ASX Announcement

31 October 2019

September Quarterly Activities Review

Progress Continues

HIGHLIGHTS

- Early exercise of options raises $5.6m.
- newGen executes 3,000kg Supply Agreement.
- Steel Blue has made prototype safety boots incorporating PureGRAPH®10 into the sole and polyurethane foam innersole.
- Exclusive licence signed with The University of Manchester for new graphene-hybrid materials, which will be of use in supercapacitors.
- Multiple new customer collaborations driven by website re-launch and exhibition presence.

Overview

First Graphene continued to make substantial progress in its objective of commercialising the PureGRAPH® range of graphene products during the September quarter. PureGRAPH® has been proven to provide a range of improved performance characteristics in a number of products to which it is added.

From early April 2019 until the date of exercise price change on 8 August 2019, the early exercise of the Company's listed options has raised A$5.6m.

The board appreciates the support of those option holders who exercised their options early and obviously share the vision for the progress of First Graphene Limited as the world's leading graphene company.

The stronger working capital position will drive the growth of First Graphene with increased production efficiencies and higher manufacturing throughput, market development with new customers and novel graphene applications and global supply capabilities.

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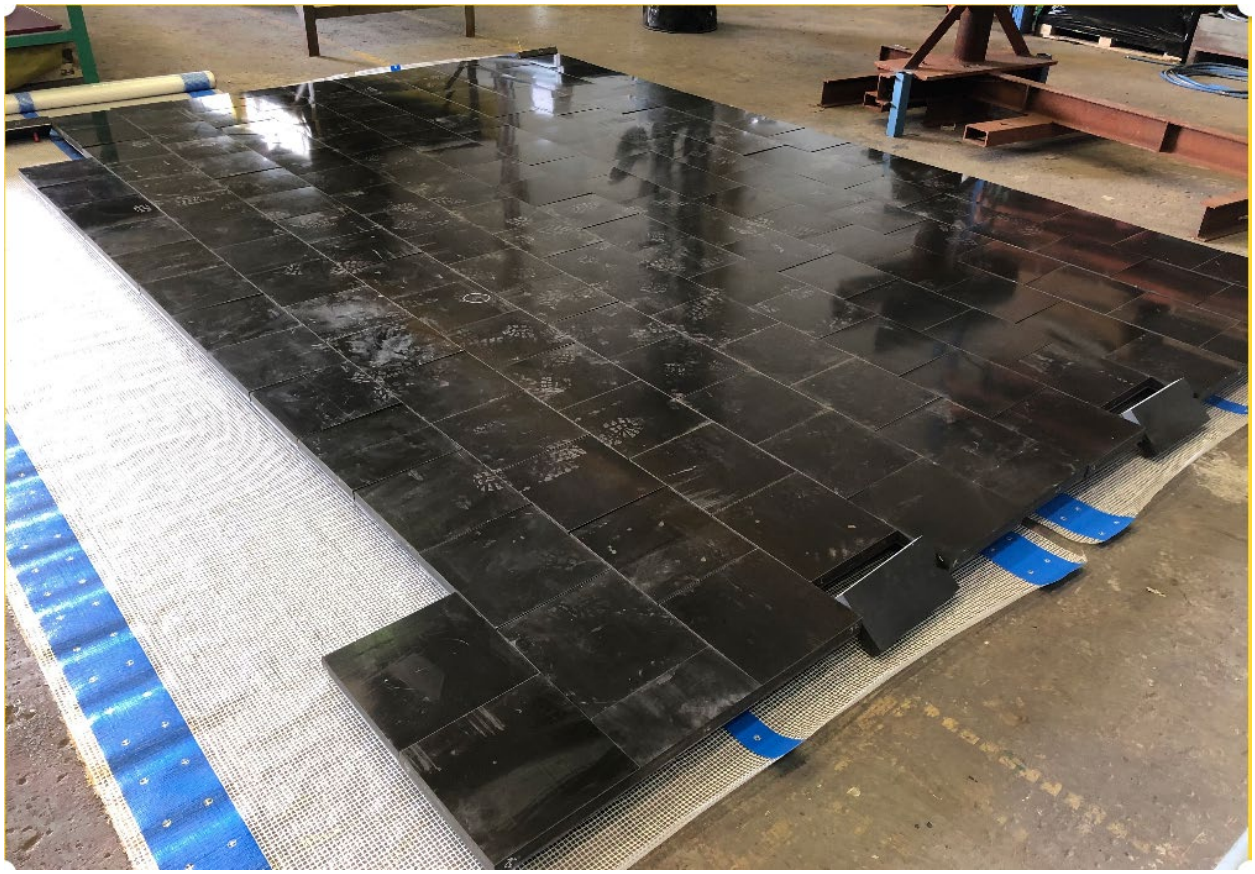
FGROC
Frankfurt Stock Exchange
FSE:M11

newGen Increases PureGRAPH® Order Size

In August 2019 FGR was able to announce a formal Supply Agreement had been executed for 3,000kg of PureGRAPH® to be supplied over the next twelve months. This was an additional 1,000kg above the original purchase order placed the previous November. The Supply Agreement terms are worth between $800,000 to $900,000 in revenue for FGR.

To date newGen has supplied its graphene enhanced Armour-GRAPH™ into its traditional iron ore market customers but recently expanded into the provision of piping spools to the lithium industry.

The use of graphene in newGen's Armour-GRAPH™ products provides considerable mechanical improvements in tensile and tear strength and abrasive resistance. Armour-GRAPH™ products are already installed in multiple mining applications and the advantage provided by PureGRAPH® in mining wear products is attracting enquiries from the global mining industry.



Armour-GRAPH™ panels being assembled at newGen's facility

PureGRAPH® incorporated into Steel Blue safety boots

In August, PureGRAPH® was incorporated into the safety capped boot TPU soles and polyurethane foam innersole at Steel Blue's Malaga WA factory.

Full boots and the sole samples have been exposed to extensive laboratory tests which are expected to exceed current industry standards for safety footwear. Extensive field trials have been commenced and will last approximately six months. Steel Blue will present the latest results jointly with FGR at the Polymers in Footwear conference, Berlin on 19-20th November.

The incorporation of PureGRAPH® into a thermoplastic polyurethane (TPU) was a major advance for FGR. Previously, the successful dispersion of graphene into a TPU masterbatch had been a challenging graphene industry issue. Extensive research by FGR resulted in a manufacturing method which overcame what was previously seen as a real obstacle.

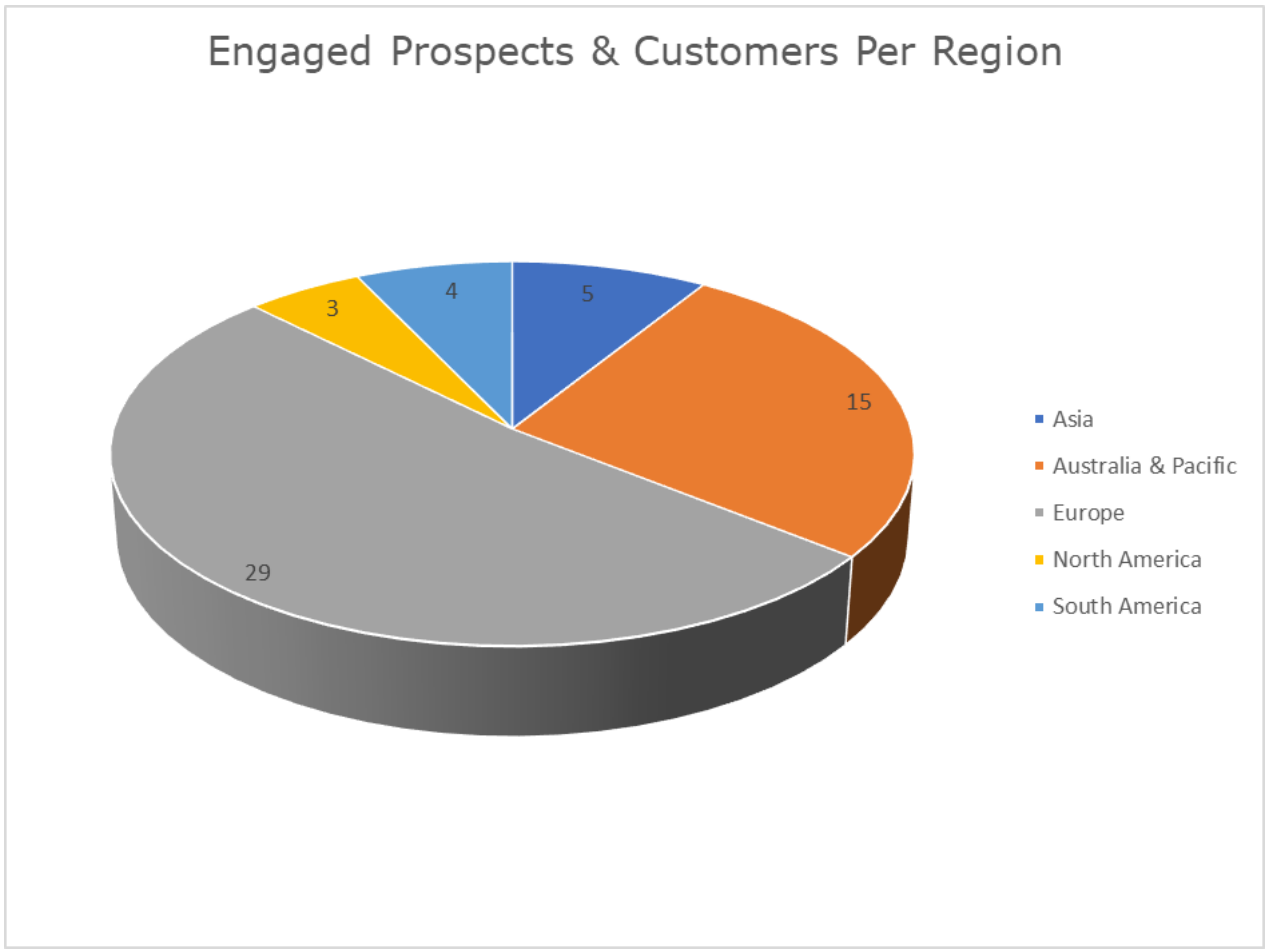
While existing TPU's already possess high abrasion resistance and tensile strength it is expected the incorporation of PureGRAPH® will improve mechanical properties while providing additional benefits in thermal heat transfer, chemical resistance and reduced permeability.

FGR will be also be conducting extensive laboratory tests on the PureGRAPH® infused TPU and polyurethane foam inner sole at its own facilities in Australia and the GEIC in Manchester.

PureGRAPH® has also been incorporated in the Metatarsal Guard (Steel Blue's Met-Guard), which is specially designed to protect the metatarsal area of the foot that extends from the toes. This is a popular choice for mining workers, factory hands and drillers, who often need the extra protection the Met-Guard affords. The incorporation of PureGRAPH® in the Met-Guard will improve both flexibility and strength of the product.

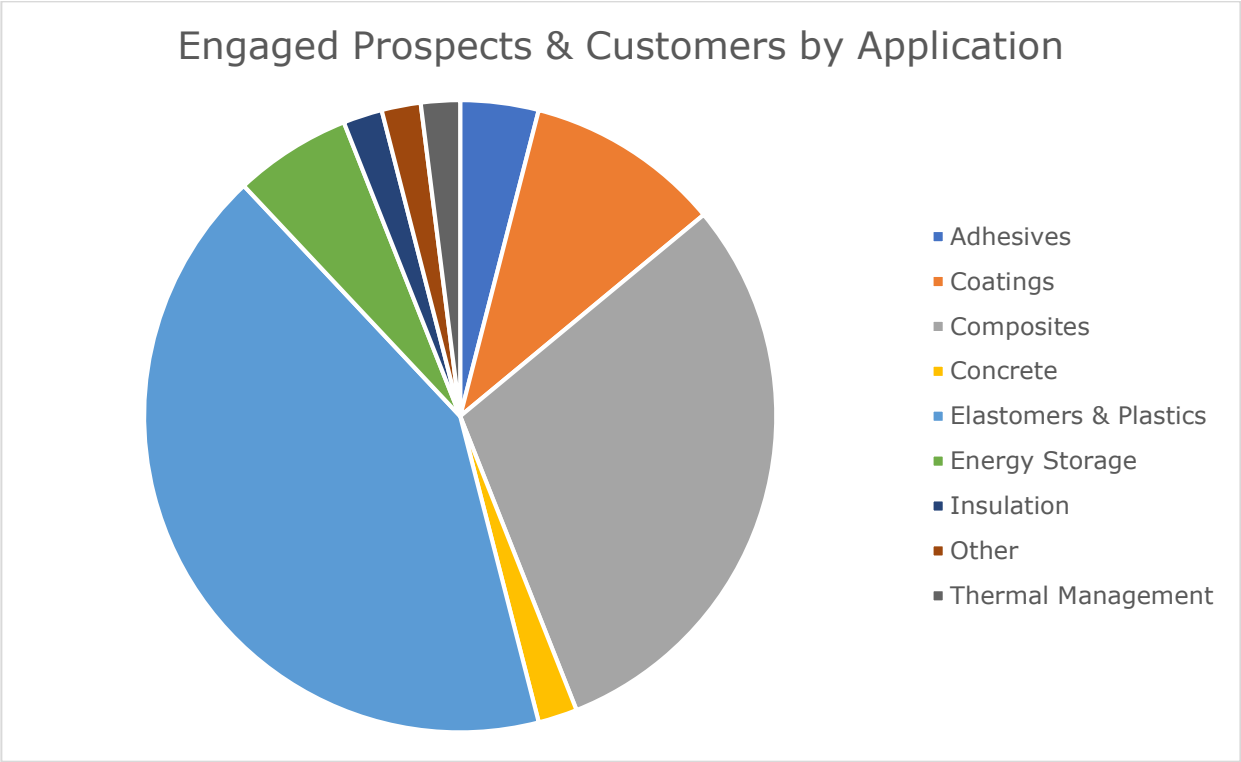
Increasing Customer Interaction:

With the establishment of our Global R&D and Marketing centre at the University of Manchester early in 2019 and the launch of a B2B focused website in July 2019 we have greatly extended our customer reach. Reinforced by our presence at shows such as Composites Europe, Stuttgart and Composites Australia, Sydney, we now have multiple customers evaluating PureGRAPH® products.



Growth in customer activity has been most pronounced in Europe due to our increased presence there. We will continue to develop a pipeline of new customers in target markets through trials and close engagement with key partners.

We are moving forward plans to extend our brand presence in the Americas and Asia and it is our strategic intent to target North and South America in 2020.



Key applications include elastomers, plastics and composites, covering various market segments including mining, leisure, automotive, mass transport and construction. The First Graphene team is working closely with customers at this time in order to assist in the development of new, disruptive products that will enable them to get ahead in their market and provide both First Graphene and the customer with sustainable differentiation in the years ahead.

The development of new materials for energy storage products will also become more important as First Graphene moves forward with a project to develop new graphene-based supercapacitor materials in conjunction with The University of Manchester.

Licence for new graphene-hybrid materials - University of Manchester

In September, FGR announced it had secured an exclusive licence granting rights to patented technology for the manufacture of metal oxide decorated graphene materials using a proprietary electrochemical process. These new graphene-hybrid materials offer the makers of supercapacitors a new class of high-performance capacitor materials.

Supercapacitors offer high power-density energy storage, with the possibility of multiple charge/discharge cycles and short charging times. The market for supercapacitor devices is forecast to grow at 20% per year reaching a revenue value of ca. AUD$3.1 billion by 2022. As with batteries, growth of the supercapacitor market is challenged by the supply of the right, high-performing materials which is dominated today using microporous carbon nanomaterials with typical gravimetric capacitance of 50 to 150 Farads/g.

Earlier research by The University of Manchester shows very high capacitance materials of up to 500 Farads/g are now possible which outperform existing materials. The manufacturing process to be employed builds on the Company's existing electrochemical processing expertise which is scaled to 100 tonne/year capacity at FGR's manufacturing site at Henderson, WA.

The University of Manchester research reveals how high capacity, microporous materials can be manufactured by the electrochemical processing of graphite raw materials with transition metal ions leading to metal oxide decorated graphene materials which have very high gravimetric capacitance of up to 500 Farads/g.

These materials can be manufactured at scale using FGR's established expertise in electrochemical materials processing. As the materials are grown in-situ through electrochemical processing they have significant advantages over previous solutions that employed simple mixing of graphene and metal oxide materials.

Funding has been secured from the UK EPSRC (Engineering and Physical Sciences Council) for the further optimisation of the metal oxide /graphene materials. In parallel to the technology platform development FGR is also engaging with device makers and end-users to ensure downstream demand is in place. FGR intends to build a kilogram pilot scale capability in its laboratories to enable testing of these materials by device manufacturers.

Vortex Fluidic Device

Overview

In this quarter, the Company established a stable set of operating conditions at First Graphene's R&D facility, based at the GEIC in the United Kingdom. As a result, FGR has proven the Vortex Fluidics Technology is transferable between sites and can produce a consistent graphene oxide product. The Company has also identified the scale up parameters, identified how FGR can resolve processing issues and have identified a novel way of introducing functionality on graphene platelets using a commercially available device.

Process scale up

First Graphene has developed the capability to operate the equipment in a continuous flow profile to produce oxidised graphene platelets. Through the collaborative work between First Graphene and Flinders University, FGR has identified potential routes to scaling up the process and understanding product quality. The next testing phase will establish the parameters required and potential scale up opportunities.

Product characterisation

Characterisation of the product made at the GEIC has been carried out. The results to date indicate FGR is adding functional oxygen groups to the graphene platelets. The Company has used a number of techniques, including Raman, XPS and Thermogravimetric Analysis to understand the nature of surface groups on the graphene platelets. Encouragingly, FGR has been able to link its analytical results with the operating conditions in the VFD, which means FGR has enhanced its understanding of the reaction processes in the VFD.

FireStop™

FGR holds the global licencing rights to graphene-based fire-retardant coatings. The Company is in discussion with a specialist formulating company to jointly develop a commercial coating product, initially for the timber construction market. This is a complex product requiring extensive testing for specific applications in specific regional markets. In parallel, FGR is evaluating the FireStop™ technology in elastomers, composites and foams.

Concrete

Further laboratory cement mortar samples have been screened at the University of Adelaide using a graphene stream from the Henderson facility which requires less processing and will therefore be easier to produce for the building industry. Results from 7 and 28 day tests provided improvements on both compressive strength and tensile strength of 30.1% and 38.6% respectively using a graphene addition rate of 0.02%.

The next quarter will see concentration on repeating the results achieved using different graphene batches and commence testing aggregate concrete and the effect of graphene on permeability. FGR has received increased customer interest in the opportunity that very small additions of PureGRAPH® can make to the physical mechanical characteristics of cementitious materials in a cost effective manner.

Significant September Quarter Announcements

Date	Subject Matter	URL Link
12 August 2091	Accelerated Option Exercise Boosts Cash by $5.6m	https://firstgraphene.net/wp-content/uploads/austocks/fgr/2019_08_12_FGR_1565561940.pdf
19 August 2019	newGen Increases PureGRAPH® Order Size	https://firstgraphene.net/wp-content/uploads/austocks/fgr/2019_08_19_FGR_1566207300.pdf
23 August 2019	PureGRAPH® Incorporated into Steel Blue Safety Boots	https://firstgraphene.net/wp-content/uploads/austocks/fgr/2019_08_23_FGR_1566511860.pdf
30 August 2019	Annual Report	https://firstgraphene.net/wp-content/uploads/austocks/fgr/2019_08_30_FGR_1567145640.pdf
23 September 2019	First Graphene Announces Collaboration in Energy Storage Materials	https://firstgraphene.net/wp-content/uploads/austocks/fgr/2019_09_23_FGR_5d4d375f833e2b470e2c97ae0e1626b9.pdf

About First Graphene Ltd (ASX: FGR)

First Graphene Ltd. is the leading supplier of high-performing, graphene products. The company has a robust manufacturing platform based upon captive supply of high-purity raw materials and an established 100 tonne/year graphene production capacity. Commercial applications are now being progressed in composites, elastomers, fire retardancy, construction and energy storage.

First Graphene Ltd. is publicly listed in Australia (ASX:FGR) and has a primary manufacturing base in Henderson, near Perth, WA. The company was recently incorporated in the UK as First Graphene (UK) Ltd. and is a Tier 1 partner at the Graphene Engineering and Innovation Centre (GEIC), Manchester, UK.

PureGRAPH® Range of Products

PureGRAPH® graphene powders are available in tonnage volumes with lateral platelet sizes of 20µm, 10µm and 5µm. The products are high performing additives, characterised by their high quality and ease of use.

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