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11th May 2021

Graphene catalysts for low-cost hydrogen fuel cells

HIGHLIGHTS

- **Metal oxide coated graphene is shown to be an effective catalyst for next-generation hydrogen fuel cells**
- **Graphene materials could replace high-cost platinum catalysts**
- **Grant funding has been secured for further testing**

First Graphene Limited (ASX:FGR; "First Graphene" or "the Company") is pleased to provide results from a collaboration with Manchester Metropolitan University (MMU) on the use of metal oxide coated PureGRAPH® materials as catalysts in Polymer Electrolyte Membrane Fuel Cells (PEM-FC).

Background

PEM-FCs are used to power hydrogen fuelled vehicles, with early adoption underway in mass transport and fleet markets. Like battery powered electric vehicles, no carbon emissions are produced but the PEM-FC has the added advantage that range can be extended by increasing fuel capacity without the need to increase the power unit size.

Existing PEM-FCs have one disadvantage in that expensive platinum catalysts are required for the oxygen reduction reactions that must take place in the cathode of the fuel cell.

Positive Results Achieved to Date

The collaborative research between First Graphene and Drs Yagya Regmi and Laurie King, of the Manchester Fuel Cell Innovation Centre at MMU, has tested metal oxide coated PureGRAPH® materials as potential oxygen reduction reaction (ORR) catalysts.

Initial results confirm that metal oxide coated PureGRAPH® is an effective catalyst for the cathode ORRs. It has the potential to be used as a cheaper alternative to platinum in the next generation of fuel cells.

Dr Regmi and Dr King are recognised experts in the field of hydrogen fuel cells and recently presented to the UK's All-Party Parliamentary Climate Change Group.

Next Steps – Further Optimisation

Both parties will now undertake a four-month collaborative project, funded by the MMU's Business Engagement Seed Fund. The fund supports academic engagement with industrial clients to address real-world business needs. In this case it will support the development of new products in hydrogen and fuel cell technology. The team will focus on further optimisation of the test devices and extended comparisons with current industrial catalysts.

The metal oxide coated PureGRAPH® catalysts were manufactured using intellectual property exclusively licensed to the Company from the University of Manchester, and provide additional opportunities including a route to supercapacitor materials.

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Dr Yagya Regmi said: *"These are very encouraging results. They demonstrate the potential for First Graphene's PureGRAPH® materials to be used as catalysts in alkaline fuel cells. Subject to further optimisation, they could provide a lower cost alternative to platinum-based catalysts."*

Michael Bell – CEO First Graphene Ltd said: *"This is a great result that consolidates our position in the growing energy storage market. It showcases our capability as an innovative and technically capable company, willing to work with world-class research teams."*

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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 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.

PureGRAPH® Range of Products

***PureGRAPH®** graphene powders and **PureGRAPH® AQUA** pastes are available in tonnage volumes with lateral platelet sizes of 50µm, 20µm, 10µm and 5µm. The products are high performing additives, characterised by their high quality and ease of use.*

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