

Morgan Advanced Materials

NAATBatt 2019
Company Update – March 13, 2019

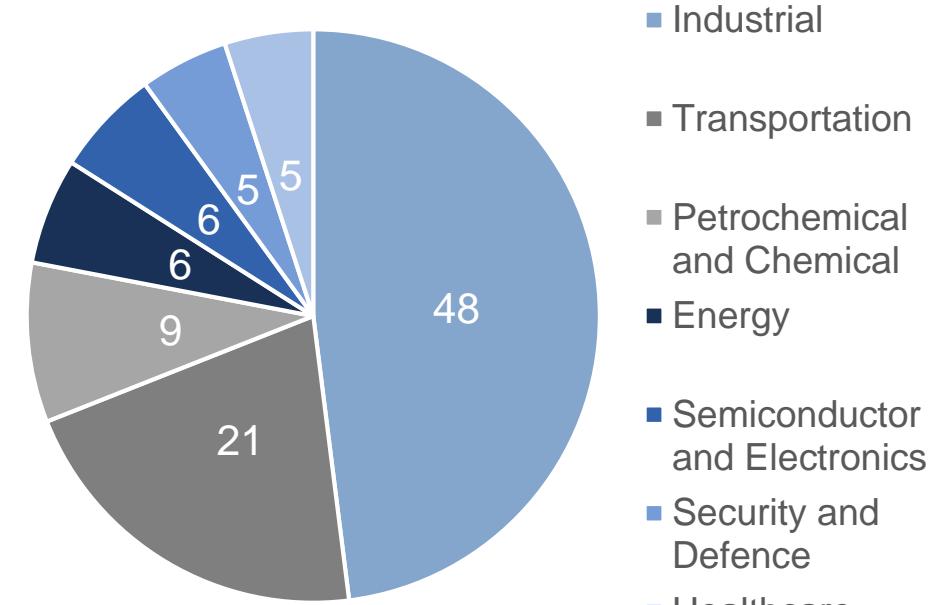
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Morgan Advanced Materials (LON: MGAM)



Global Business Units
Thermal Ceramics
Molten Metal Systems
Electrical Carbon
Seals and Bearings
Technical Ceramics

Approximately 8,800 employees
Manufacturing in over 30 countries
Selling into more than 100 countries
2018 revenue GBP1.03 billion

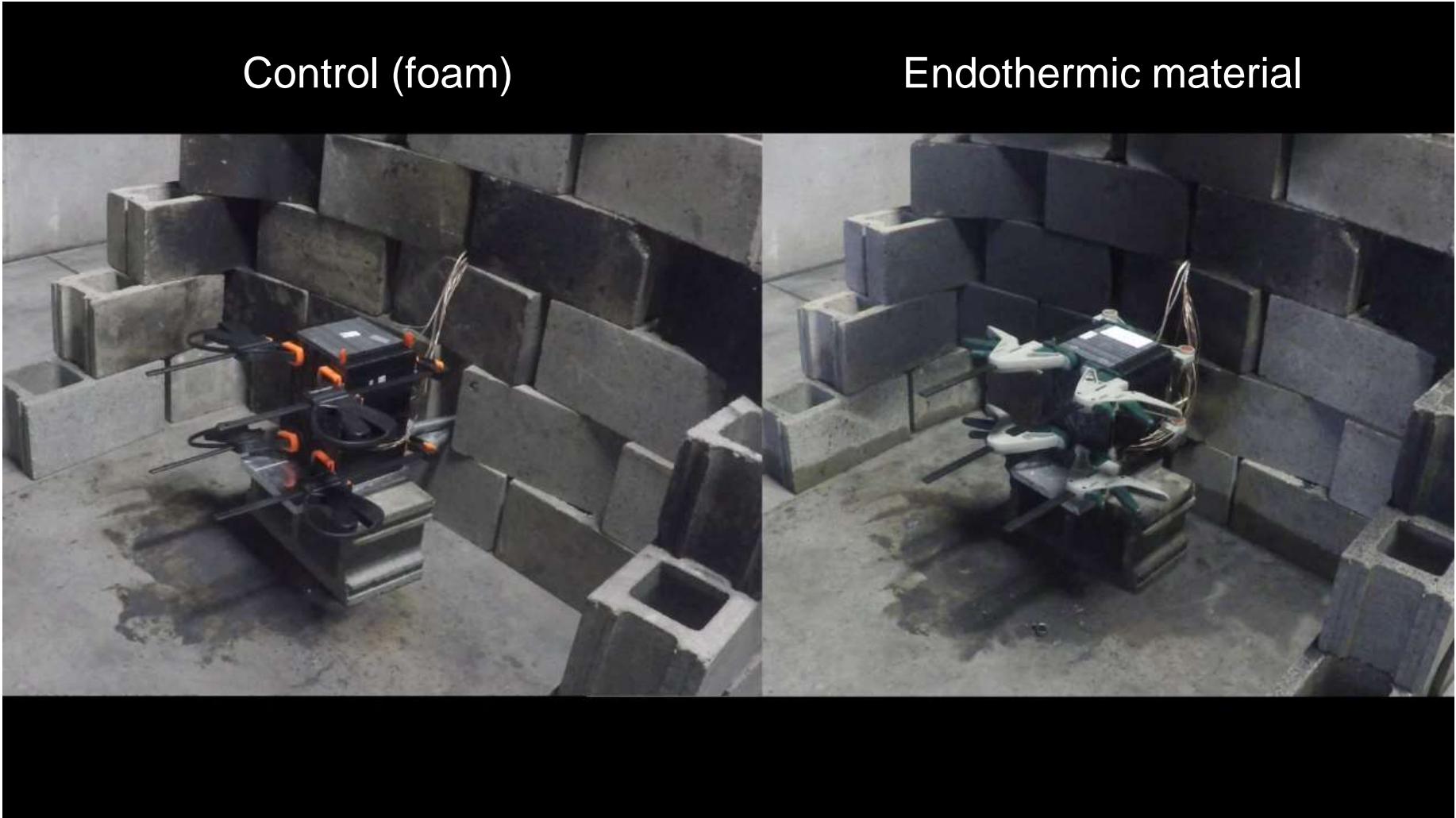


Primary markets addressed
(% by 2018 revenue)

What's the deal with thermal runaway....

Parameters for tests:

- Module with 24 prismatic NMC cells
- Two cells are grouped together to form an element
- Each element separated by material sheets
- One element within the module was overcharged until thermal runaway occurred
- 100% SOC for all cells within module
- All inherent safety features disabled



Morgan's suite of solutions for prevention or mitigation of the effects of a thermal runaway event



Cell-cell



Module-module



Pack

Prismatic/cylindrical:

- Superwool EST Block
- Superwool EST Paper

Pouch:

- Superwool EST Compression Paper

- Superwool Papers
- Mica Laminated Superwool Plus Paper
- WDS Vacupor
- WDS Lamdaflex

- Superwool Papers
- Fiberglass Laminated Superwool Paper
- Superwool Blankets

Morgan in energy storage

Related Technologies

Thermal processing of electrode materials

EV lightweighting

EV vacuum pump components

EV water pump components

Ceramic feedthroughs

Lithium-Ion Batteries

Dealing with Thermal Runaway

Anode materials and additives

Separator materials

Recycling technology (molten metal separation)

“Beyond Lithium Ion”

Battery transportation

Alternative Technologies

Fuel Cells

Supercapacitors

Flow batteries

Sodium-sulfur

Sodium-metal halide

Thank you