

Novel supercapacitor technology patent granted in US, providing further momentum in sector



Highlights

- **US patent granted for novel supercapacitor technology**
- **Exclusive worldwide license enables First Graphene to advance research and development with view to up-scaling to meet industry demand**
- **Same technology also shown to be effective and cheaper electro-catalyst for oxygen reduction reactions in fuel cells**

First Graphene Limited (ASX: FGR; “First Graphene” or “the Company”) is pleased to announce that a patent has been granted in the United States for novel supercapacitor technology being advanced by the Company.

The technology, used to produce metal oxide decorated products that show superior performance to existing activated carbon used in supercapacitors, was developed by a team at the University of Manchester.

First Graphene holds an exclusive worldwide licensing agreement for the technology and continues to progress this project as one of our key strategic research and development projects. That includes developing new test cells and investigating options or scaling the technology to address industry demand.

These metal-oxide decorated products offer higher energy density and capacitance when used in supercapacitors and have the unique advantage of also being suitable for use as electrocatalysts.

The supercapacitor device market is projected to grow from US\$409 million in 2020 to US\$720 million by 2025 at an expected CAGR of 12.0 per cent. The growth of the market is driven by increasing demand in energy harvesting applications and growing use of supercapacitors in trains and aircraft. Moreover, the increasing global demand for electric vehicles is likely to fuel further growth in the market.

Supercapacitor technology is exciting because it stores more energy than a capacitor and delivers it at a higher rate than a battery. A recent report by leading nanotechnology publication [Azo Nano](#) highlights the potential to combine supercapacitors with battery technology to deliver optimised hybrid systems. The report stated:

“Within the next five years, graphene supercapacitors are likely to be utilised in laptops, smartphones, electronics, public transportation, and many other applications due to increased development in terms of energy storage limits.”

In addition, work continues in collaboration with Warwick Manufacturing Group (WMG) and the University of Manchester on the supercapacitor program. Partly funded through an Innovate UK grant, First Graphene has successfully proven that its coin cell technology can deliver considerably improved performance over the more commonly used activated carbon.

The breakthrough has been described by Azo Nano as a “watershed moment” and will now enable the focus to shift to upscaling the technology. The focus now moves to construction of pouch cells. This format, while not intended for commercial release, allows relatively simple and rapid construction as a platform for lifecycle testing.

Working with experts at Manchester Fuel Cell Innovation Centre, First Graphene has also found evidence that metal oxide-coated PureGRAPH® is an effective catalyst for oxygen reduction reactions in fuel cells. The findings pave the way for a cheaper alternative to platinum, which is currently used as the preferred catalyst.

The Company’s work with WMG regarding supercapacitor materials, is now in its second iteration of an ongoing program to manufacture, test, optimise and repeat our work to identify the best performance configurations.

Work is being undertaken on product optimisation and formulations will be a key enabler to advancing research and development in this area.

The Company is actively seeking partners to advance this R&D work.

First Graphene Managing Director and CEO Michael Bell said:

“Having this novel technology protected by patent in the US provides the opportunity to actively engage with industry to further develop our solutions in the supercapacitor space.

At the same time, First Graphene has made great progress over the UK summer to overcome a range of challenges identified in earlier test work. We are now at the point of being able to scale up the technology from coin cell to pouch cell size for further lifecycle testing and optimisation.

This progress now puts the Company in the position to partner with industry and take another step towards commercialisation of this novel supercapacitor technology.”

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About First Graphene Ltd (ASX: FGR)

First Graphene Limited is focused on the development of advanced materials to help industry improve. The Company is a leading supplier of graphitic materials and product formulations with a specific commercial focus on large, high-growth global markets including cement and concrete; composites and plastics; coatings, adhesives, silicones and elastomers (CASE); and energy storage applications.

One of the key outcomes these advanced materials offer is the reduction of carbon dioxide emissions, whether directly through a reduction in output of these harmful greenhouse gases or lower energy usage requirements in manufacturing, or indirectly due to enhanced performance characteristics and extending the usable life of products.

First Graphene has a robust manufacturing platform based on captive and abundant supply of high-purity raw materials, and readily scalable technologies to meet growing market demand.

As well as being the world's leading supplier of its own high performance PureGRAPH[®] graphene product range, the Company works with multiple industry partners around the world as a supplier of graphitic materials and partner to research, develop, test and facilitate the commercial marketing of a wide range of sector-specific chemical solutions.

First Graphene Ltd is publicly listed in Australia (ASX:FGR) and has a primary manufacturing base in Henderson, near Perth, WA. The company is 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, where it has a strong marketing and R&D capability.

With authority of the board, this announcement has been authorised for release by Aditya Asthana, Chief Financial Officer and Company Secretary.