

Graphene technology

Elite partnership heralds global expansion

In recognition of its status as the world leader in the manufacturing of electrochemically exfoliated graphene, ASX-listed First Graphene has been invited to be one of three first-tier partners in the University of Manchester's £60 million (\$107 million) Graphene Engineering and Innovation Centre (GEIC – pronounced “geek”).

The GEIC has been established to accelerate the commercialisation of graphene by bringing together industry operators and university scientists under one roof.

Company chairman Warwick Grigor says the deal with the university will give First Graphene access to the best brains in the graphene business and the most advanced equipment for measuring and working with the material.

The proximity to UK and European-based materials and manufacturing sectors will also dramatically expand the commercial opportunities for the company.

The installation of a Graphene Cell in the GEIC facility will provide better logistics for supplying European customers, compared with shipping graphene from the Henderson production facility.

Bulk volume, high-quality graphene is only just coming of age with the commissioning of First Graphene's Henderson production facility earlier this year.

“Prior to this it has been a chicken-and-egg situation where companies may have wanted to use this advanced material but there was no reliable supply,” Grigor says.

“Without that supply in the first place, they had no reason to look for applications for the material.

“Now there is a reliable supply with the facility in Fremantle capable of supplying up to 100 tonnes annually, using feedstock of the highest grade natural graphite.

So, the logjam has been removed.

“The graphene plant is not operating at full capacity yet while the focus is shifting to generating a sales book, but it is work in progress.

“The company is de-emphasising graphite production just now, as it has a four-year graphite stockpile at present.

“It is smarter to concentrate on the sales book now, with the ability to restart the mines as and when the stockpile is drawn upon.”

Graphene has extraordinary properties.

The material is made of carbon, like diamonds and coal, but with a completely different molecular structure – the atoms are bonded into a hexagonal lattice (akin to chicken wire) that is just one atom thick in its purest form.

It is the hardest substance ever tested; harder than diamonds and 200 times stronger than steel, but one which can still be stretched and twisted like fabric.

It is also an excellent conductor of both electricity and heat and is transparent, among other qualities.

Originally conceptualised in the 1960s, graphene was first made in 2004 and investigated at the University of Manchester in work that earned researchers Andre Geim and Konstantin Novoselov the 2010 Nobel Prize for physics.

Although plenty of applications have been found for the material, the media hype of the time ran far ahead of the actual industrial applications. Something similar happened with the discovery of plastics.

Companies such as First Graphene are now working to greatly increase the range of applications for the use of this material, both established and well into the development phase. Just like all other technologies, the more applications can be found for graphene,

Companies may have wanted to use this material but there was no reliable supply.

Warwick Grigor

the more technology becomes accepted, and the cheaper the material becomes as more volume is produced.

One innovation is in super-capacitors to replace traditional batteries, with the first units for use in industrial applications becoming available in 2017. A very big potential market is to use those super-capacitor/batteries in electric cars.

First Graphene has an interest in the BEST Battery Superconductor Project being undertaken with Swinburne University of Technology in Melbourne.

As the company has announced to the ASX, this involves scaling up science already proven at Swinburne into an industrial scale battery.

The resulting product is expected to be considerably more durable and take a much shorter time to charge than the lithium-ion batteries now used in cars.

Another application is in infusing graphene into carbon fibre as a coating for aeroplane wings.

The resulting coating is lighter, more resistant to impact (the in-flight wear and tear on a wing), and causes less drag than a conventional carbon fibre coating.

There are many others, including as a



Graphene is made of carbon. It is harder than diamonds, stronger than steel. PHOTO: BONNINSTUDIO

substitute for rubber that is able to withstand the extreme cold of space, or as a material that can be used for printing circuits onto clothes.

Through its GEIC partnership, which cost about £200,000 a year, the company will gain access to leading UK and European research in the area.

The University of Manchester has 250 researchers working on graphene and the broader area of two-dimensional materials.

Many applications involve its use in membranes, composite or coatings, but one

exciting application is in gym shoes: where such shoes required a trade-off between “stickiness”, or grip the shoes have on gym surfaces or wet trails, and durability of the shoe material.

The use of graphene dramatically changes that trade-off.

Grigor says that besides giving the company access to leading-edge research, the investment gave First Graphene office space and a springboard into the UK and European markets. The company would also have access to UK government incentives.

Best quality graphene products from the world's largest, most advanced production facility.

First Graphene continues to lead the way in graphene innovation. It has recently become a Tier 1 participant in the University of Manchester's exciting new Graphene Engineering & Innovation Centre (GEIC). The aim of GEIC is to commercialise graphene uses and First Graphene will be at the forefront of this development.



Large scale graphene production capabilities



Super capacity batteries



Conductive polymers



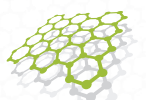
Vortex fluidic device & turbo thin film



Fire retardant coatings



Building materials



For more information please contact:
First Graphene
T: +61 1300 660 448
E: info@firstgraphene.com.au