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Staff Battery Scientist



 **SOUTH 8™**

Liquified Gas Electrolyte–LiGas[®]: Next Generation Electrolyte for Lithium-Ion Batteries

Space Power Workshop | Torrance, CA
21 April 2026

Delivering advanced battery cells for mission-critical applications in the harshest of environments

SOUTH 8



San Diego, CA



42 employees

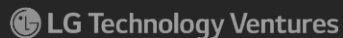


60+ Patents

- » **Founded in 2016 as a spin-out of UC San Diego**
- » **Core innovation:** Liquefied Gas (LiGas[®]) Electrolyte to enhance standard Li-ion cells
- » POs and JDAs with >35 leading aerospace & defense customers, EV OEMs and cell manufacturers
- » Scaling manufacturing in California to reach 2.5 MWh by Q4 2026 to serve specialty customers in aerospace and defense



OUR INVESTORS



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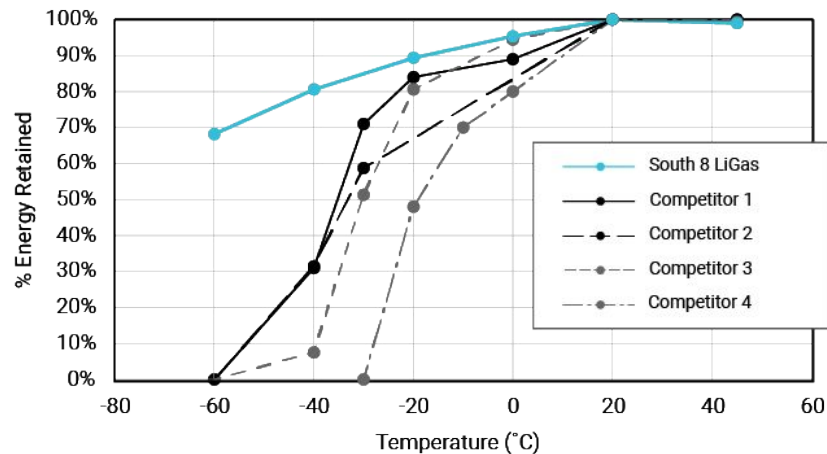
Conventional
Liquid Electrolyte



Liquefied Gas
Electrolyte

LiGas Cells show
industry-leading
wide operating
temperature range
from -60 °C to 60 °C
(-76 °F to 140 °F)

~3.5 Ah 18650
Top Tier Cell
Comparison



OUR INVESTORS

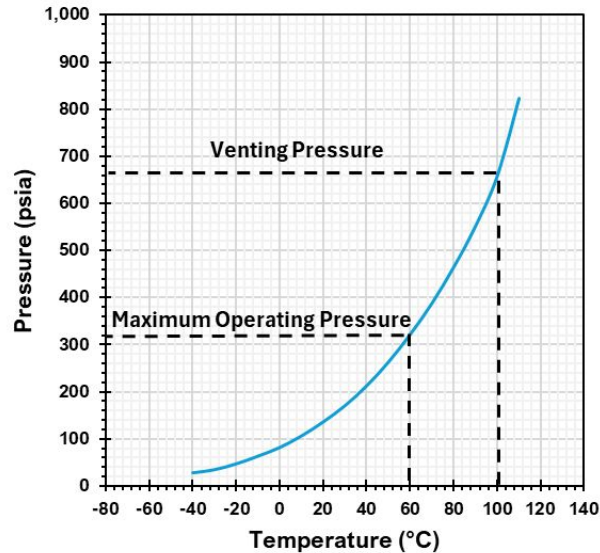


LiGas is made of domestically sourced and commercially available gases & salts.

LiGas characteristics

- Low viscosity
- Low melting points
- Non-ozone-depleting
- Non-toxic, non-corrosive
- Excellent electrochemical stability
- Commercially available in high purity
- Compatible with all common battery materials

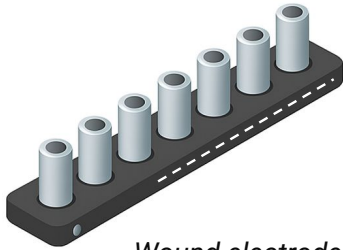
Typical vapor pressure for LiGas cell



"Fill + Finish" model used to manufacture cells for defense & aerospace customers

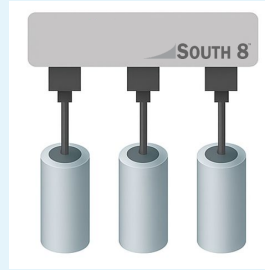
South 8 currently delivers 3.5Ah 18650 cells directly to customers for defense, aerospace, and specialty applications

① Standard Dry Electrodes



Wound electrodes from TAA-compliant manufacturers

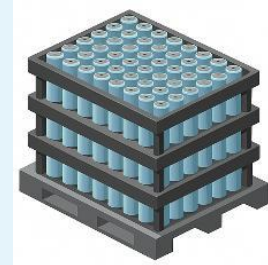
② Fill LiGas



③ Finish Cells

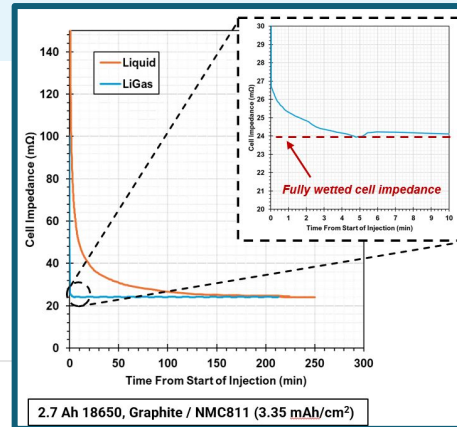


④ LiGas 18650s



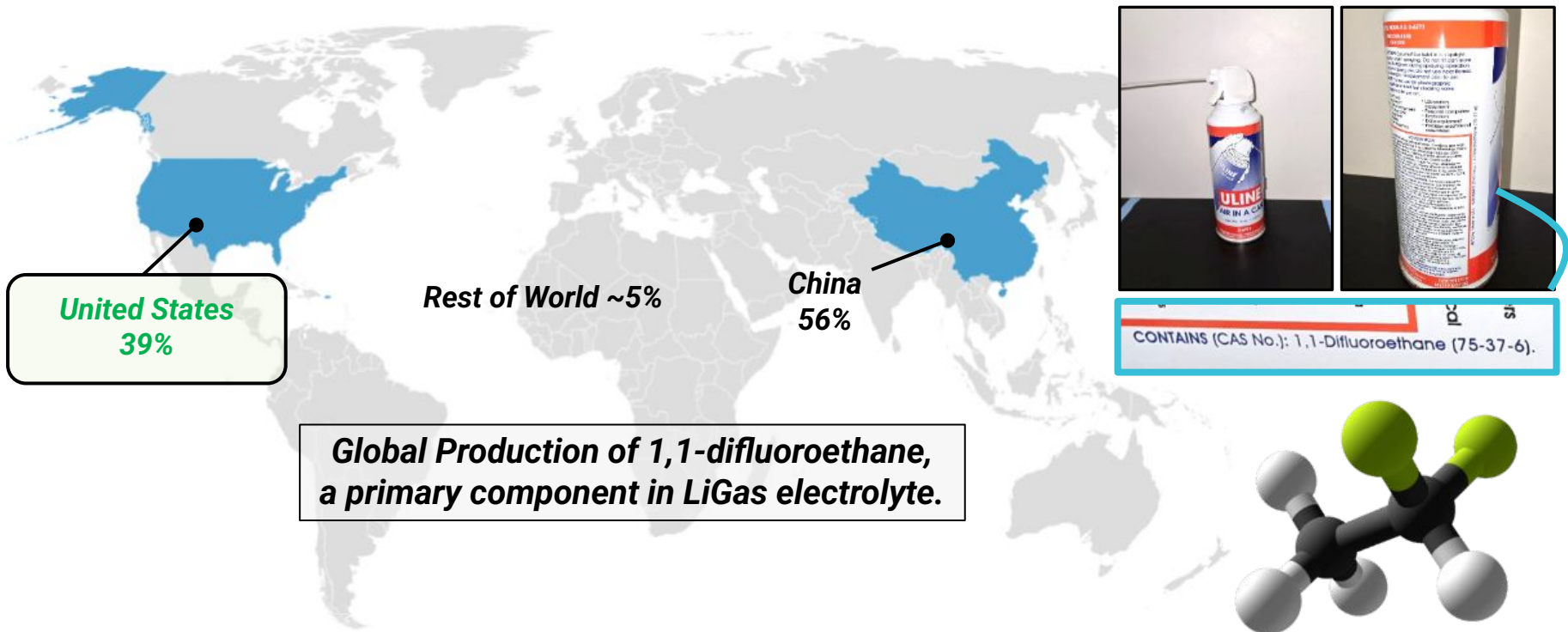
Domestically-finished, high-capacity 18650 cell

Pressure accelerates process
LiGas fully wets the jelly roll in 4 minutes.
Liquid takes 3-4 hours.



U.S.A. produces 39% of the world's 114,000 MT of annual 1,1-difluoroethane.

Production of 1,1-difluoroethane in the U.S.A. is increasing, ensuring a secure supply chain.



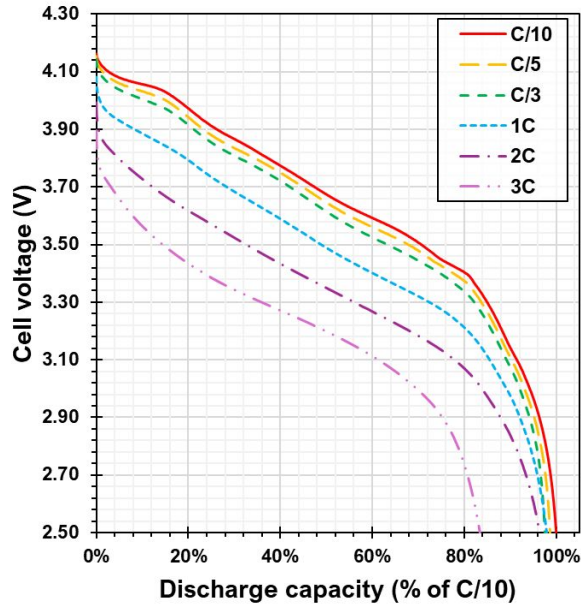


LiGas Performance

Gen4B LiGas has demonstrated superior performance at both low and high temperatures across different chemistries with multiple partners.

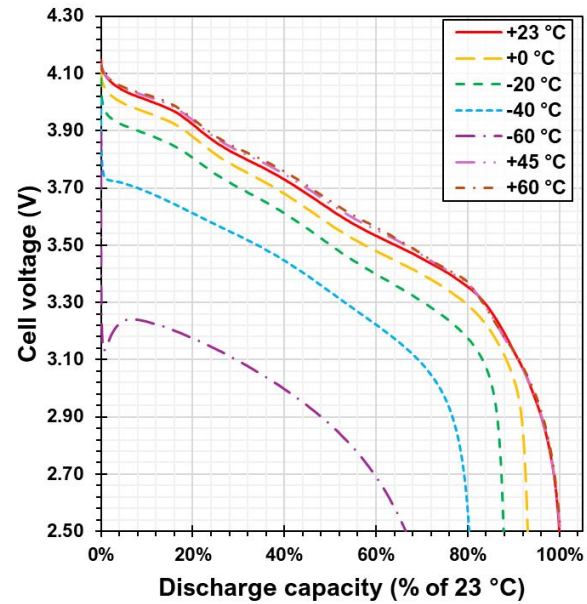
Production Line Cells

--Data generated by South 8--
+25 °C: C/3 charge, discharge at rate
3.5 Ah 18650 (Graphite-Si / NMC)



Production Line Cells

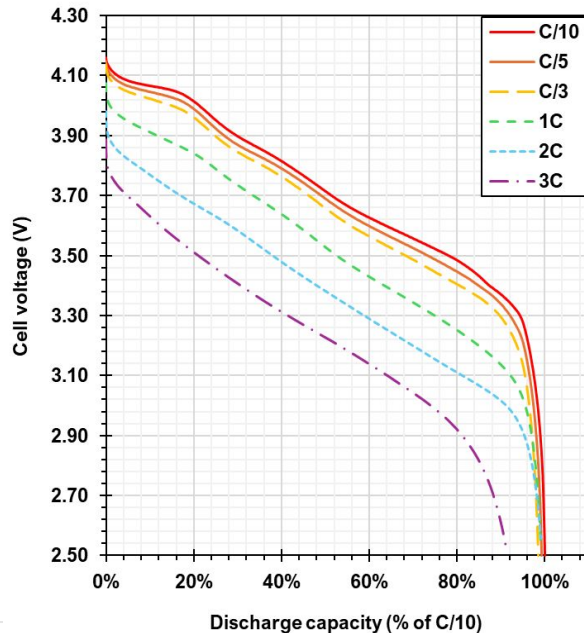
--Data generated by South 8--
C/3 charge at +25 °C, D/3 discharge at temp
3.5 Ah 18650 (Graphite-Si / NMC)



Gen4B LiGas has demonstrated superior performance at both low and high temperatures across different chemistries with multiple partners.

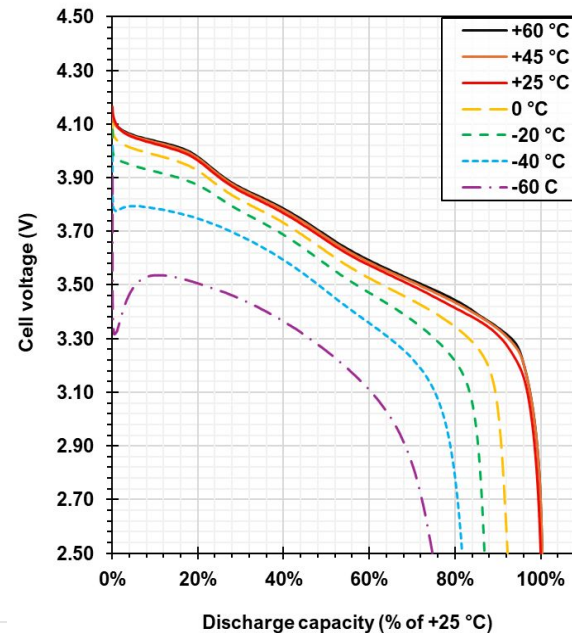
Partner A Jelly Roll

--Data generated by South 8--
+25 °C: C/3 charge, discharge at rate
5.0 Ah 21700 (Graphite / NMC)



Partner A Jelly Roll

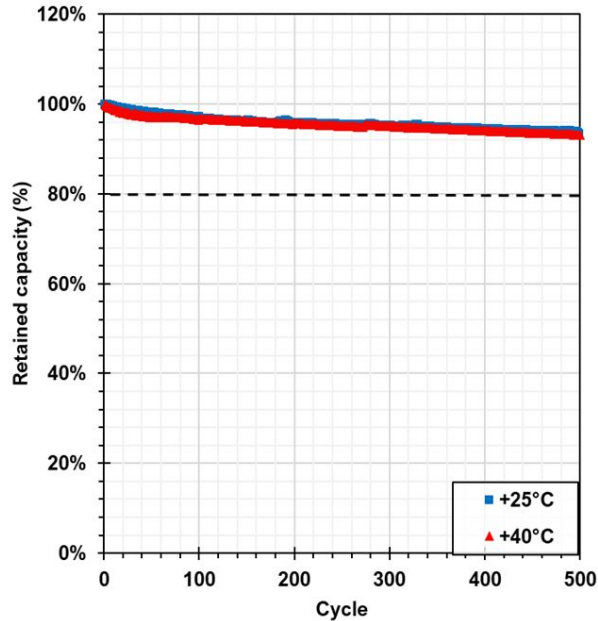
--Data generated by South 8--
C/3 charge at +25 °C, D/3 discharge at temp
5.0 Ah 21700 (Graphite / NMC)



Gen4B LiGas has demonstrated superior performance at both low and high temperatures across different chemistries with multiple partners.

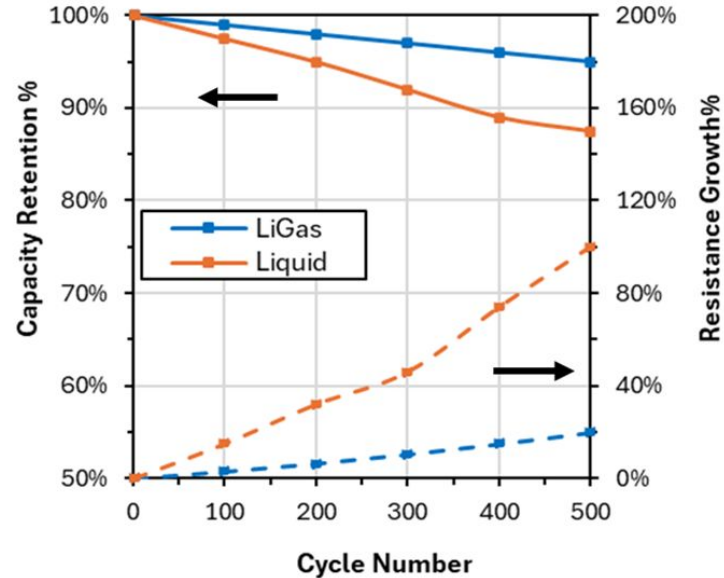
Partner A Jelly Roll

--Data generated by South 8--
+25 and +40 °C Cycle Life, C/2 + 1D
5.0 Ah 21700 (Graphite / NMC)



Partner A Jelly Roll

--Data generated by Partner A--
+40 °C Cycle Life, C/2 + 1D
4.9 Ah 21700 (Graphite / NMC)

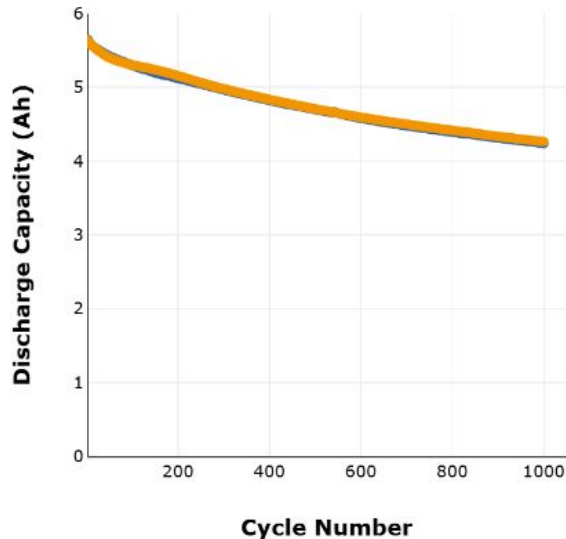


Gen4B LiGas has demonstrated superior performance at both low and high temperatures across different chemistries with multiple partners: *graphite-Si anodes*

Partner A Jelly Roll

--Data generated by South 8--
+40 °C Cycle Life, C/2 + 1D

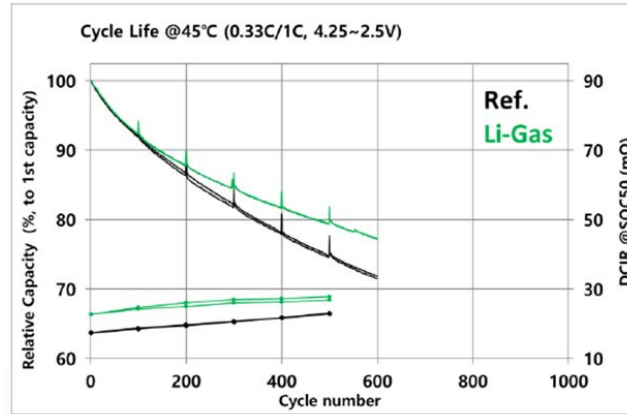
5.7 Ah 21700 (Graphite-Si / NMC)



Partner B Jelly Roll

--Data generated by Partner B--
+45 °C Cycle Life, C/3 + 1D

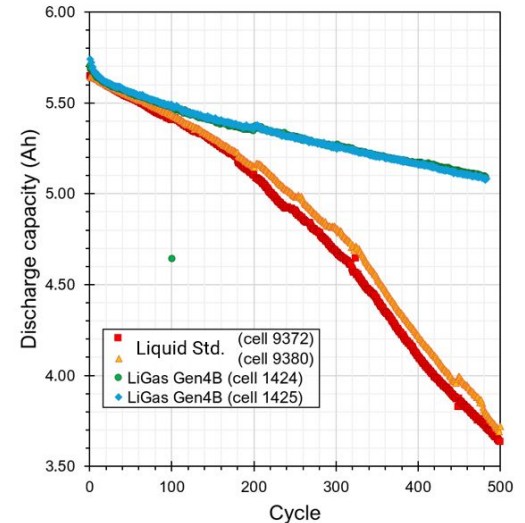
6.0 Ah 21700 (Graphite-Si / NMC)



Partner C Jelly Roll

--Data generated by South 8--
+45 °C Cycle Life, C/3 + D/3

5.9 Ah 21700 (Graphite-Si / NMC)



Recent micro-drone sub-zero flight demonstration at the University of Alaska, Fairbanks

In an early sUAS demonstration, LiGas cells were able to enable 2.4x longer flight time at -20 °C compared to conventional liquid electrolyte cells



sUAS Demo Flight: 05 Feb 2026, 10:30am

Cell Temperature: Cold-soaked overnight in chamber; temp at flight: -20 °C

Outside Temperature: -9 °C / Windchill: -15 °C

Wind: 2.8 m/s NE

Cell Type: 3.5Ah NMC811 / Graphite + Si 18650x2

Liquid Electrolyte

00:07:41

LiGas

00:18:22

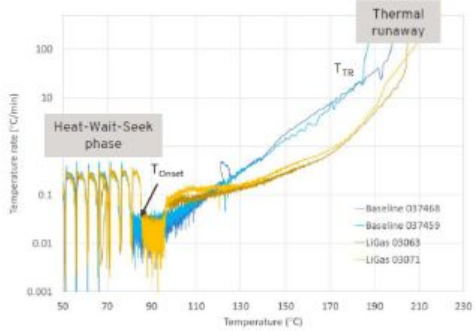
LiGas cells = 2.4X longer UAS flight time vs. conventional liquid electrolyte cells



LiGas Safety

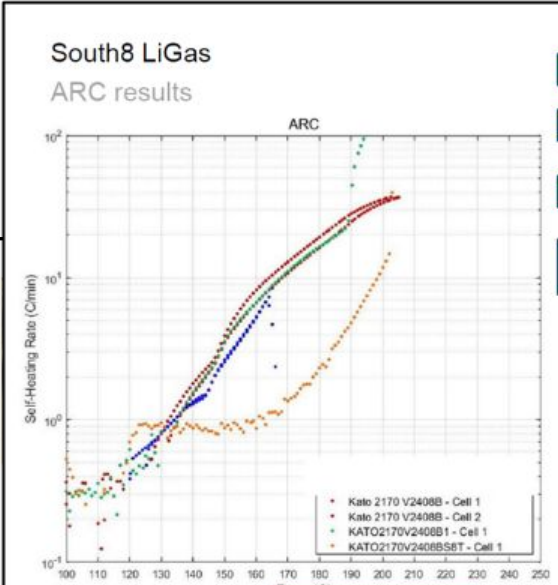
Third-party ARC testing shows LiGas cells have a reduced self-heating rate and a higher thermal runaway temperature.

South8 Cells - ARC HWS Analysis



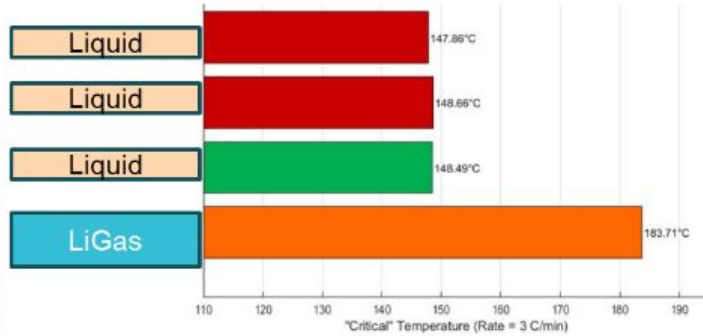
LiGas® cells show a slightly delayed thermal runaway with slower kinetics (temperature rise rate); however, this is accompanied by more ejecta, resulting in a 75% mass loss compared to a 50% mass loss for baseline cells. Typical 18650 tends to vent and eject material from the positive terminal end of the cylinder, where the vents valve is located. For LiGas® cell the vent valve is placed at the negative terminal.

2.7 Ah nameplate capacity 18650



Liquid electrolyte
 LiGas electrolyte (Gen3)

Cell #	Cell GED (Wh/kg)	T _{onset} (°C)	Average max T (°C)	ΔH (kJ) Total enthalpy	mass loss %
LiGas® #03063	224.18	86.26	536.66	21.02	77.50
LiGas® #03071	223.57	86.19	348.89	12.28	75.82
Baseline #037459	221.93	81.31	451.52	16.51	52.92
Baseline #037488	230.55	81.28	492.96	18.59	47.95



Venting at 70-80 C suspected for Sout8-filled cells based on the temperature dip (although smaller dip than anticipated).

We will run nail penetration test next, and gas release and bomb calorimetry after.

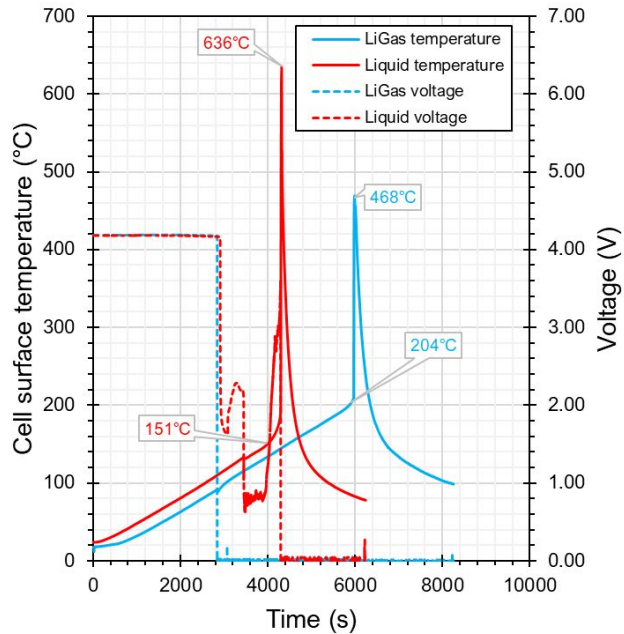
Currently, some test equipment is being validated so not all tests can be readily conducted

5.9 Ah nameplate capacity 2170

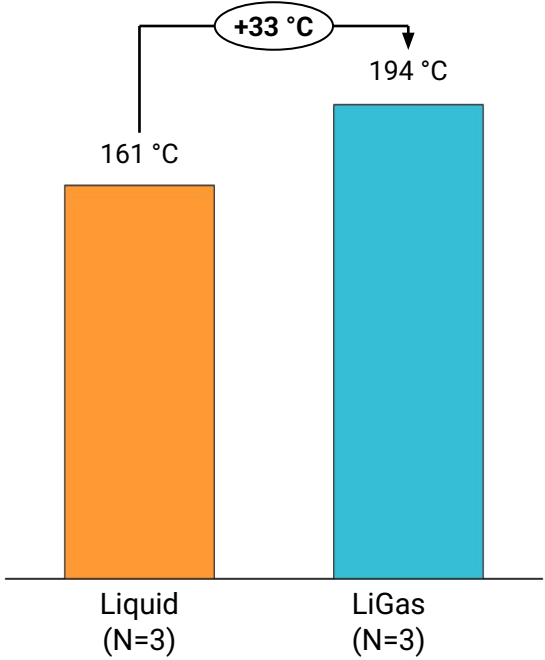
Thermal Ramp (SAND2022-0089 R)

LiGas cells vent per design below +100 °C.

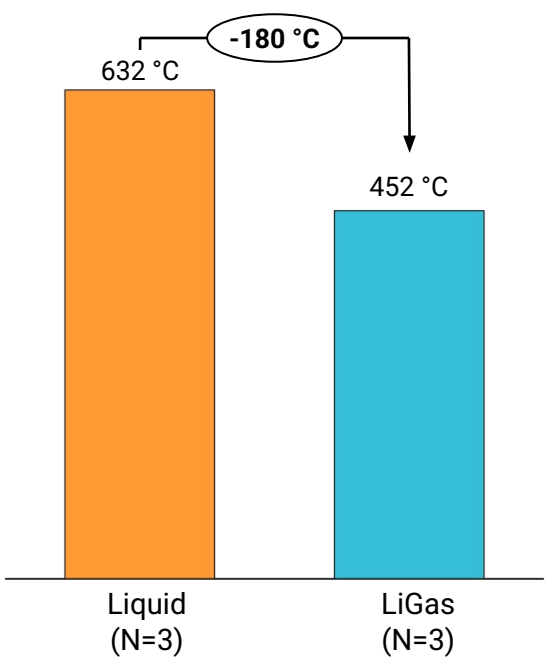
Conclusion: LiGas cells have a **higher** thermal runaway onset temperature and **lower** peak temperature than liquid.



Avg. Onset Temperature

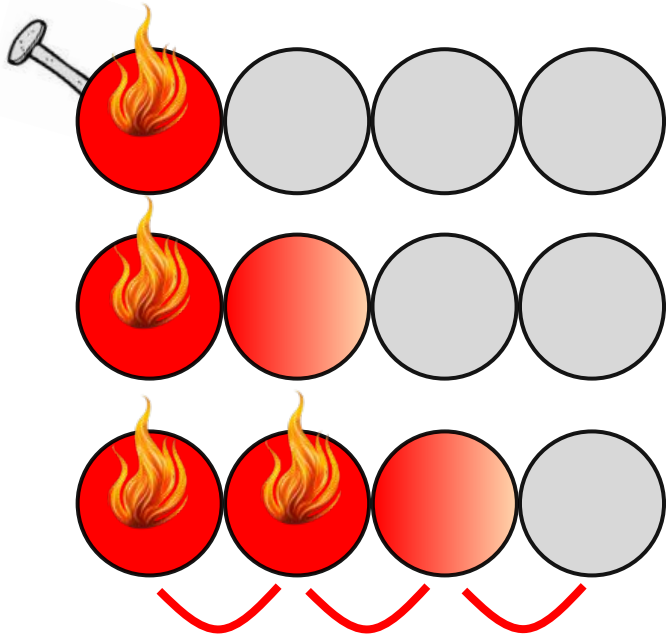


Avg. Peak Cell Temperature



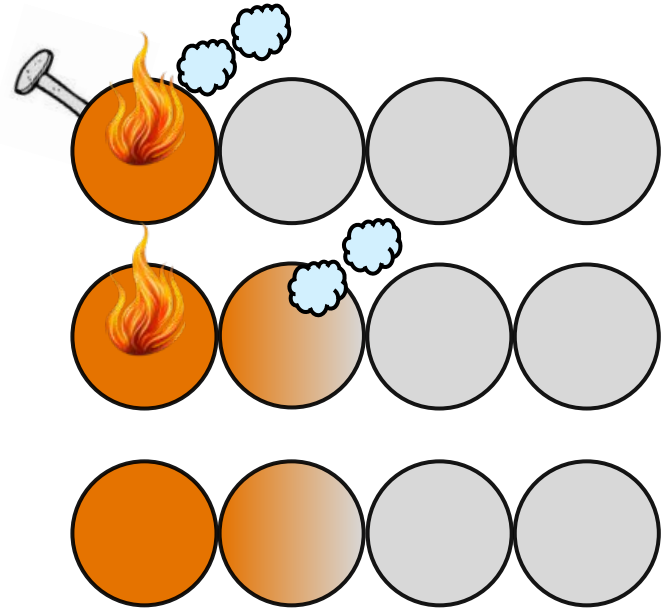
LiGas features an inherent “vented cell barrier”, preventing thermal propagation.

During thermal runaway, the **Liquid Electrolyte**...
...burns which adds more fuel to the fire...
...leading to increased heat output and higher peak temperatures...
...and allowing for thermal propagation to adjacent cells.



Thermal Propagation

During thermal runaway, the **LiGas Electrolyte**...
...rapidly vents from the cell, removing fuel from the fire...
...leading to less heat output and lower peak temperatures...
...which may vent an adjacent cell, but not push to thermal runaway...
...allowing LiGas cells to effectively shut down thermal propagation.



Vented cell cannot deliver enough heat to propagate

Defense customer ballistics test: no thermal propagation

Cells with identical jelly rolls: COTS version vs. LiGas-filled

Electrolyte Type

Burn time reduced 99% with LiGas

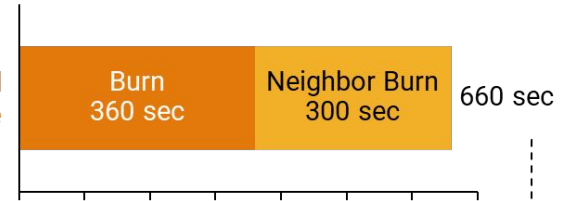
Liquid electrolyte



Rapid thermal propagation



Liquid electrolyte



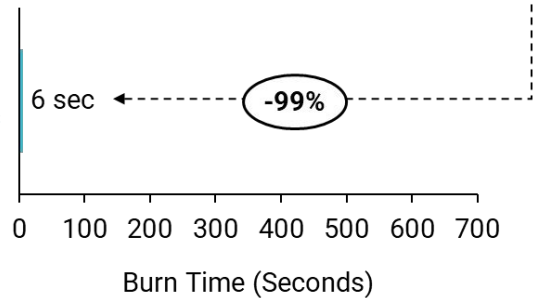
South 8 LiGas



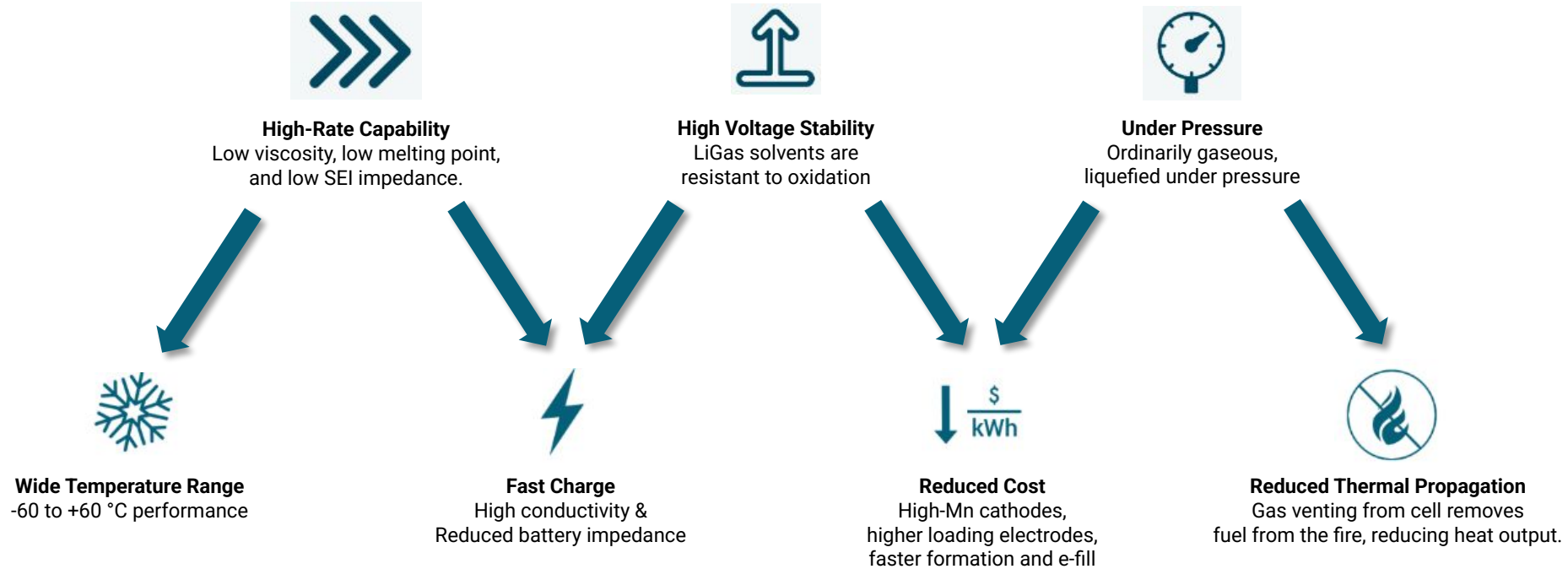
No thermal propagation



South 8 LiGas



Three LiGas properties leads to four primary value propositions.



Thank You