



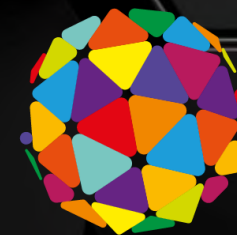
**UNIVERSAL
MATTER**

ADVANCED MATERIALS

Exploring graphene and related nanomaterials to significantly enhance coatings

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June 2024



SURFEX
Surface, Paint & Coatings Technology

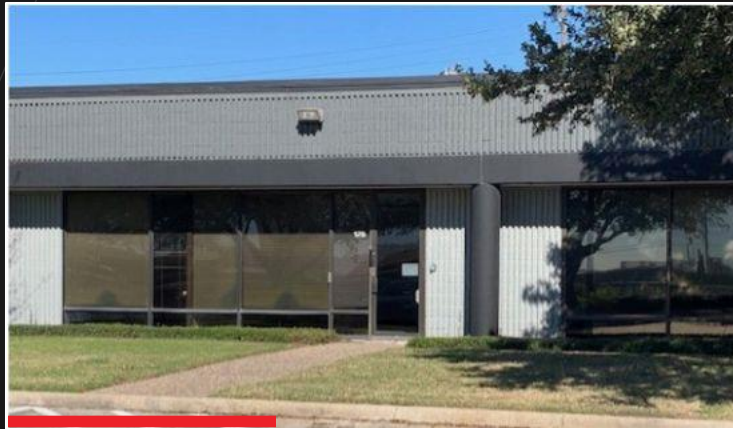
Universal Matter – International Presence

Universal Matter facilities in Canada, United States and United Kingdom



Corporate HQ : UMI Burlington, ON, Canada

- New application development lab
- Polyhedral Graphitized Carbon and dispersion production facility
- Operational by Q2 2024
- 20 staff



USA Subsidiary : UML Houston, TX

- USA Subsidiary: UML Houston, TX
- Process, product & application development lab
- Pilot production
- 9 staff



UK Subsidiary: UMUK, Redcar, England

- Formerly Applied Graphene Materials UK Ltd
- Process, product & application development lab
- Graphene production plant
- Dispersion Plant for liquid graphene additive production
- 20 staff

Universal Matter – Our **Vision**

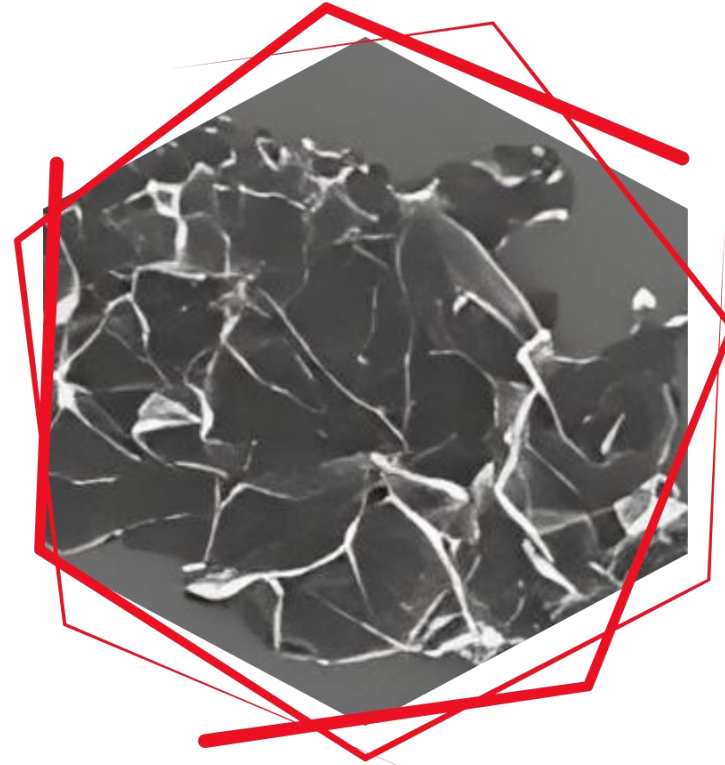
Produce high quality and economical graphene and related advanced materials from simple carbon feedstocks that significantly enhance performance and dramatically reduce our carbon footprint

“Using carbon to decarbonize”

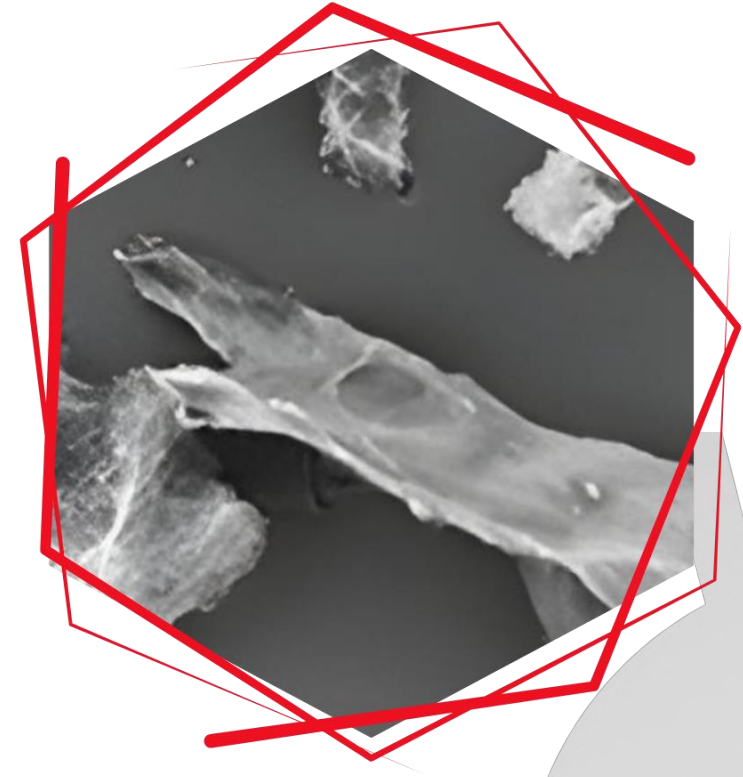


Our Graphene Nanoplatelets

A-GNP 35



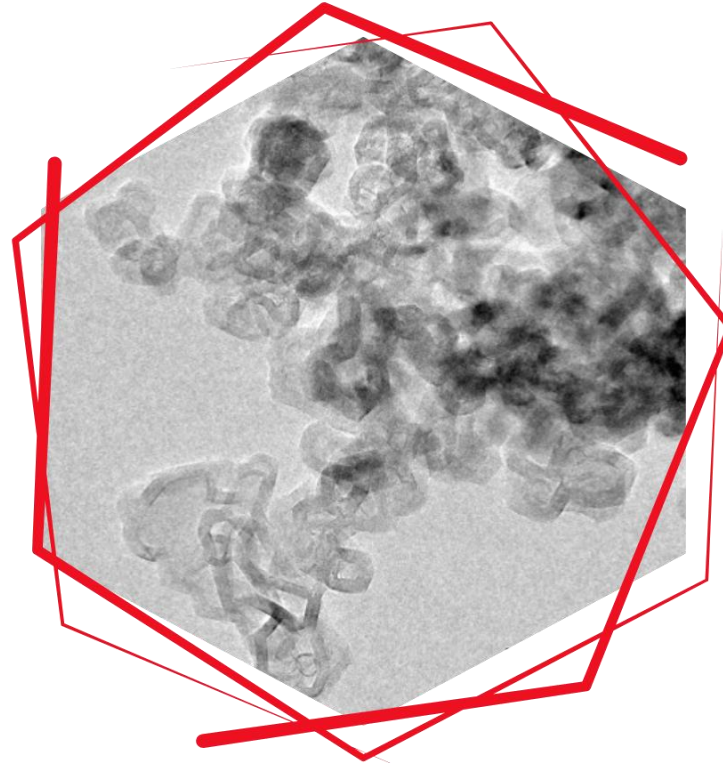
- GNP with very thin, crumpled sheets of 5-10 atomic layers



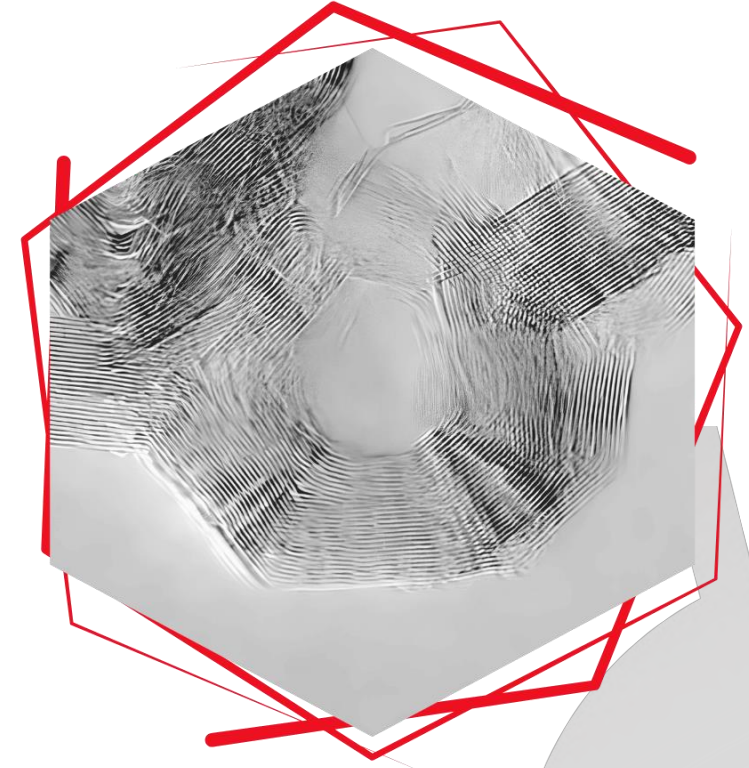
- Very low density and high surface area, enabling enhanced corrosion prevention

Introduction to Polyhedral Graphitised Carbon

PGC-18



- PGC-18 has the small primary particle size but a large structure

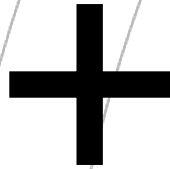


- Forms distinct graphene layers in a “onion” type structure

The Solution: **Universal Matter** Processes



HIGH QUALITY: Few layer, defect free graphene



NEW MORPHOLOGIES: Unique range of graphene structure; GNP, Turbostratic flake & Polyhedral



MORE ECONOMICAL: High-volume, efficient production process



HIGHLY SUSTAINABLE: Energy efficient process, using waste, upcycled and recycled carbon as raw materials

Leaders in Graphene **Dispersion Technology**



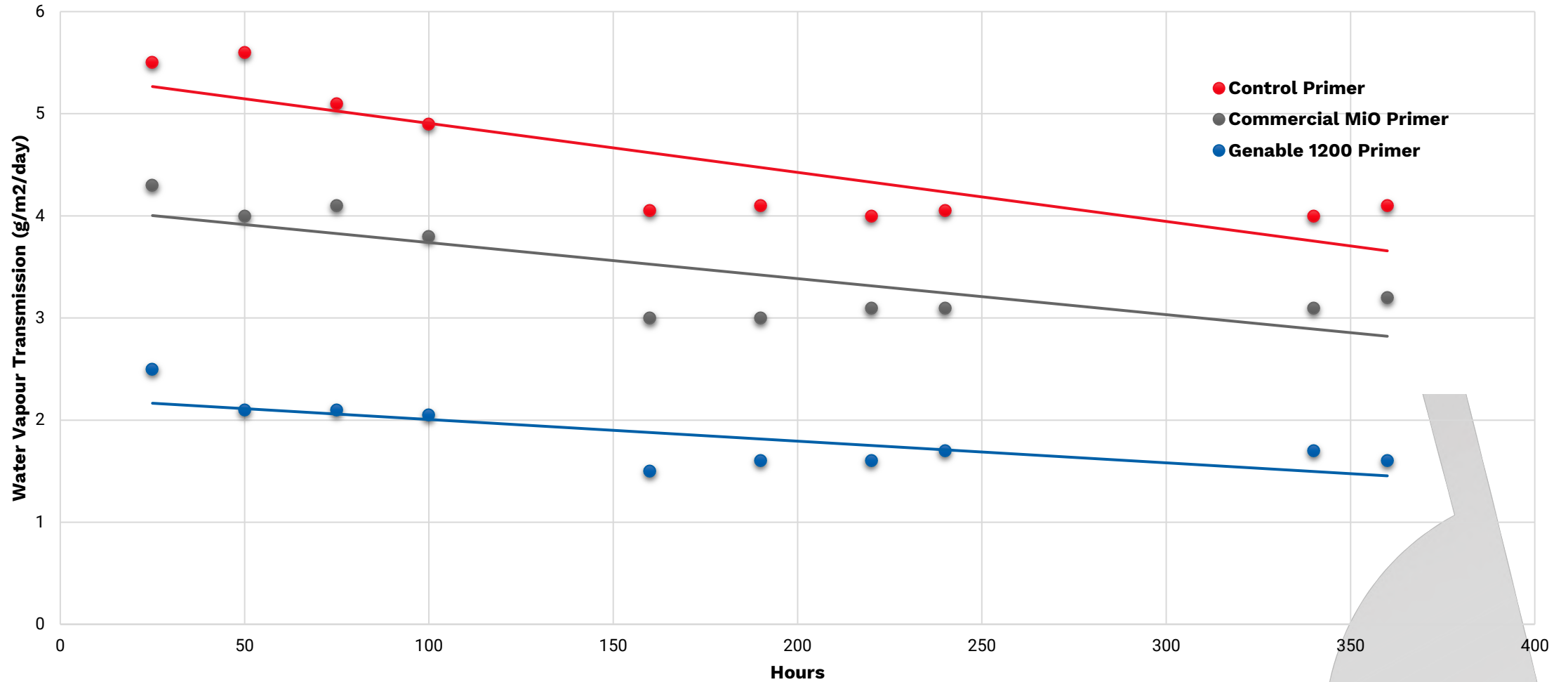
✓ **Easy to handle** and **incorporate** into new and existing industrial products

✓ **Industry leading** dispersion **in-can stability** and **outstanding compatibility** with all existing liquid chemistries

✓ **Optimised dispersion** properties, designed for maximum performance in the final application system

✓ Helping **you** to benefit from the potential of graphene in a **simple**, **safe** and **easy** to formulate way

Outstanding Barrier Enhancement



Outstanding **Barrier Enhancement**

C4 type anti-corrosion 2k epoxy primer

720 Hours Neutral Salt Spray

Zinc Phosphate Primer



Genable 1200 Primer



1440 Hours Neutral Salt Spray

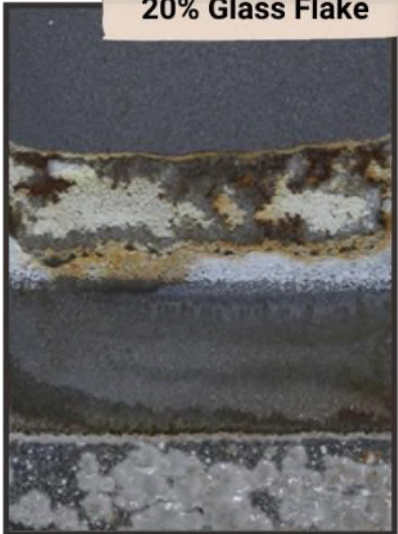


Outstanding **Barrier Enhancement**

2k epoxy primer chemical resistance – 28 days waterline immersion

Lactic Acid Submersion

20% Glass Flake



5% Genable 1200



10% Genable 1200



Sodium Hypochlorite Submersion

20% Glass Flake



5% Genable 1200



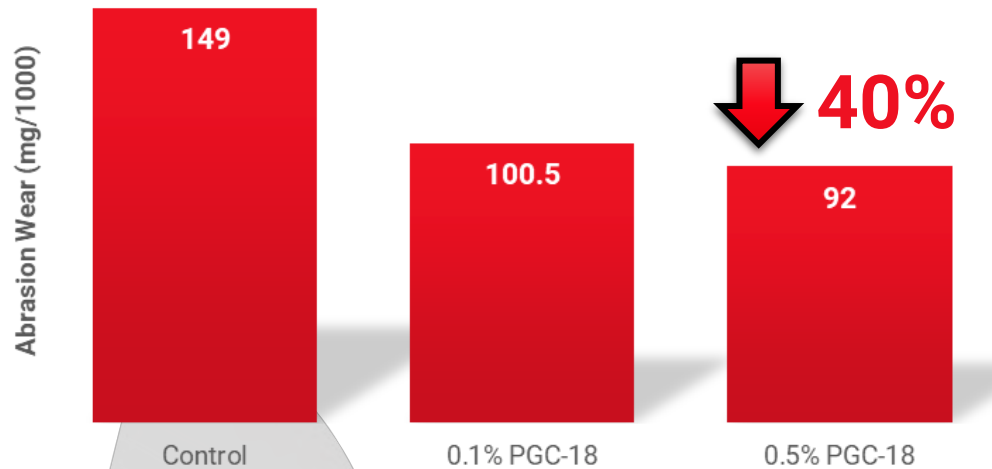
10% Genable 1200



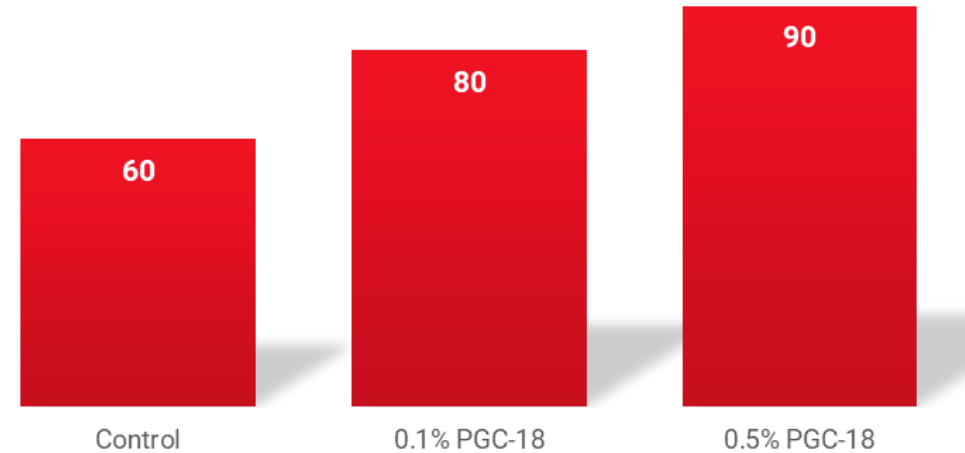
Exciting Mechanical Property – Polyurethane System

- **Abrasion** - Tested to ASTM D4060 - 100 cycles, 1Kg load and a 60 RPM speed, extrapolated to 1000 cycles
- **Impact** - Tested using an Elcometer 1615 Variable Impact Tester, 1kg weight dropped to direct impact.

Abrasion Resistance

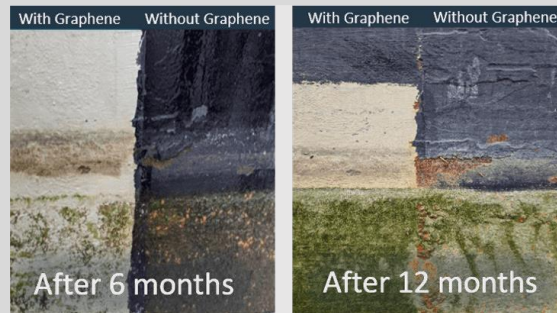
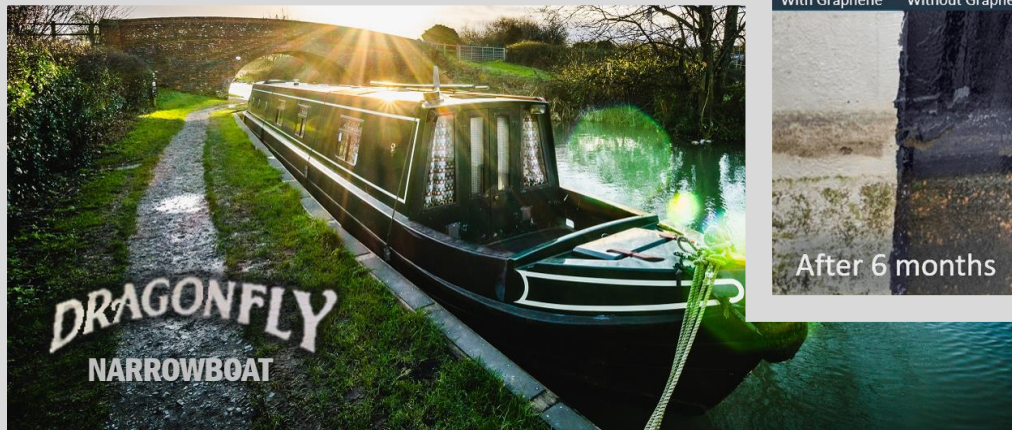


Impact Resistance (distance/cm)



Case Studies

Graphene provides effective, easy, safe protective anti-corrosion paints



Commercial Primer



Genable HC Primer



Environment Agency

Summary

- Universal Matter have demonstrated significant improvements in:
 - ✓ Water barrier protection
 - ✓ Anticorrosion performance
 - ✓ Chemical resistance
 - ✓ Abrasion resistance
 - ✓ Impact resistance
- Proven commercial traction with industry leading dispersion technology - **helping you benefit from the potential of Graphene**
- Ultimately leading to coatings and infrastructure with an improved performance and sustainability profile.



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MATTER**

ADVANCED MATERIALS

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