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CeraBEV — Ceramic Coatings for Safer, Lighter EV Battery Systems

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ZircoFlex Heat Shield Technology
Thermal protection for high-temperature applications

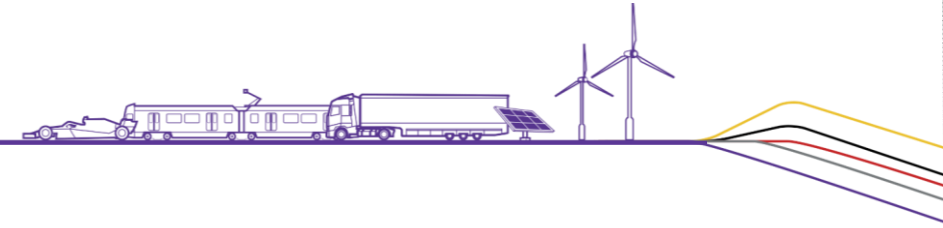
ZircoFlex FORM
Formable ceramic coating

zircotec Coatings
Advanced ceramic coatings for industrial and automotive applications

Performance 1 Coatings
High performance, high-temperature resistant coatings

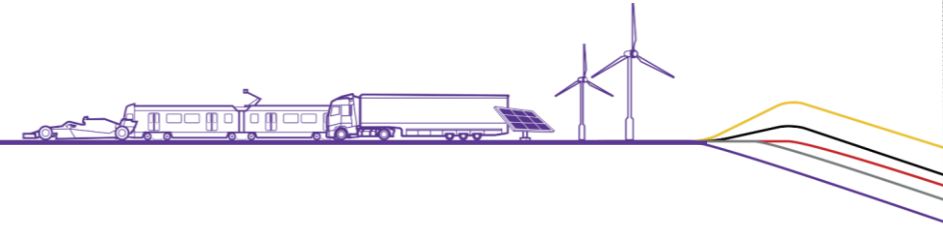
ThermoHold Coatings For Carbon Composites
Thermal protection for carbon fiber and carbon fiber reinforced plastic (CFRP)

Session: Batteries — Innovations in Design, Manufacture & Disassembly
Cenex Expo 2025



Ceramic Coatings for Safer, Lighter EV Battery Systems

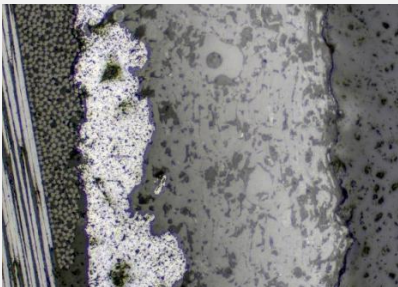
- Technology evolution
- What two challenges did we tackle with CeraBEV (Ceramics for BEVs)
- What's the current state?
- How did we develop these
- Performance validation
- Manufacturability
- Next steps



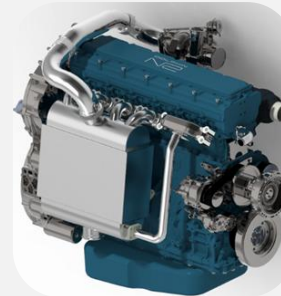
The early days...



UK Atomic
Energy
Authority

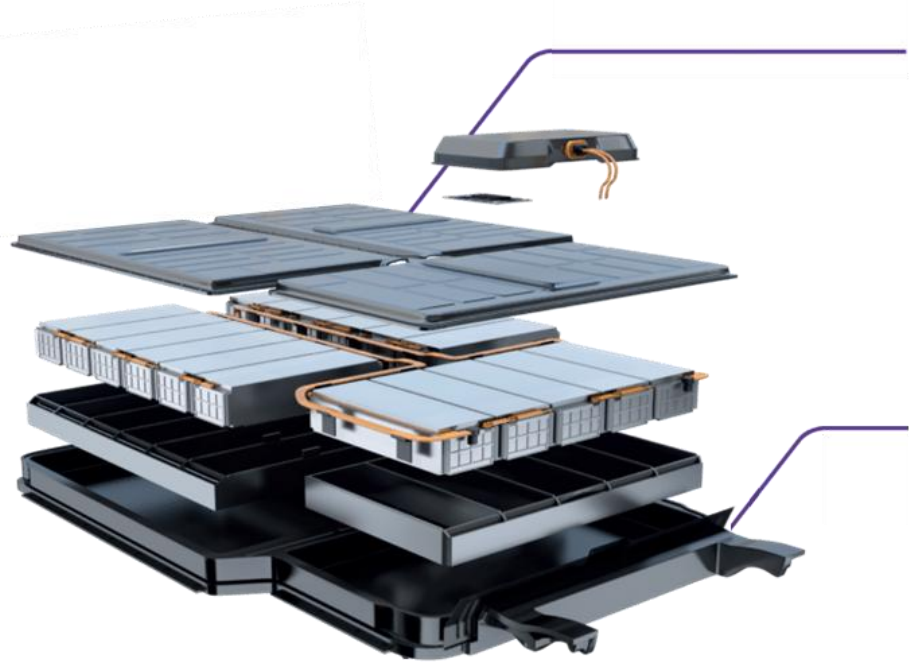
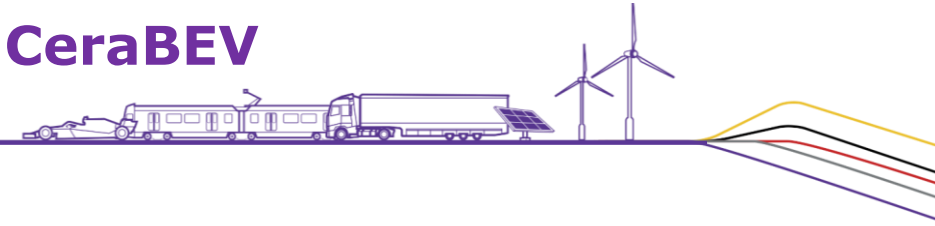


Automotive ICE



EV





ElectroHold®
DIELECTRIC

Advanced Coating Solutions for Cooling Plates

Improved dielectric properties, enabling optimised thermal management. Coatings for separators, cooling plates, castings etc.

ElectroHold®
FLAMEPROOF

Innovative Coatings for Battery Enclosures

Resistance to thermal runaway scenarios, enabling the use of lightweight materials such as Aluminium and Carbon Fibre.

Project Supported by:

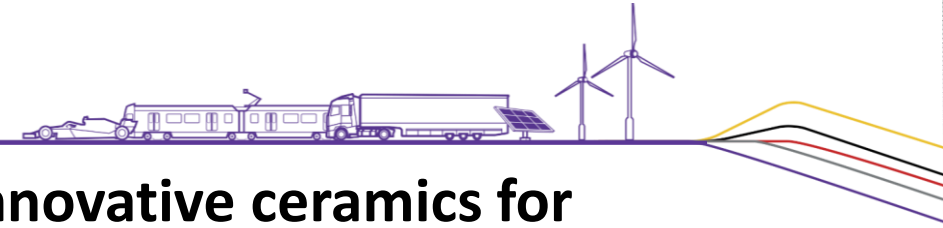


Innovate
UK

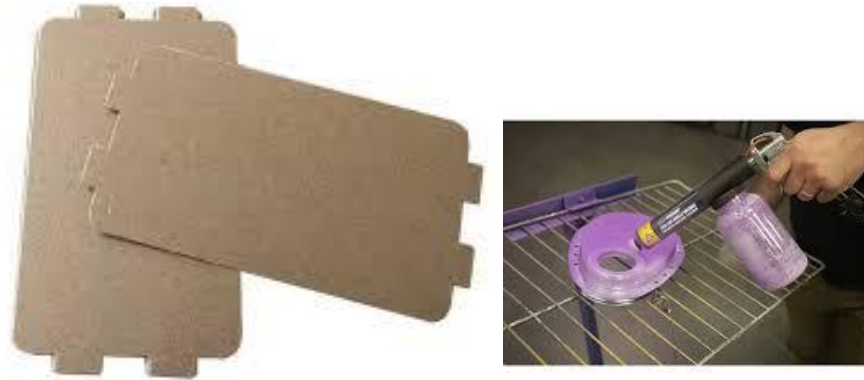


A 12month ARMD Project running
September 2024 – September 2025



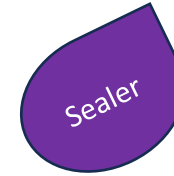


Current protection for enclosures



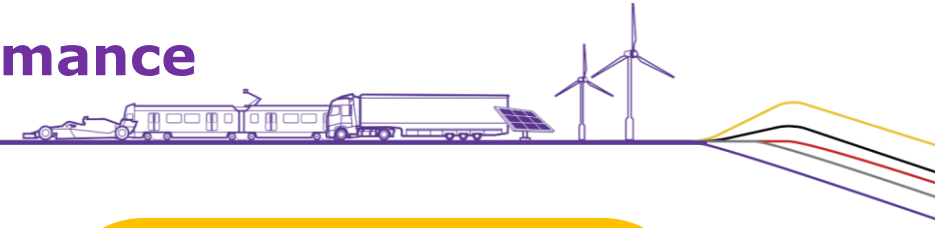
- Challenging to assemble
- Loss of dielectric at high temperature
- Multilayered thermal protection often required
- Widely available in market

Innovative ceramics for enclosure protection



Ceramic
Substrate: (Aluminium and CFRP)

- Integrated onto substrate (multi-material)
- Stable at very high temperatures
- Thin/lightweight
- Current similar coating systems had limited dielectric strength and were expensive -> back to drawing board



- Parallels between the battery enclosure/cooling plate coating sets eased development and testing
- Aligned with industry standards, but found gaps where we developed own-protocols

Thermal

(Thermal shock, runaway, simulation)



Mechanical

(Adhesion, hardness, durability)



Electrical

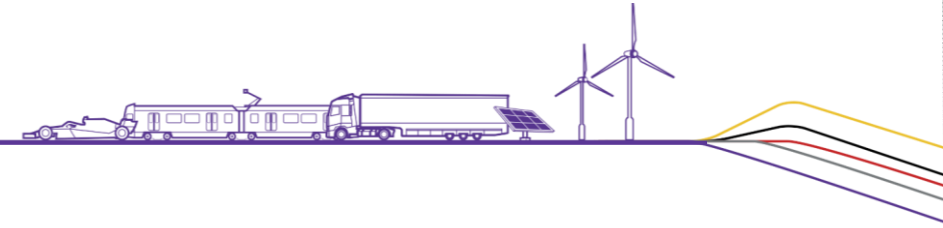
(Dielectric strength – RT & elevated, Holiday)



Environmental

(Humidity, NSS)





“Burner Rig”

20x



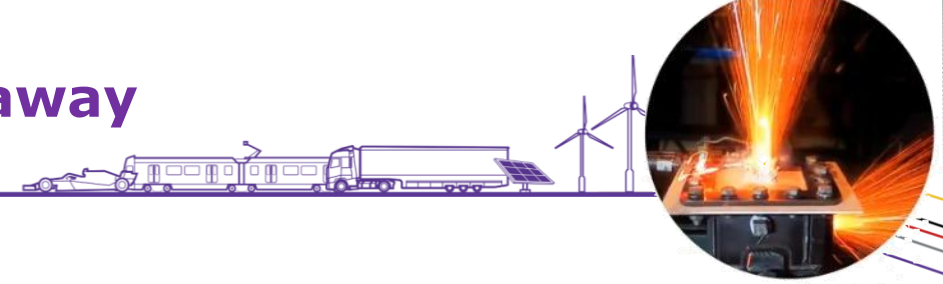
- Designed & built by Cranfield
- Simulates flame exposure
- Quick and low cost
- Repeatable
- Obtains coating-specific data

Thermal Runaway

2x



- UL2596 standard test
- Performed externally
- Real runaway event with 25 cells
- Expensive, slow & “one-shot”
- Obtains coating-substrate system data

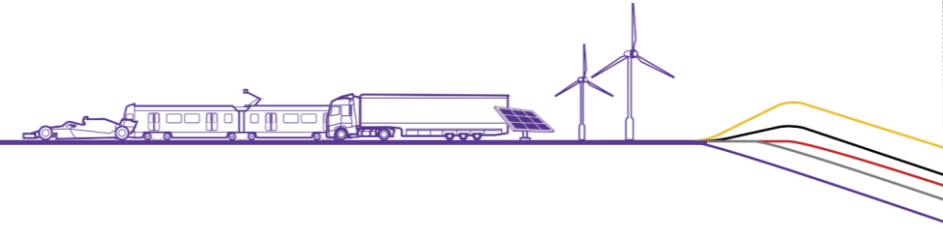


COATED PLATE

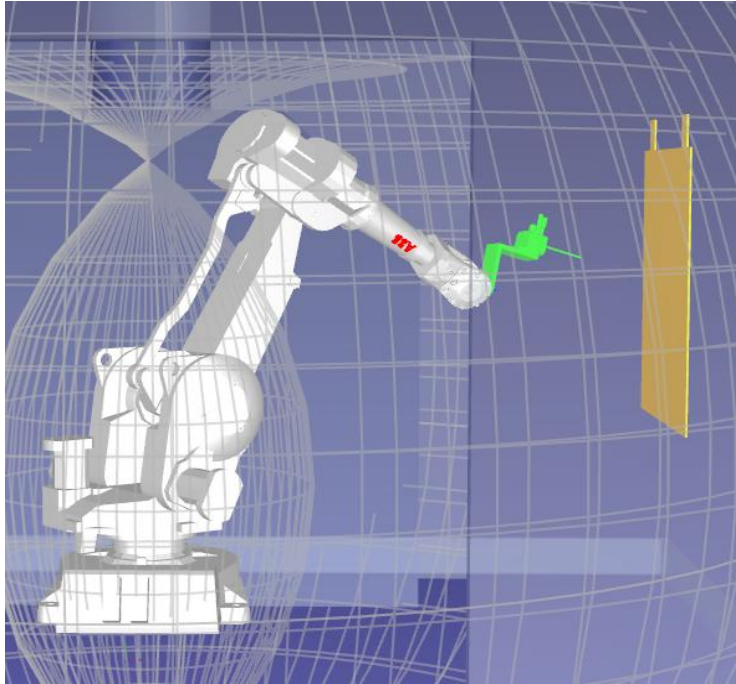


UNCOATED PLATE





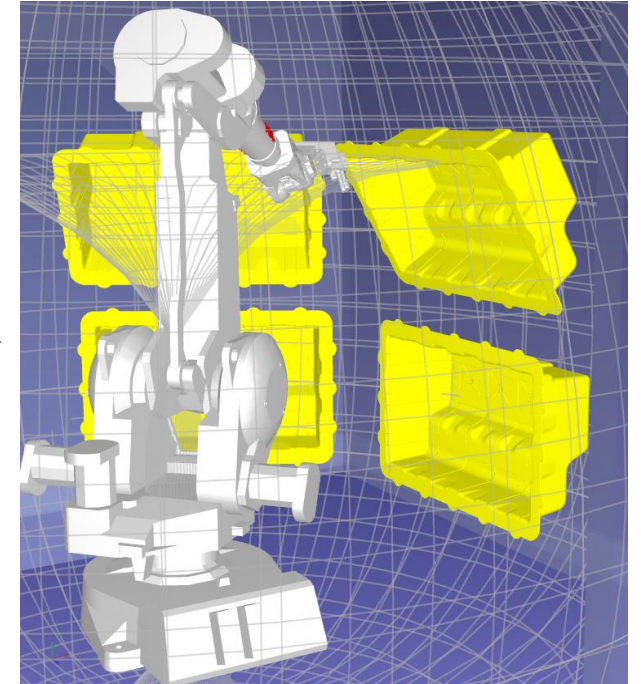
Simulate



Act



Scale-up

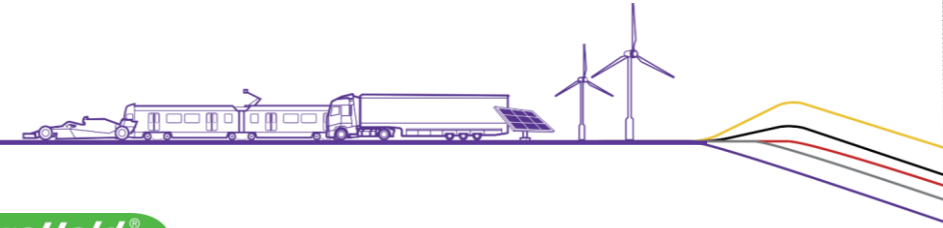


Improve

10 pcs

1000 pcs +

- Robot programming for complex geometries
- Heat management model



ElectroHold®
DIELECTRIC

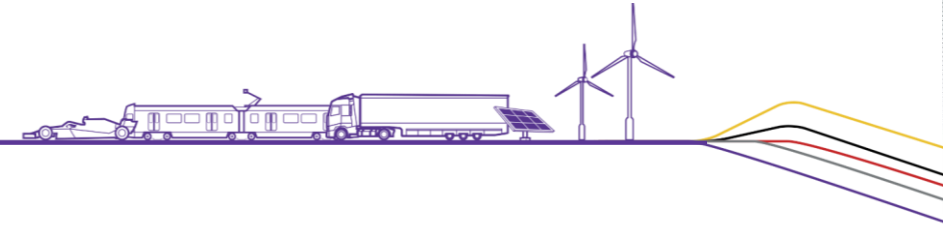
Dielectric & thermally
conductive for cooling plates



ElectroHold®
FLAMEPROOF

Thermal runaway protection coating
for lightweight enclosures





We've now released our ElectroHold® Coatings – TDS Available

Looking for partners

Access to test data, simulations and demonstrators

We'll support engineering qualification and production

Need something else – a range of other coatings in the pipeline

Visit Stand C3-223 (and APC stand)

Thanks for your time.

A stylized line art illustration in dark blue. On the left, four curved lines (yellow, black, red, and grey) lead to a set of industrial buildings and three cooling towers. To the right, a winding path features several vehicles: a car on a slope, a semi-truck, a Formula 1 car, a high-speed train, and a tractor in a lower section.

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