



# December Quarterly Activities Review

## Graphene Initiatives Make Substantial Progress

### HIGHLIGHTS

- Receipt of commercial scale order for PureGRAPH™ products
- The University of Manchester appointed FGR to supply graphene products to GEIC
- Marketing Manager appointed to accelerate UK sales push
- Graphene Engineering Innovation Centre officially opened
- Placement for \$1.45m completed in December 2018

### Overview

During the September Quarter, the First Graphene continued to make substantial progress with the objective of commercialising its PureGRAPH™ range of graphene products. The immediate focus is on the deployment of the graphene into a number of products which can be significantly enhanced with its inclusion.

### Commercial Development

In November 2018 FGR was able to announce it had received an order from newGEN Group for 2,000 kg of PureGRAPH™ range products to be delivered during 2019, for use in newGen's Armour-GRAPH™ product range.

This order confirmed First Graphene's status as the world's leading graphene company, and there are expectations for an expanding sales book in 2019, from both newGen and other customers and product verticals.

The purchase order for 2,000kg of PureGRAPH™ range products represented a significant development not only for FGR but also for the broader graphene market. It demonstrated the initial market appetite for high-quality bulk graphene products of the type in which FGR specialises. Up until now, the graphene sector has been supplying mostly samples for evaluation. This order represents a step change in the business as it starts to scale up for larger size orders.

### *First Graphene Limited*

ACN 007 870 760

ABN 50 007 870 760

### *Registered Office*

Suite 3

9 Hampden Road

Nedlands WA 6009

Tel: +61 1300 660 448

Fax: +61 1300 855 044

### *Directors*

Warwick Grigor

Craig McGuckin

Peter R Youd

Clive Carver

### *Joint Company Secretaries*

Peter R Youd

Nerida Schmidt

E: [info@firstgraphite.com.au](mailto:info@firstgraphite.com.au)

W: [firstgraphite.com.au](http://firstgraphite.com.au)

### *ASX Symbol*

FGR

FGROC

FGR has been working closely with newGen Group to provide performance enhancement to their existing products with the addition of PureGRAPH™ graphene products. newGen Group has introduced a branded Amour-GRAPH™ product range of wear liners for bucket wheel, pipe spools and conveyor applications.

newGen has supplied a wear lining system for dryer chute applications to a large Australian cement producer in their Perth facility. It is a leading supplier of cement and lime to Western Australia's mining, agriculture and construction industries.

Each 50m<sup>2</sup> liner will contain 10 to 12kg of PureGRAPH™ and is a further significant step in the adoption of First Graphene products into large industrial applications. PureGRAPH™ has been demonstrated to provide up to 37% improved tensile strength and improve abrasion resistance by 100% to 500% in high-performance polyurethanes.

Orders for several kilogram development quantities continued to be sold to overseas customers during the quarter.

### **University of Manchester and GEIC**

In October 2018 a Memorandum of Understanding was executed with The University of Manchester under which FGR will provide graphene products for research to be undertaken by researchers at the GEIC (Graphene Engineering Innovation Centre). The MoU will be in effect for three years. FGR will be providing its PureGRAPH™5, 10 and 20 products initially and will make other 2D materials available as they are developed.

The collaboration will explore opportunities in the area of development and commercialisation of 2D materials, accelerate the adoption of these materials into commercially viable markets. It is agreed that a strongly focused end-user perspective is required. The parties will look to consistently communicate, co-operate and where available direct their resources with the intent of promoting the growth of the overall graphene and 2D materials market.

The GEIC was officially opened on Monday 10 December 2018 by His Royal Highness The Prince Andrew, Duke of York. The official opening was attended by VIP invitees from the political and business communities, including FGR Chairman, Warwick Grigor.

The official opening was followed on Tuesday by an Industry Showcase, attended by some 250 industrial attendees. This provided an opportunity for FGR's UK based staff to meet downstream partners. There has been considerable excitement around the development of new projects and collaborations and positive discussions are already progressing on composites, electrochemical manufacturing of GO, concrete and energy storage materials.

As a Tier 1 participant and provider of graphene materials to GEIC FGR is anticipating an increase in collaboration and sales during calendar 2019.



HRH, the Duke of York and Professor Dame Nancy Rothwell Opening the GEIC



FGR Chairman, Warwick Grigor and Marketing Manager, Chris McMahon at the GEIC Opening

## **Concrete Additives**

First Graphene (FGR) continued to make excellent progress in developing PureGRAPH™ graphene additives for concrete products. Significant improvements in the strength of concrete products have been demonstrated. In a systematic study, it was confirmed that addition levels of 0.02% w/w of PureGRAPH™ additive, produced increases in compressive strength of 34% and increases in tensile strength of 27% in concrete mortars.

The PureGRAPH™ concrete additive was introduced as a concrete admixture directly in the water used for preparing the concrete mortar. No additional mixing equipment or processing steps were required. As with other composite developments at FGR, strengthening was dependent upon the type of graphene additive used, with higher aspect ratio graphenes providing the best improvement.

Increased strength opens up the possibility of stronger or lighter concrete structures with an associated reduction in carbon footprint for major infrastructure projects. These results are currently being reviewed with cement manufacturers and consultants in the construction sector to initiate industry evaluation in 2019. In a further development, the programme is being extended to evaluate the reduction in water permeability and ion transport which would reduce issues with concrete corrosion around reinforcement bars (re-bars). During 2019 FGR will be supporting a UK government funded proposal with the School of Mechanical, Aerospace and Civil Engineering at the University of Manchester to develop graphene additives for reduced water permeability.

## **Regulatory Submissions**

Within the European Union Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) registration is required if an organisation plans to sell greater than one tonne of a chemical within the EU or United Kingdom. First Graphene Ltd joined the consortium which is registering graphene as a new chemical. The consortium consists of three graphene organisations, one from China, one from Canada and one European producer. The application has been lodged and approval is anticipated in mid-February 2019

Similarly, in Australia the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) in Australia needs to be finalised. The (NICNAS) registration process is required for all chemicals used by industry in Australia.

## **Admission to AIM**

During the quarter the Company undertook the initial work required for an admission to AIM. However, with the turmoil in global markets in October and November, which saw the Dow Jones Index lose approximately 10%, and the continuing uncertainty surrounding the UK's Brexit position the Directors resolved to withhold going forward.

The matter will be reviewed later in calendar 2019.

## **Corporate**

A placement of 9.67 million fully paid ordinary shares at a price of 15¢ to raise \$1.45m was made in December 2018. The issue was within the Company's capacity under Listing Rule 7.1 and did not require shareholder approval. The placement was predominantly to existing institutional and family office shareholders. The funds will be used to support the commissioning of the facilities at GEIC and the recruitment of additional sales and technical staff.

Managing Director, Craig McGuckin, stated: *“With the opening of GEIC in December and the receipt of the newGen purchase order the Company is looking forward to an exciting 2019. Continued sales orders are expected as the marketing initiatives are developed.”*

<b><u>Significant September Quarter Announcements</u></b>	
<b>Date</b>	<b>Subject Matter</b>
15 October 2018	FGR to Supply Graphene to the University of Manchester
16 October 2018	Marketing Manager to Accelerate UK PureGRAPH™ Sales
25 October 2018	PureGRAPH™ Graphene Demonstrated in Real-World Application
26 October 2018	Agreement Signed with Chemiplas to Test PureGRAPH™ Graphene
29 October 2018	Effectiveness of PureGRAPH™ in Coolants Confirmed in Trials
14 November 2018	PureGRAPH Products in Mining Equipment – Impressive Results
19 November 2018	Important Milestones in the Manufacture of Graphene Oxide
20 November 2018	newGen Contract Introduces PureGRAPH™ into Cement Industry
21 November 2018	FGR Making Progress Towards PureGRAPH™ in Concrete Additives
28 November 2018	First Graphene Receives Commercial Scale Order for PureGRAPH™
11 December 2018	Placement Completed and GEIC Officially Opened

The above announcements can be viewed in full by accessing the company's website.

### **About First Graphene Ltd (ASX: FGR)**

First Graphene has established a commercial graphene production facility for the bulk scale manufacture of graphene at competitive prices. The Company continues to develop graphene related intellectual property from which it intends to generate licence and royalty payments.

The Company has collaboration arrangements with three universities and is at the cutting edge of graphene and 2D related material developments. First Graphene is a Tier 1 participant in the Graphene Engineering and Innovation Centre (GEIC) of the University of Manchester. First Graphene is working with numerous industry partners for the commercialisation of graphene and is building a sales book with these industry partners.

### **PureGRAPH™ Range of Products**

The PureGRAPH™ range of products were released by FGR in September 2018, in conjunction with a detailed Product Information Sheet.

PureGRAPH™ graphene powders are available with lateral platelet sizes of 20µm, 10µm and 5µm. The products are characterised by their low defect level and high aspect ratio.

### **About Graphene**

Graphene, the well-publicised and now famous two-dimensional carbon allotrope, is as versatile a material as any discovered on Earth. Its amazing properties as the lightest and strongest material, compared with its ability to conduct heat and electricity better than anything else, means it can be integrated into a huge number of applications. Initially this will mean graphene is used to help improve the performance and efficiency of current materials and substances, but in the future, it will also be developed in conjunction with other two-dimensional (2D) crystals to create some even more amazing compounds to suit an even wider range of applications.

One area of research which is being very highly studied is energy storage. Currently, scientists are working on enhancing the capabilities of lithium ion batteries (by incorporating graphene as an anode) to offer much higher storage capacities with much better longevity and charge rate. Also, graphene is being studied and developed to be used in the manufacture of supercapacitors which can be charged very quickly, yet also be able to store a large amount of electricity.

For further information, please contact

Craig McGuckin  
Managing Director  
First Graphene Limited  
+ 61 1300 660 448

Warwick Grigor  
Non-Executive Chairman  
First Graphene Limited  
+61 417 863187