ASX Announcement

24 July 2018

Agreement To Supply Graphene for Advanced Cooling Products

Highlights

- Collaboration Agreement signed with FlexeGRAPH to supply graphene for suitability testing in their products
- FlexeGRAPH is developing advanced coolant technology using graphene-enhanced heat transfer fluids
- Nanofluid coolant technology represents the first breakthrough in liquid coolants in 90 years, establishing a new standard
- Up to 60% improvements in thermal conductivity over current competitors

Advanced materials company, First Graphene Limited ("**FGR**" or "t**he Company**") (ASX: FGR) is pleased to advise of a Collaboration Agreement with Flex-G Pty Ltd ("Flex-G" or "FlexeGRAPH").

Background

As FGR continues its program of commercialising graphene it is working with a wide range of industries that are seeking better product performance from the introduction of graphene into their manufacturing processes. Previous ASX releases have informed shareholders of work with maritime services products such as marine shipping cables and antifouling paints, and polyurethane liners and ground engaging tools for the mining industry.

Recent discussions with FlexeGRAPH, a company based at a university in Canberra, have resulted in the signing of a collaboration agreement to supply graphene to test its suitability for use in electrified systems such as batteries and high-performance computing and data centres, so they can be charged faster with reduced capacity losses as well as improved cooling of high performance computing and data centres to reduce power consumption. The market size for heat transfer fluids in Australia was $3bn in 2016, and is expected to grow to $4.5bn by 2022.

To date, whilst at the experimental scale, FlexeGRAPH has been sourcing its graphene under licence from the Canberra-based university. The opportunity exists for FGR to provide more economically priced large-scale graphene supplies in due course.

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Coolant Technology Being Developed by FlexGRAPH

FlexeGRAPH has developed a family of fluids enhanced with graphene nanotechnology to replace existing water and glycol-based coolants and liquids used in heat transfer applications. These results in enhanced thermal conductivity and heat transfer with excellent stability, even at elevated operating temperatures.

The main areas of focus and the benefits achieved are currently;

a) Car engine cooling
   i. enabling higher operating temperature
   ii. reduced fuel consumption and emissions
   iii. smaller radiators, pumps and fans

b) EV battery cooling
   i. reduced charging times
   ii. extended battery lifetime

c) HPC and data centre cooling
   i. Reduced volume of cooling systems and energy consumed

d) Drilling and cutting fluids
   i. Improved tool performance and component quality

Managing Director, Craig McGuckin, stated: *"FGR is pleased to be working with FlexeGRAPH and providing commercial samples of graphene for use in its advanced cooling technology. This is an opportunity to functionalise our standard product and demonstrate yet another application which may benefit from our high quality, low cost graphene. The ability to produce graphene at scale and at a lower cost than our competitors is a compelling advantage that will be of material assistance to our customers."*

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 four universities and is at the cutting edge of graphene and 2D related material developments. Most recently First Graphene has become 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.

About FlexeGRAPH

FlexeGRAPH was founded in Australia in 2017 and produces graphene-based materials for electrified systems such as batteries and high-performance computing and data centres. The core technology was developed at the Australian National University and has been patented and exclusively licenced to FlexeGRAPH.

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.

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