



Stratosphere™ AGMe: A PE-based Separator Enhancing Cold Performance and Energy Density in VRLA

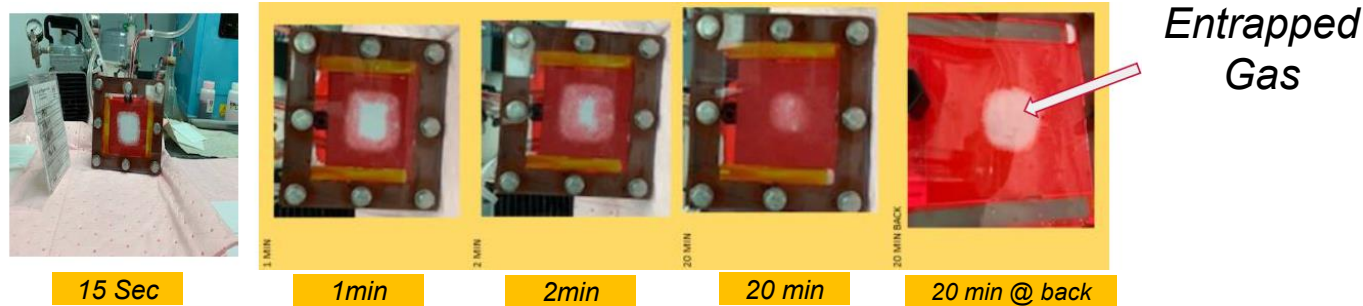
DTC R&D Team
April 27, 2026

Stratosphere™ AGMe: A PE-based Separator Enhancing Cold Performance and Energy Density in VRLA



- AGMe: Replace AGM technology in VRLA with a Daramic PE solution
- ALBA: AGMe enable homogeneous acid filling and formation of plates with non-AGM Separator for VRLA

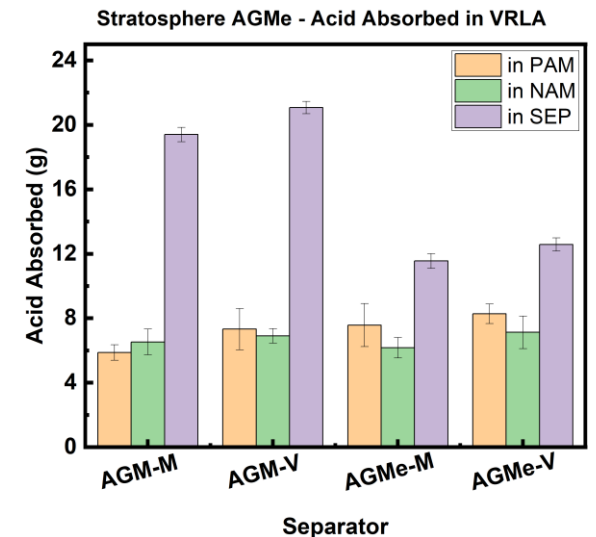
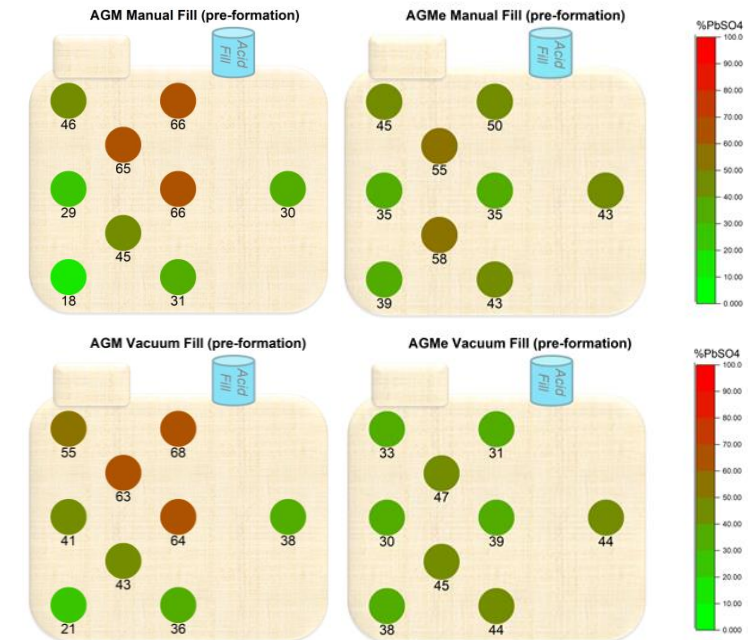
Historically: AGM entraps gas at center:



- ALBA Teardowns: post-filling composition (XRD) & acid absorption

- (Hybrid) AGM vs. (AF13-C1C2) AGMe; Manual vs. Vacuum Fill
- Plate Composition:
 - AGM: sulfate gradient from acid port to bottom left corner
 - AGMe: Manual fill enables homogeneous formation of PbSO_4
- Vacuum improves acid saturation in POS/NEG/SEP
 - AGMe: more acid to plates

Stratosphere™ AGMe Enhancing both Plate Uniformity and Acid Absorption



Compression: AGM: 30%, AGMe: 5%

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❑ Built 75x 14Ah VRLA Batteries: (“hybrid”) AGM vs. (AF13-C1C2) AGMe

❑ Rupture Test:

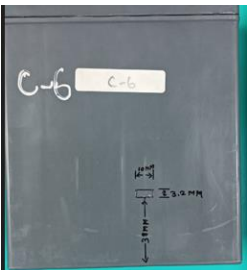
- AGM: Passed
- AGMe: Passed

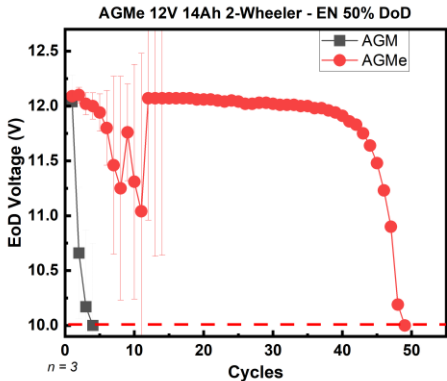
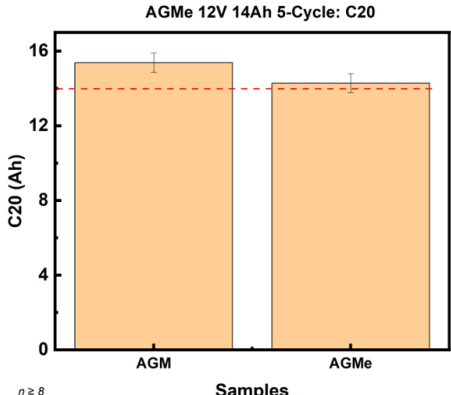
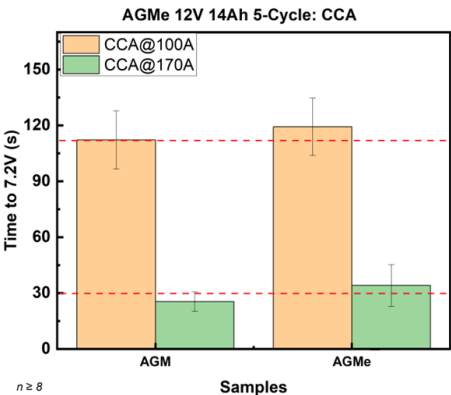
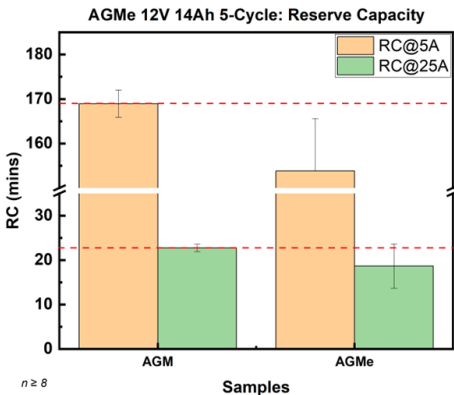
❑ BCI 5-Cycle:

- RC: AGM > AGMe
- CCA: AGMe > AGM
- C20: AGM > AGMe

❑ 50% DoD:

- Significant life improvement with AGMe

		
Rupture Test	AGM	AGMe
Excess Acid:	0 mL	0 mL
Pass?	PASS	PASS



Compression: AGM: 30%, AGMe: 5%
*hybrid: mix of coarse/fine fibers

AGMe Works!
Optimization Underway

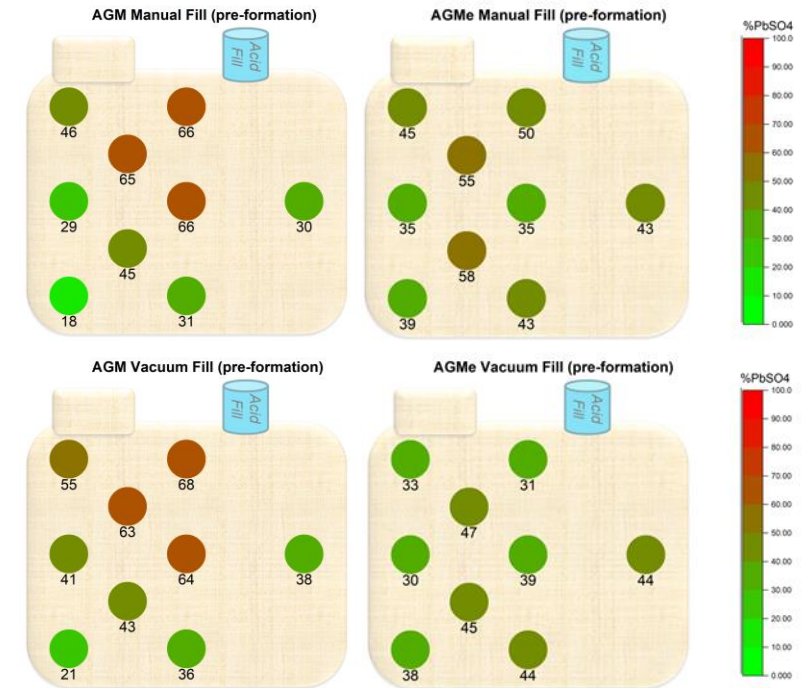
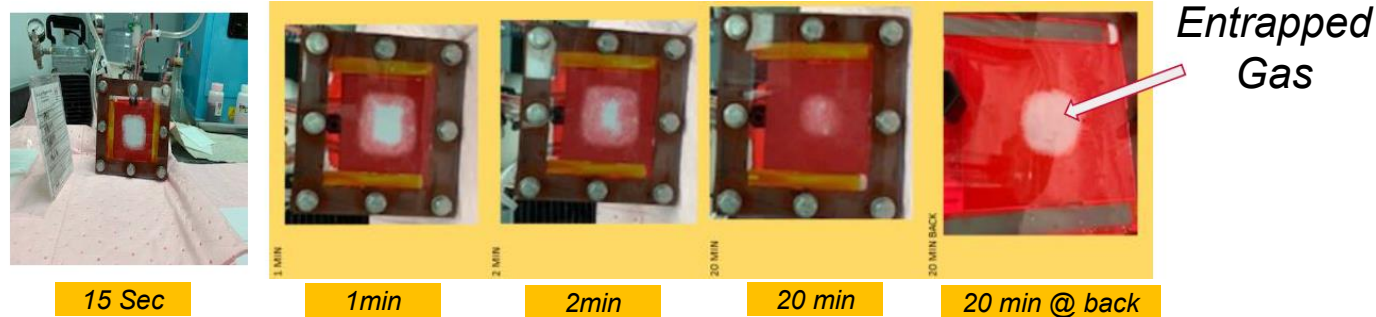
Stratosphere™ AGMe Enhancing both Plate Uniformity and Acid Absorption



- Absorptive Gelation Membrane evolution (AGMe): Replace AGM technology in VRLA with a Daramic PE solution

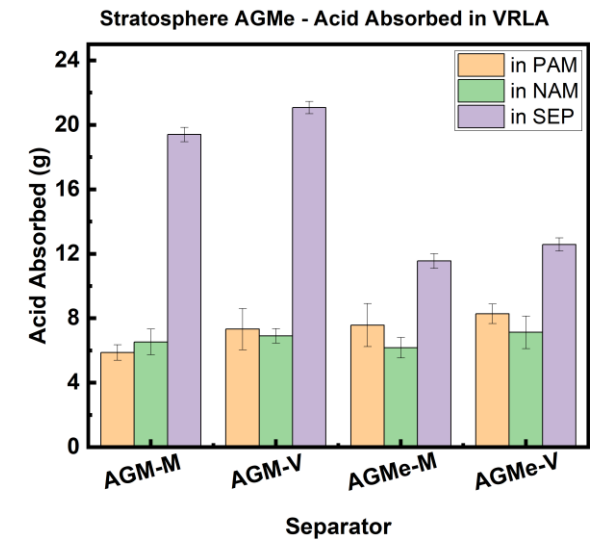
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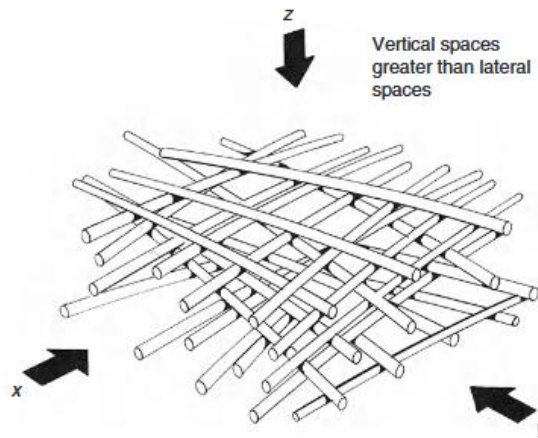


Compression: AGM: 30%, AGMe: 5%

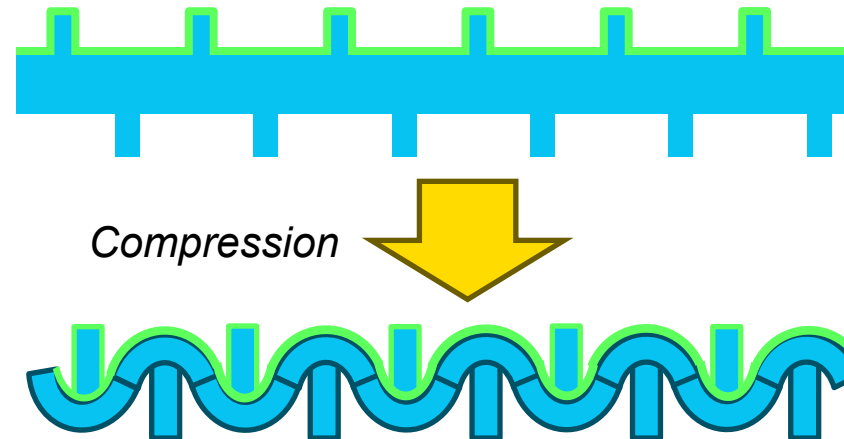
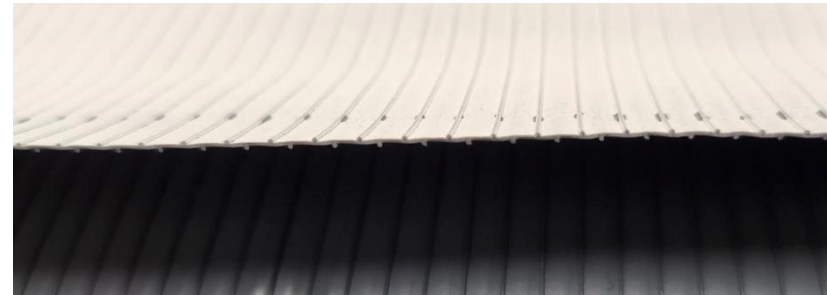
What is AGMe?

- Absorptive Gelation Membrane evolution (AGMe): Replace AGM technology in VRLA with a Daramic PE solution

AGM

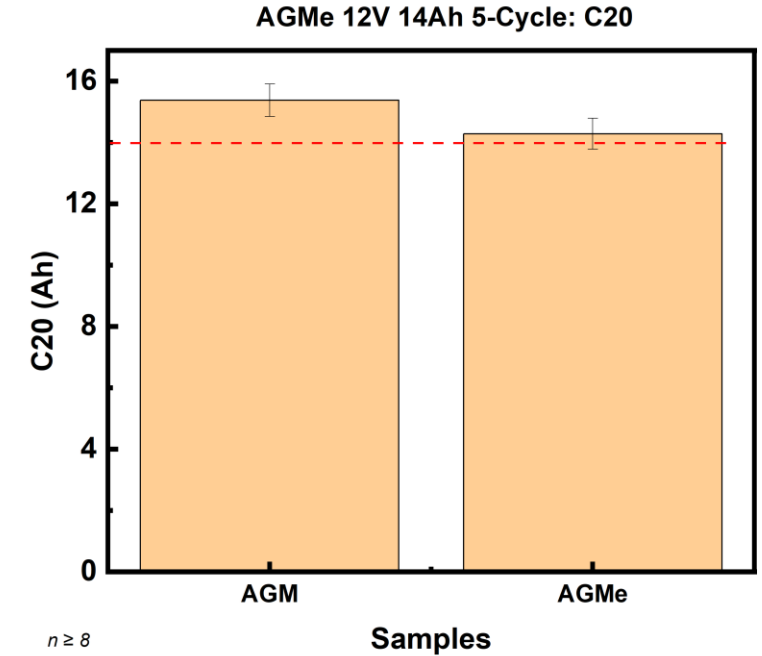
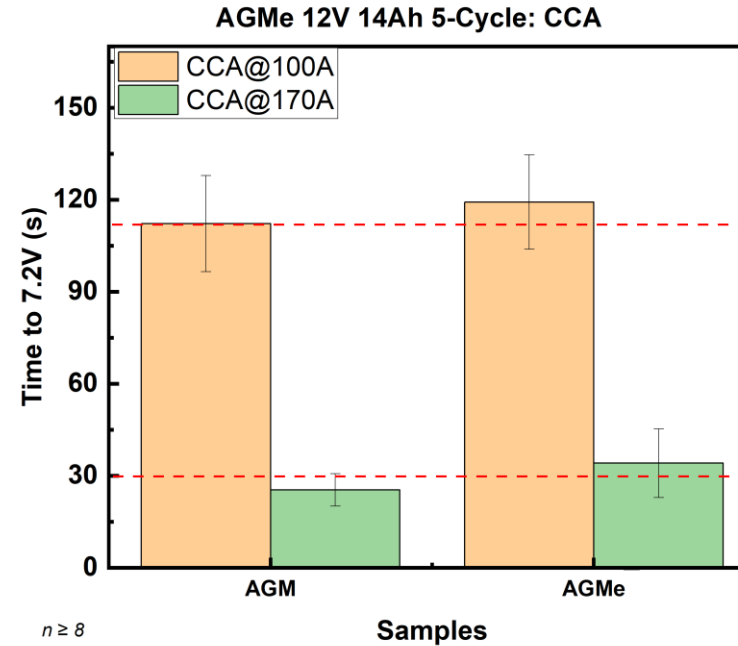
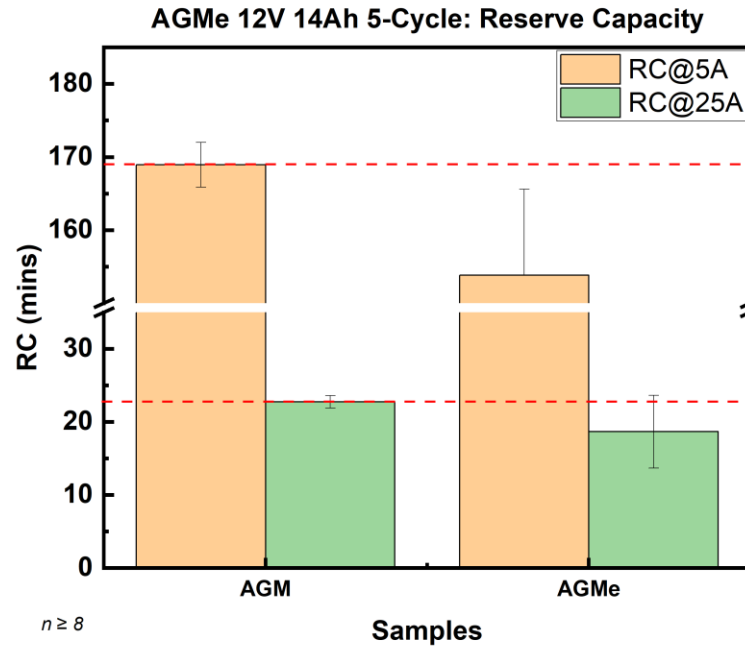


AGMe



AGMe: Next Generation of VRLA Separators

Results - BCI-5 Cycle



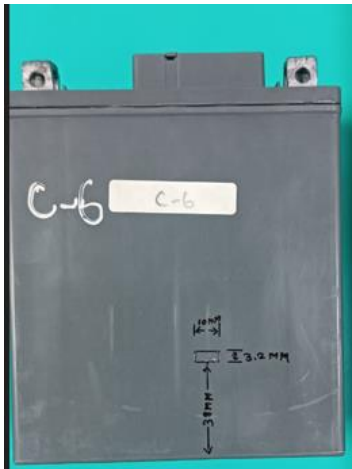
dotted red line denotes manufacturer rating

**No typical RC Rating: use AGM (ctrl) as std; 170A CCA is closest equivalent to competitor*

- RC: AGMe significantly lower than ctrl probably due to less electrolyte
- CCA: AGMe higher than AGM
 - *AGM below rating closest competitor equivalent*
- C20: All pass, exceeding 14Ah

AGMe on par with AGM in Initial Performance

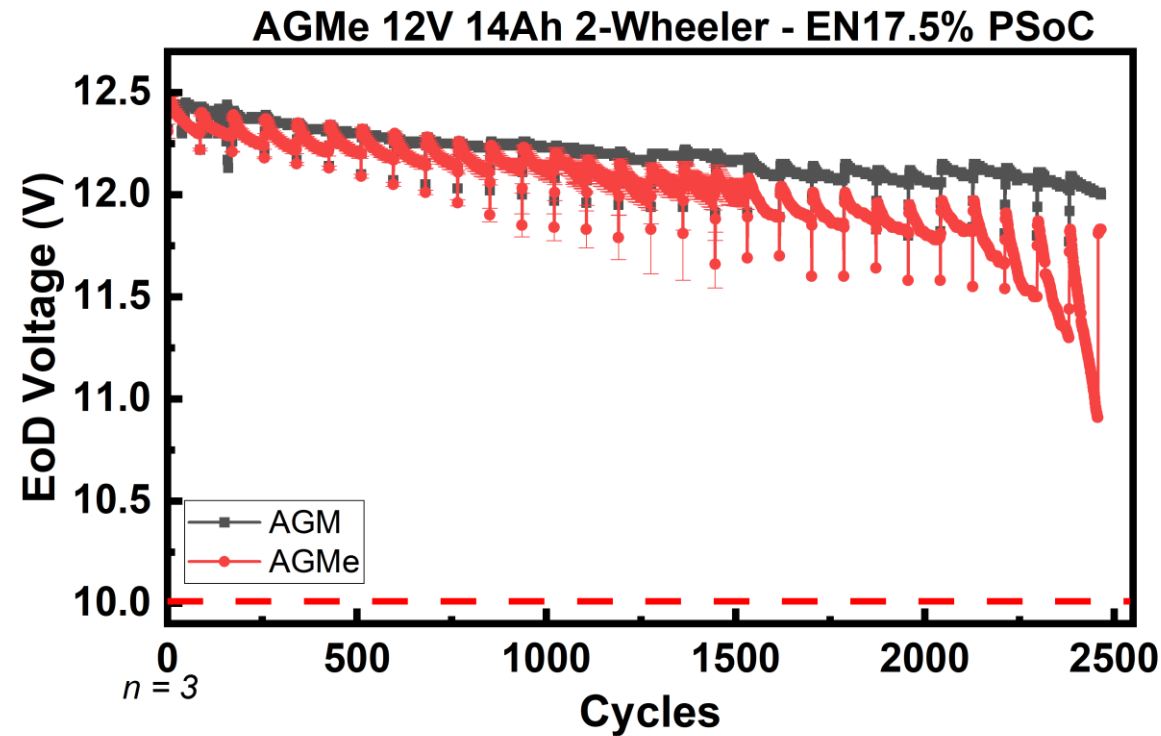
Results - Rupture Test



Rupture Test	AGM	AGMe
Excess Acid:	0 mL	0 mL
Pass?	PASS	PASS

AGMe Qualifies as VRLA!

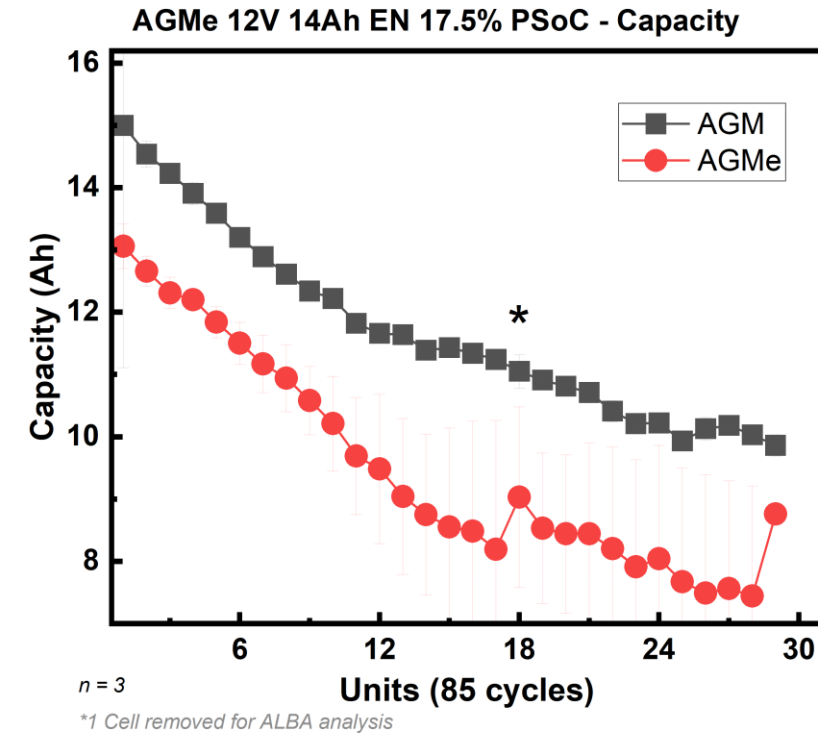
Results - EN 17.5% PSoC



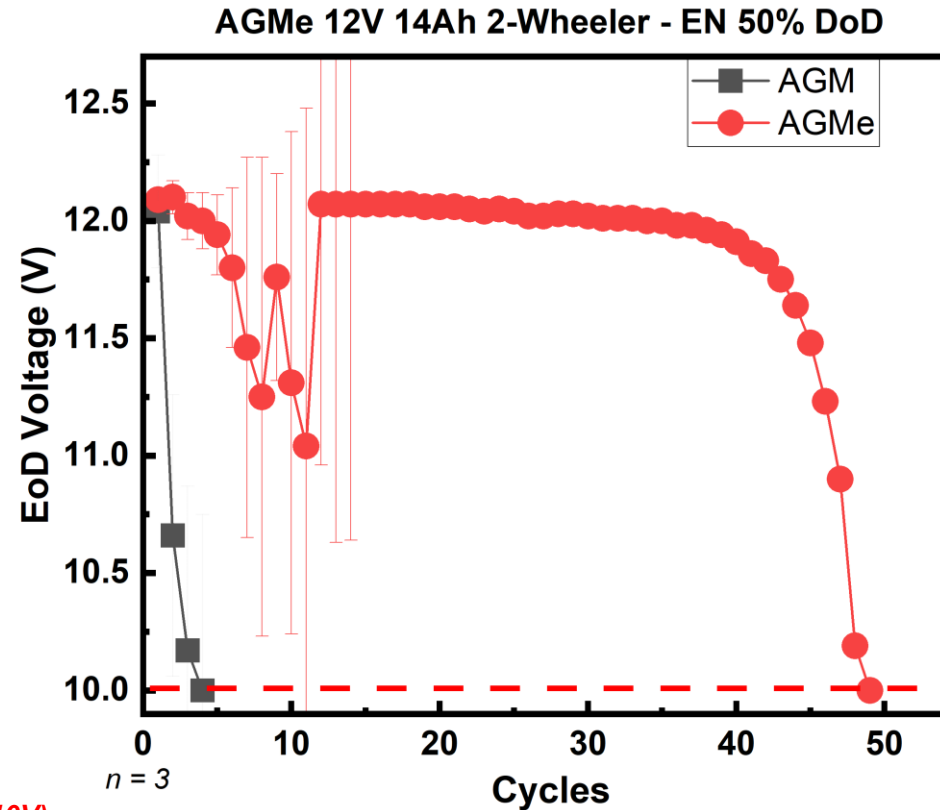
dotted red line denotes failure (10V)

Stopped test at 30 weeks

- Both AGM and AGMe lasted 30+ weeks!
- AGM maintaining higher End of Discharge Voltage & Capacity
- AGM maintaining higher Capacity than AGMe



AGMe Sustaining AGM Cycle Life



- AGM failed very quickly (shorted)
- C1C2 lasted ~50 cycles

AGMe Outlasted Control by ~1000%
AGMe Provides Better Short Protection

1. How does AGMe help Battery Makers *Do More, With Less*?

1. **Accelerated Throughput:** Achieve faster acid-filling and superior plate formation homogeneity without need for vacuum systems
2. **Minimized Waste:** Lower compression allows for easier battery rework, directly boosting overall production yields
3. **Robust Proven Manufacturing:** A PE-based design enables high-speed enveloping and improved production runnability
4. **Premium Performance, Lean Investment:** AGM-tier performance while maintaining lower capital expenditure of EFB lines
5. **Enhanced Power Density:** Thinner separators <0.8 allow for tighter plate spacing, maximizing CCA and enabling battery downsizing

2. How does AGMe Benefit the End User (OEM's Customers)?

- FLB Cost with VRLA Performance
 - Downsizing & weight reduction
 - Stratosphere AGMe reduces acid stratification, shorting and improves cyclability
 - Reduces warranty returns

Development

- Round 2 Build Underway - Optimizing Acid Absorption and Capacity
- Pre-commercial Line 2nd Validation
- Commercial Tooling - ETA: May 2026



Development and Scale-up Rapidly Continues!