A New Class of Supercapacitors on the Horizon Thanks to Alliance between First Graphene and University of Manchester

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First Graphene and the University of Manchester have recently signed a contract, according to which the company has licensed the patented technology of producing metal-oxide-decorated graphene materials by means of a proprietary electrochemical process developed by the researchers of this university. These innovative hybrid materials hold great promise for use in manufacturing a new class of high-performance supercapacitors.

First Graphene Ltd has signed an exclusive worldwide licensing agreement with the University of Manchester to develop graphene-hybrid materials for use in supercapacitors. The licencing agreement is for patented technology for the manufacture of metal oxide decorated graphene materials, using a proprietary electrochemical process.

The graphene-hybrid materials will have the potential to create a new generation of supercapacitors, for use in applications ranging from electric vehicles to elevators and cranes.

Supercapacitors offer high power-density energy storage, with the possibility of multiple charge/discharge cycles and short charging times. The market for supercapacitor devices is forecast to grow at 20% per year to approximately USD 2.1 billion by 2022. Growth may, however, be limited by the availability of suitable materials.

Supercapacitors typically use microporous carbon nanomaterials, which have a gravimetric capacitance between 50 and 150 Farads/g. Research carried out by the University of Manchester shows that high capacitance materials incorporating graphene are capable of reaching up to 500 Farads/g. This will significantly increase the operational performance of supercapacitors in a wide range of applications, as well as increasing the available supply of materials.

Published research by Prof. Robert Dryfe and Prof. Ian Kinloch of the University of Manchester

reveals how high capacity, microporous materials can be manufactured by the electrochemical processing of graphite raw materials. These use transition metal ions to create metal oxide decorated graphene materials, which have an extremely high gravimetric capacitance, to 500 Farads/g.

Prof. Dryfe has secured funding from the UK EPSRC (Engineering and Physical Sciences Council) for further optimisation of metal oxide/graphene materials. Following successful completion of this study, First Graphene is planning to build a pilot-scale production unit at its laboratories within the Graphene Engineering and Innovation Centre (GEIC). It is anticipated that this will be the first step in volume production in the UK, to enable the introduction of these materials to supercapacitor device manufacturers.

Dr Andy Goodwin, Chief Technology Officer of First Graphene Ltd says: “This investment is a direct result of our presence at the Graphene Engineering and Innovation Centre. It emphasises the importance of effective external relationships with university research partners. The programme is also aligned with the UK Government’s Industrial Strategy Grand Challenges and we’ll be pursuing further support for the development of our business within the UK.”

James Baker, Chief Executive of Graphene@Manchester, added: “We are really pleased with this further development of our partnership with First Graphene. The University’s Graphene Engineering Innovation Centre is playing a key role in supporting the acceleration of graphene products and applications through the development of a critical supply chain of material supply and in the development of applications for industry. This latest announcement marks a significant step in our Graphene City developments, which looks to create a unique innovation ecosystem here in the Manchester city-region, the home of graphene.”

Read the original article on First Graphene.