ASX ANNOUNCEMENT

2 December 2024

Significant Performance Improvements Achieved in Graphene Enhanced Water-Based Coatings

HIGHLIGHTS

- **Initial test work has demonstrated significant corrosion improvement in graphene enhanced water-based acrylic epoxy coatings**
- **Water-based coatings are experiencing strong market growth as environmentally friendly alternatives to solvent-based coatings which contain fossil fuel derived organic solvents**
- **Aligns with Sparc's strategy to expand its graphene based additive portfolio into complimentary product areas and markets**
- **Results will support broader customer engagement in addition to current testing and trials of ecosparc®, Sparc's flagship graphene based additive product**

Sparc Technologies Limited (**ASX: SPN**) (**Sparc, Sparc Technologies** or the **Company**) is pleased to announce the results of initial test work in water-based acrylic epoxy coatings. The testing has demonstrated significant corrosion performance improvements through the incorporation of low dosages of carefully selected grades of graphene compared to an unmodified control. Testing has been performed using two industry-recognised electrochemical measurement techniques.

Water-based coatings are gaining prominence due to better environmental credentials compared to more widely used solvent-based coatings which contain fossil fuel derived organic solvents. These results are the first evidence that Sparc has seen whereby graphene significantly improves the corrosion performance of water-based coatings. This extends Sparc's reach into a new and rapidly growing area of the coatings market where there are clear performance challenges to address. It also complements Sparc's flagship **ecosparc®** product range.

Sparc Managing Director, Mr. Nick O'Loughlin commented:

> *"There is an increasing push from the coatings industry towards more environmentally friendly water-based products, however their performance has not been adequate for wide scale industry adoption in corrosive applications. Our results clearly demonstrate a significant performance improvement with graphene which has the potential to unlock significant growth in this developing area of the coatings market. Pleasingly, these results have been achieved by leveraging Sparc's proprietary knowledge and expertise working with graphene-based additives in the significantly larger solvent-based anticorrosion market and allows us to broaden our customer engagement."*

Initial testing was conducted with internally formulated water-based 2-pack acrylic epoxies with dry film thicknesses of approximately 75 microns applied to garnet blasted cold rolled steel. Formulations incorporating several grades of graphene at low dosage rates and an unmodified control without graphene were produced for the testing. Coated panels were tested via two electrochemical impedance spectroscopy (**EIS**) techniques within Sparc's laboratory:

- Rapid Electrochemical Assessment of Paint (**REAP**): Short term electrochemical testing to estimate the long-term corrosion resistance of coated metals. The testing measures a water uptake value and disbondment rate to determine a time to failure (**TTF**) in number of hours. The method was developed by and all calculation factors are based on the experiment results of Kendig, 1996[1].
- Accelerated Cyclic Electrochemical Technique (**ACET**): Application of cycles of EIS measurements, cathodic polarizations and potential relaxation. Degradation of the coating system is accelerated by cathodic polarization; EIS and potential relaxation monitor changes in the coating system. Testing was conducted according to the ISO 17463 (2022) standard.

The graphene enhanced coatings demonstrated a significant improvement in corrosion protection across both testing methods:

- REAP: Graphene enhanced coatings showed slower ingress of water through the paint film to the steel substrate significantly reducing the disbondment rate and improving the TTF of the coatings by 5.5x to 11.6x (Figure 1) compared to the unmodified coating.
- ACET: Graphene enhanced coatings showed improved coating resilience with significantly less blistering and no corrosion after six cycles of cathodic polarization (AC/DC/AC) as evidenced by visual inspection.

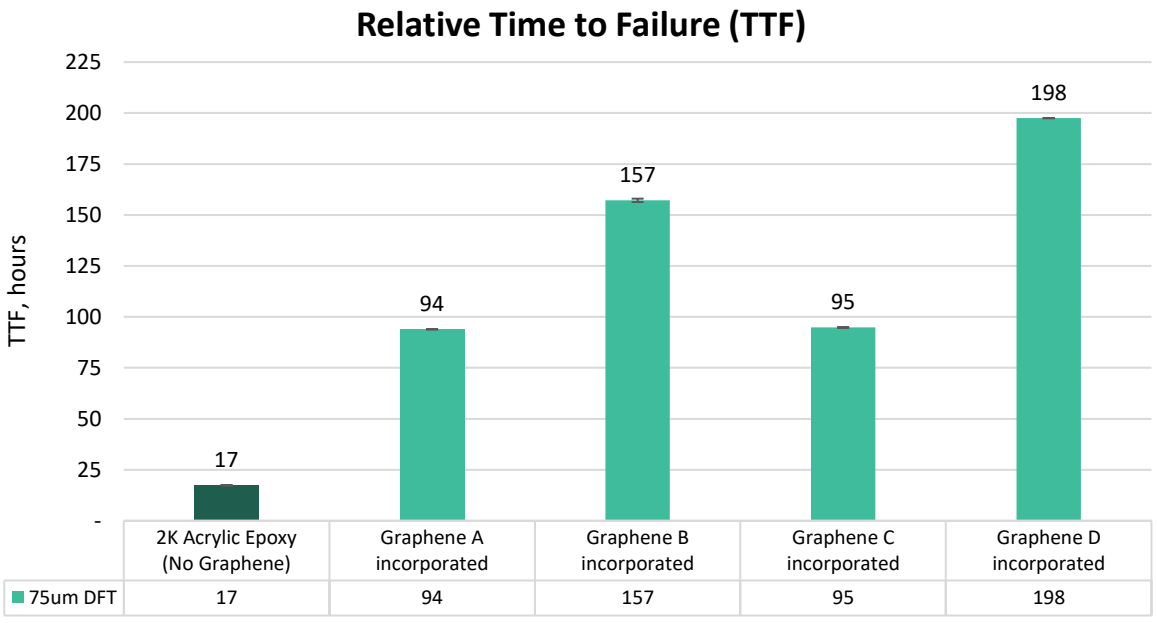

Figure 1: Relative time to failure of unmodified and graphene enhanced water-based coatings using Rapid Electrochemical Assessment of Paint (REAP) test method

Results with internally formulated coatings were subsequently validated by the testing of a commercially available water-based coating which showed similar levels of performance improvement through the incorporation of graphene. In addition to electrochemical testing Sparc has successfully incorporated relevant graphene grades into additives suitable for use in water-based epoxy coatings which have shown good initial stabilities. This demonstrates the potential for Sparc to develop an additive product for this area of the coatings market.

[1] Kendig, M., Jeanjaquet, S., Brown, R., Thomas, F., J. Coatings Tech., 1996, 68, 39-47.

Water-based epoxy coatings use water as a carrier instead of fossil fuel derived organic solvents. The key benefits of water-based epoxy coatings include non-toxicity, low odour and low VOCs (volatile organic compounds) and ease of application and clean up. Despite these advantages, the durability, performance and cost of water-based epoxy coatings is generally worse than equivalent solvent-based products which has limited market adoption.

With tightening regulations on VOC content and both industry and individual consumers seeking more environmentally friendly alternatives, there is an increasing push to develop higher performing water-based products. The global water-based epoxy market was valued at US$1.6 billion in 2022 and is projected to reach US$2.9 billion by 2029, at a CAGR of 8.9% during the forecast period[2]. In comparison, the global market for anticorrosion coatings is estimated at US$43 billion by 2029[3].

-ENDS-

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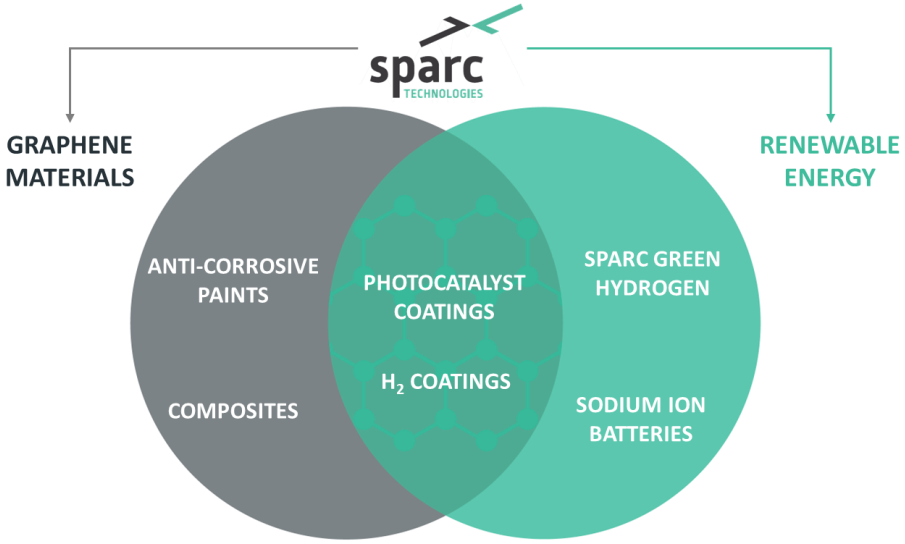
[2] Sourced from 24ChemicalResearch, https://www.24chemicalresearch.com/reports/202538/global-waterborne-epoxy-coating-market-2023-2029-411
[3] Sourced from Exactitude Consultancy https://exactitudeconsultancy.com/reports/3960/anti-corrosion-coatings-market/

About Sparc Technologies



Sparc Technologies Limited ('Sparc', ASX: SPN) is an Australian company pioneering new technologies to disrupt and transform industry while seeking to deliver a more sustainable world. Sparc has established offices in Australia, Europe and North America and is focused on three core areas of technology development.

1. Sparc is the majority shareholder of **Sparc Hydrogen** which is a company pioneering the development of a **photocatalytic water splitting** (PWS) green hydrogen production technology. PWS is an alternative to producing green hydrogen via electrolysis, using only sunlight, water and a photocatalyst. Given lower infrastructure requirements and energy use, the process has the potential to deliver a cost and flexibility advantage over electrolysis.

2. Sparc has spent over 5 years developing a **graphene based additive** product, **ecosparc®**, which has demonstrated >40% anti-corrosion improvement in commercially available epoxy-based coatings. Sparc recently commissioned a manufacturing facility to produce **ecosparc®** and is engaging with global coatings companies and asset owners to conduct field trials.

3. Sparc is also developing sustainable **sodium ion battery anode technology** utilising agricultural bio-waste materials.

For more information please visit: sparctechnologies.com.au

For more information about **ecosparc®** please visit: ecosparc.com.au

For more information about Sparc Hydrogen please visit: sparchydrogen.com