

Transition from Tronox Electrolytic Division to BORMAN

 **BORMAN**

- September 2018, Borman acquired the assets of Tronox's (NASDAQ: TROX) specialty chemicals division based in Henderson, Nevada.
- Locations: Henderson, NV, logistics warehousing in South Carolina and Indiana.
- \$55M of revenue with approximately 90 employees, operate on approximately 100 acres.

BORMAN at a Glance

Two Businesses

Manganese Based Business

Battery Group

- EMD
- LMO



Boron Based Business

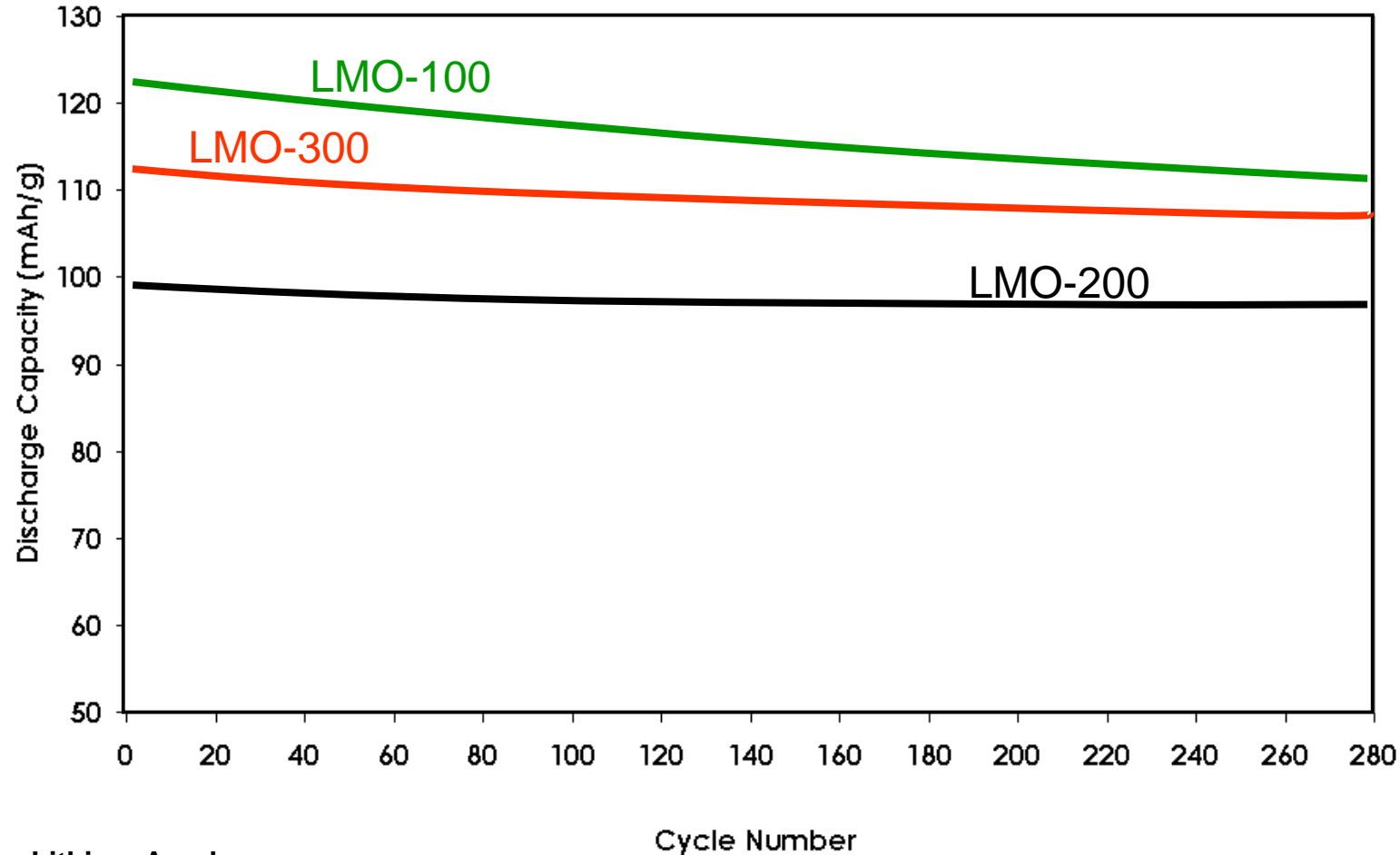
Boron Group

- Boron Trichloride
- Elemental Boron



Borman Standard LMO Product Portfolio

Spinel C/3 Charge / 1C Discharge at Room temp



LMO-100 – La-doped formulation

LMO-200 – Al/Cr-doped specific formulations

LMO-300 – Al/Cr-doped specific formulations

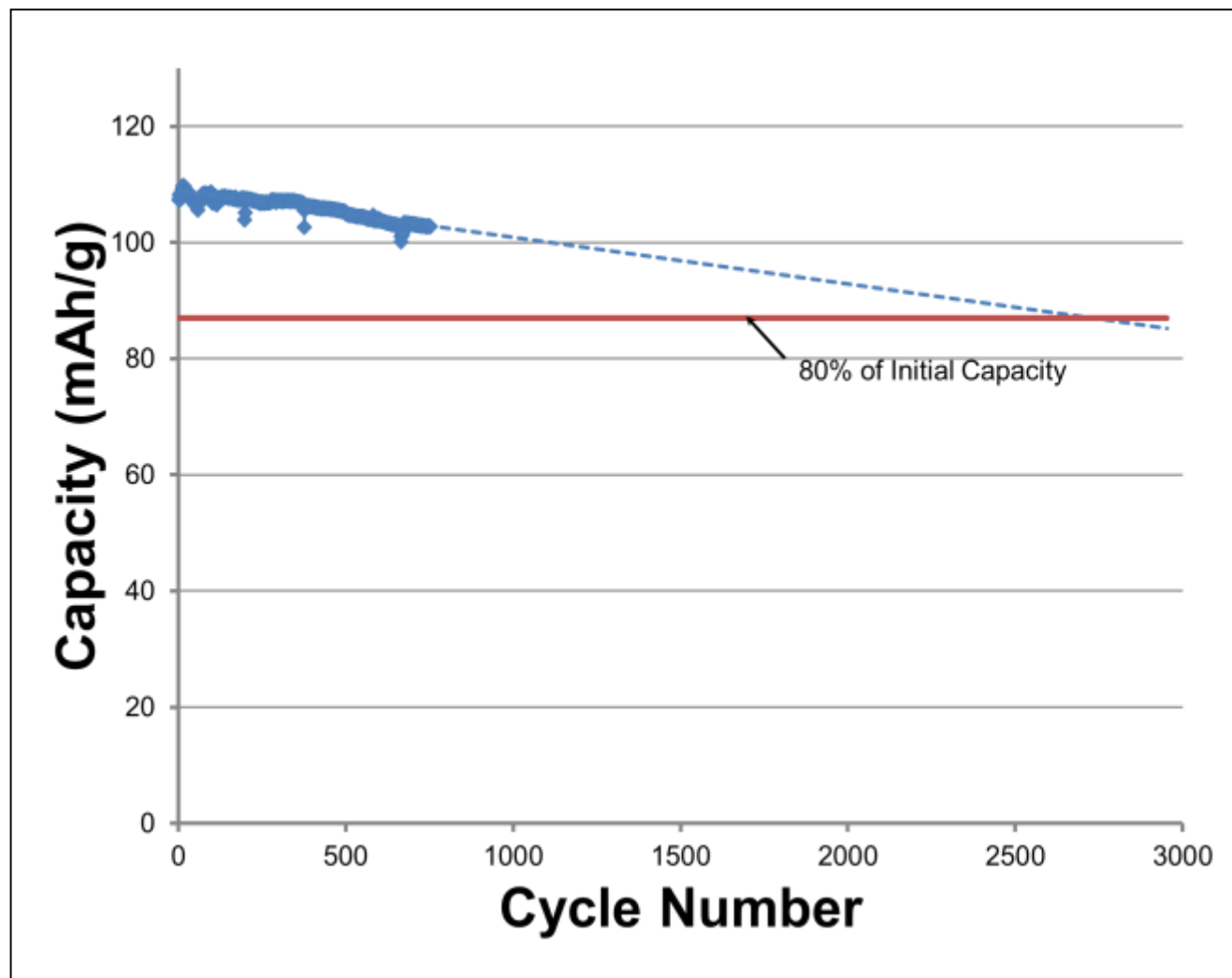
Lithium Anode

LMO Product Improvement Initiative

Product improvement through Precursor Optimization

- Reduce key impurities such as K, Ca, SO_4^{2-} , Fe

Result: LMO with excellent cycle life. Up to 2700 cycles in Li coin cell at 60°C!

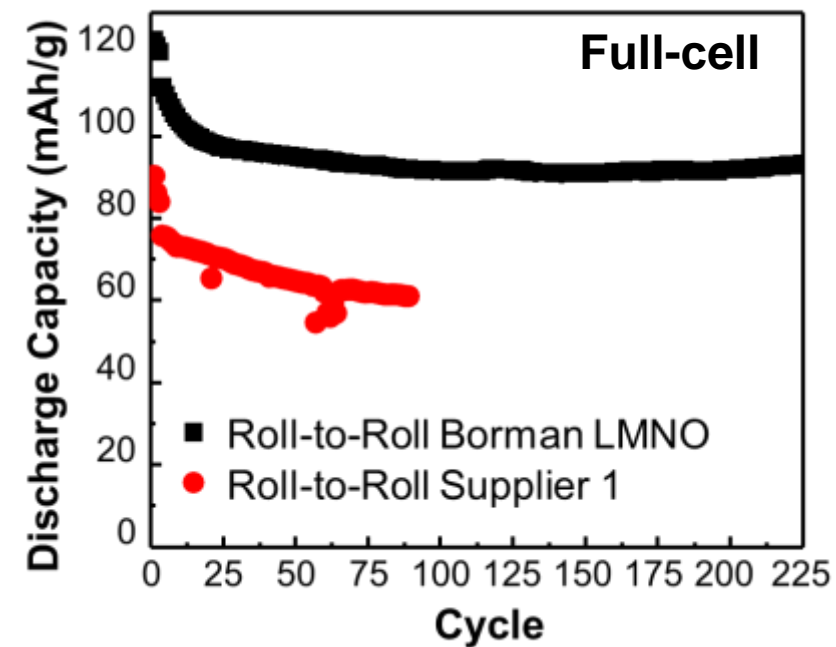
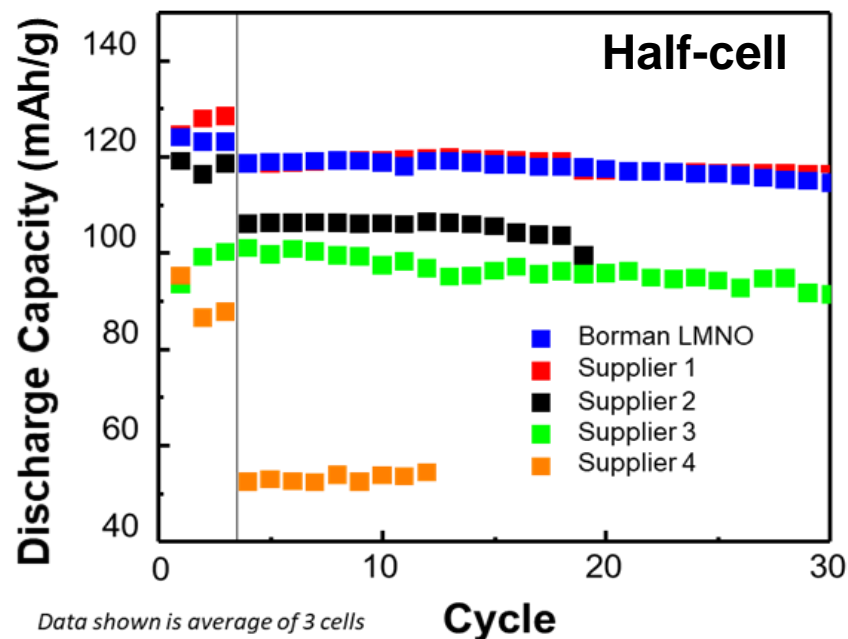


Next generation LMO - 5V $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$

Why LNMO?

- ❖ High operating voltage (4.7V), good capacity (120-140mAh/g):
higher Power and Energy density
- ❖ Eliminates costly Co from formula, more environmentally friendly
- ❖ Safety – safer than LCO and NMC, similar to LFP
High energy alternative to LFP and standard LMO
- ❖ Targeted / current applications
 - Electric and Hybrid vehicles (PHEV, Mild (48V), micro-hybrid)
 - Defense
 - communication / portable power
 - High energy applications under harsh conditions – e.g. Aircraft
 - Portable medical devices

Cell Coin Cell Cycling of Roll-to-Roll Electrodes



- Third party (Giner, Inc.) evaluation with 4 other worldwide suppliers
- Tronox LMNO (non-doped) outperforms other spinel suppliers
- Significant improvement over suppliers 2-4 (Capacity, Resistance)
- Full cell coin cells yield >200 cycles at 5-Volt
- Capacity exceeds previous top supplier by ~20 mAh/g
- Excellent cycle stability

