
First Graphene Announces Low-cost, High-performing Graphene-based Electrocatalysts

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First Graphene has developed a low-cost, high-performing graphene-based electrocatalyst that targets the rapidly growing production of 'green hydrogen' by water electrolysis. Electrocatalysts are used to produce 'green hydrogen', but currently require high-cost rare metals such as iridium and ruthenium which can drive up operating costs. First Graphene's solution uses its PureGRAPH® technology to produce higher-performing, affordable electrocatalysts.

[First Graphene](#) has completed a 12-month project in the [United Kingdom](#) to develop low-cost, high-performing electrocatalysts for hydrogen production.

Supported by AUD\$183,000 (around USD\$121, 300) in funding from Innovate [UK](#), the project trialed production of graphene enhanced water-splitting electrocatalysts. In this project, First Graphene investigated the optimal formulation of coatings to be applied to electrodes, which were tested against defined performance targets.

The Company benchmarked the graphene enhanced, low-cost electrocatalysts against two different commercial catalyst materials, assessing the product's stability and mass activity. Results indicated First Graphene's catalyst requires less energy to produce hydrogen when compared to a commercial iridium catalyst in similar conditions.

The solution also reportedly performed remarkably well compared to a commercial ruthenium catalyst, resulting in close to three-times the output in hydrogen production despite using the same quantity of ruthenium.

Importantly, this means First Graphene's electrocatalyst has the potential to become a commercially beneficial solution that allows quantities of high-cost and scarce ruthenium to

last longer during hydrogen production.

First Graphene's solution can combine low-cost transition metals with the high conductivity of the Company's PureGRAPH® platelets to produce higher-performing, affordable electrocatalysts.

The results from the Innovate [UK](#) project have been used to leverage further government funding via a new project to assess the details of scaled catalyst production. The AUD\$155,000 (around USD\$102,800) project commenced under The Centre of Expertise in Advanced Materials and Sustainability (CEAMS) pilot scheme in the [UK](#). The project aims to define process parameters in pilot-scale production of graphene catalyst materials, which is a necessary step towards full-scale production and partnerships with end users.

First Graphene has the capability to perform electrochemical analysis in-house, following the establishment of a dedicated testing facility at its [UK](#) headquarters in Manchester. This new facility will result in faster, more cost-effective testing of electrocatalysts and graphene materials, paving the way to develop new products such as graphene oxide, and create new application opportunities and insights for existing PureGRAPH® materials.

First Graphene has also embarked on a new project with the Greater Manchester Electrochemical Hydrogen Cluster (GMEHC) in the [United Kingdom](#).

The GMEHC is a consortium of leading research facilities and experts aiming to address material challenges and measurement problems holding back innovation in hydrogen, fuel cell technology and electrolyser value chains. The aim of this project will be to analyze graphene metal oxides through the GMEHC to demonstrate the technology in an electrolyser stack for the first time.

This project targets the displacement of iridium in electrolyzers, with testing to provide key performance data including stability and efficiency metrics.

Data from this stack testing will be provided to catalyst end-users, which will mark an important milestone towards the commercialization of this licensed technology.

The Company expects existing plant equipment to be utilized for production, which will further diversify First Graphene's product lines to meet demand from new industries.

First Graphene Managing Director and CEO, Michael Bell, said: "First Graphene has developed a significant variety of opportunities to provide low-cost, high- performing solutions for the global renewable energy sector. I am proud of the work conducted by the First Graphene team, and I look forward to seeing these opportunities progress towards commercialization."

Read the [original article](#) on Graphene-Info.