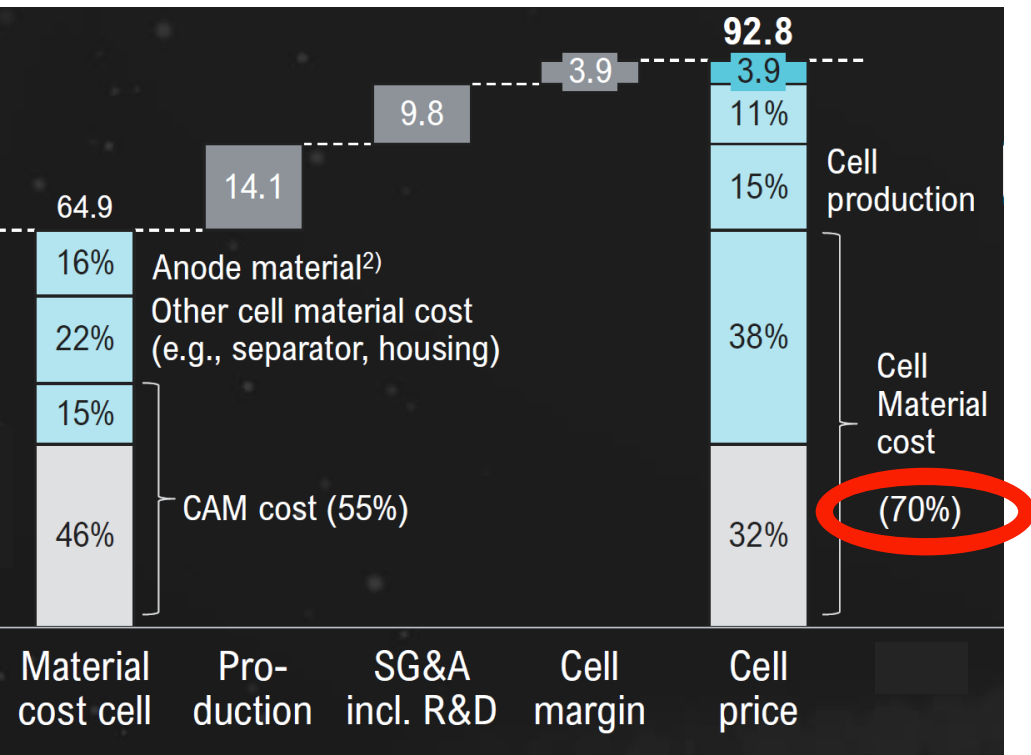
→ Lithium metal without dendrites

>>1000 Cycles

<<\$60/kWh

Industry standard separator and commercially available electrolyte

Driver Cell Cost - Materials



Average price structure of 65 Ah NMC 622 pouch cell

Sources: AVICENNE ENERGY 2022

Source: Roland Berger

Cathode Precursor Composition

Technology concept: Local sourcing of cathode precursors

- Zeta process enables the use of sulfur recovered from refineries or even from fertilizer industry
- All materials can be NA/EU sourced
- Lowest cost precursor materials!



Chemical grade >\$30 /kg; from refineries < \$0.2 /kg



Powder << \$5 /kg

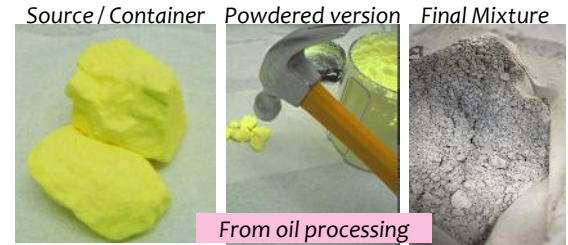
National industry of polyacrylonitrile and derivatives > 40,000 tons/year carbon-fiber. Not including textiles!



Powder*
\$50 to < \$10/kg

Emerging national industry of producing carbon nanomaterials, such as carbon nanotubes and graphene. Already used in batteries.

*used as <2 wt%

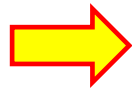


Key Innovations – Performance Increases

Now 3rd Party validated: No Polysulfides!

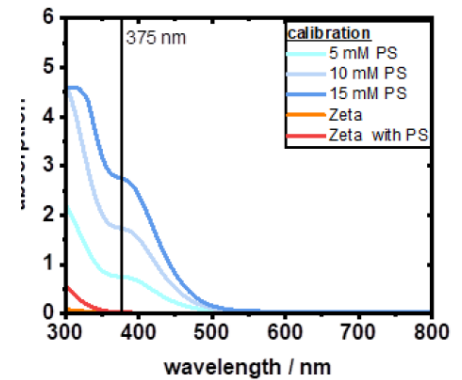
Conclusion

- Combination of Zeta Energy electrolyte system + sulfurized carbon cathode



→ effective hindering of polysulfide formation + shuttle

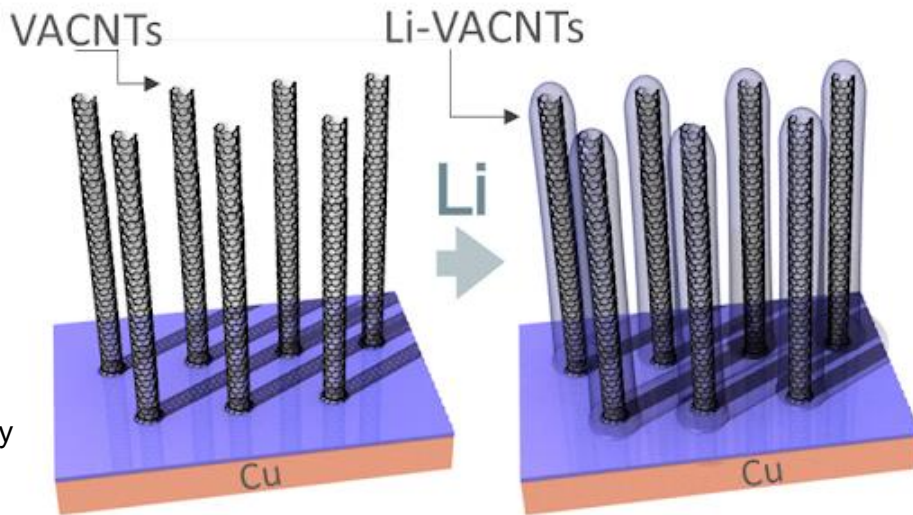
- High, customizable sulfur content (low 40s to high 50s) even higher in future
- Tunable for either Power or Energy battery
- Dry Processability – High loading, low binder content
- Materials processing scalable – tons/hr
- Pairable with different Anode chemistries:
 - Silicon (Si/Gr or Gr/Si)
 - Li metal (Li metal on Cu foil, or VACNTs)
 - Li Alloys (Mg) – others to be explored



Zeta Li-VACNT anode

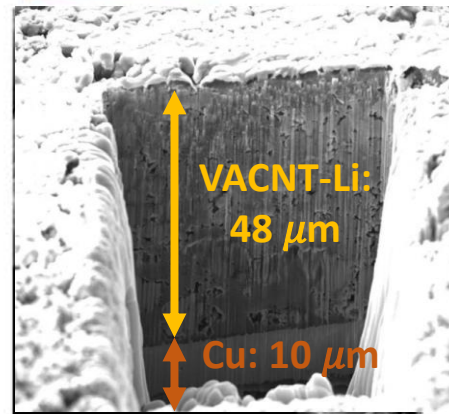
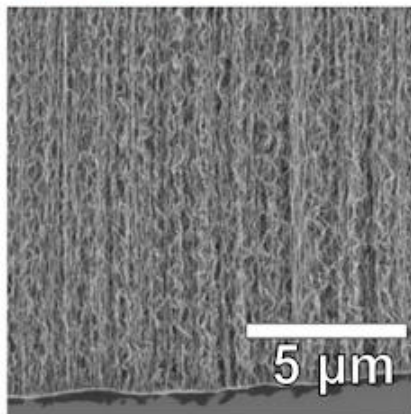
VACNT on Cu

- High surface area
- High porosity
- High electrical conductivity



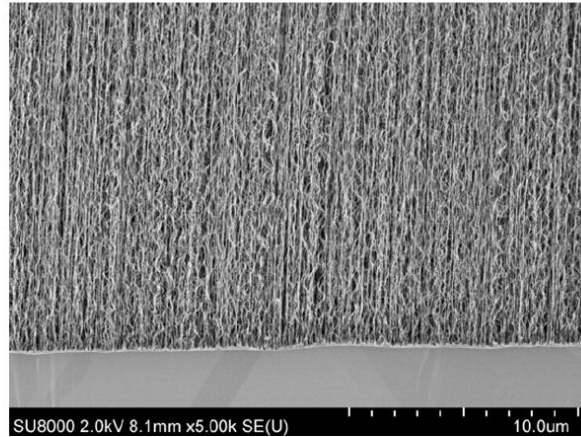
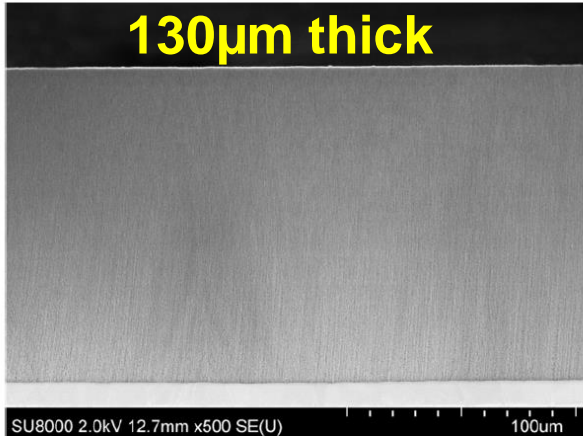
Li-VACNT on Cu

- High charge capability
- No dendritic structure
- High Li to C ratio



Vertically Aligned CNTs – Performance Increases

130 μ m thick



- Increase growth speed (target \ll 30 sec)
- Low-cost Cu foils
- Roll2Roll processing
- Pairable with different Cathode chemistries
- Dry process
- Replace hydrocarbon precursor with CO₂



Largest Lithiated VACNT Electrode - Update

- Lithiated VACNTs Anode
- Sulfurized Carbon Cathode
- Largest lithiated CNT anode!!



Next Step:

First cell produced completely dry!

Ultra Dry

Gen2 - 1 Ah
pouch cell



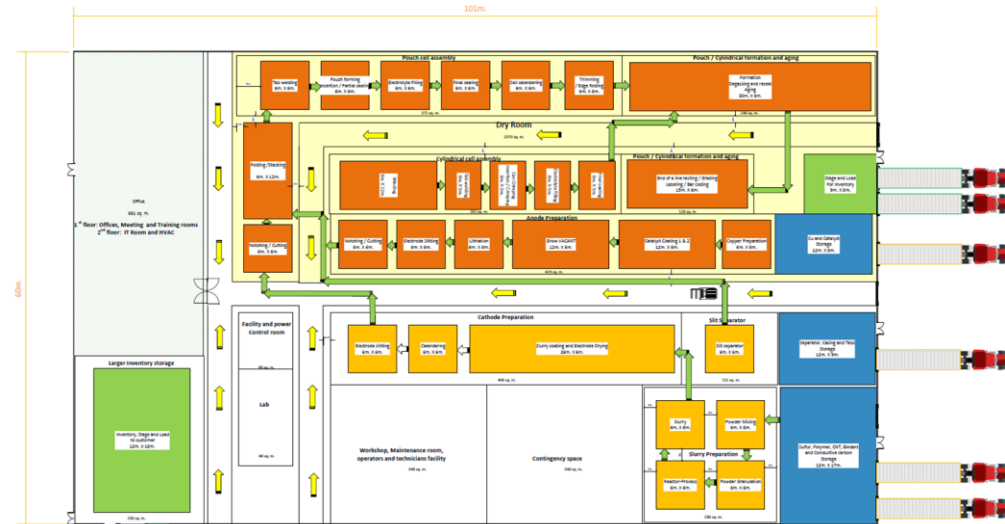
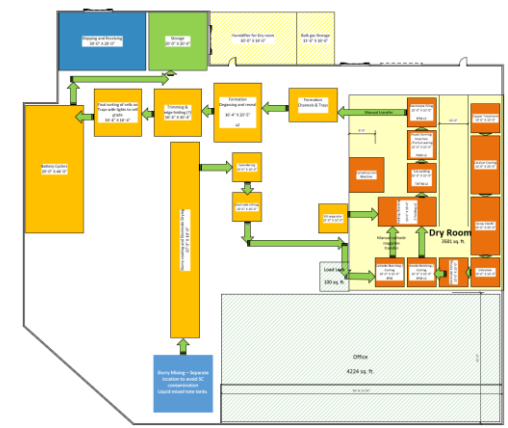
Gen2



Capacity	0.98 Ah
Zeta Energy cathodes	5 ds + 2 ss (2.69 mAh/cm ²)
Zeta Energy anodes	Gen2 – 6 ds (lith. VACNTs)
Separator	7 + 2 + 2 μm
weight	16.846 g
thickness	3.285 mm

Fast Scaling

- Zeta Validation Center: Q3 '24
(Small Pilot Line):
 - Location: Near Lab in Houston
- Pilot Line (100 -500MWh): Q2 '25
 - Location: t.b.d.
- GWh Plant: SOP 2027
 - Location Criteria:
 - Close to Customer
 - Close to Funding
 - Shortest supply chain
 - EU/NA



Zeta's Needs for Fast Scaling

Funding:

- Series B to close in Q3, further investor funding
- US Government Funding
 - DOE related: ARPA-E, VTO
 - Large Loans: LPO
 - IRA related
 - EU: We are always open

Customers:

- Product specifications/definition, testing, integration, packaging, etc.
- Focus on auto and grid for high volume
- Existing facility for rapid integration
- Non-auto for fast revenue generation



U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy
VEHICLE TECHNOLOGIES OFFICE



Material Scaling

Sulfur Shortage?

Syncrude in Fort McMurray, Alberta

Capacity: 2300 tons/day

This supports

1.61 TWh / year of Zeta Cathode



... this is just one of their facilities



Thank You!