Haydale Graphene Industries plc

("Haydale" or the "Group")

Haydale Win Major Research Grant Awards

Haydale Graphene Industries plc (AIM: HAYD), the Group focused on enabling technology for the commercialisation of graphene and other nano materials, is pleased to announce that it has been awarded a number of research grants, totalling £350,000, to accelerate the development of new products enhanced by the incorporation of functionalised graphene and other nanomaterials.

These grant funded projects are:

1. **The development of electrically conductive graphene enhanced adhesives for aircraft structures**. The ability to conduct electricity throughout a composite aircraft fuselage, including bonded joints which are normally electrically insulating, is essential for improved safety. This new grant builds on an existing research project to develop electrically conductive carbon fibre composite materials for aircraft construction. This collaborative project is funded under the National Aerospace Technology Exploitation Programme and other partner organisations include Airbus, GE Aviation Systems, Element Materials Technology and SHD Composite Materials. The project commenced in February 2016 and is expected to take 18 months to complete.

2. **The development of multi-functional graphene enhanced composite materials which are not only capable of detecting the build-up of ice on structures, such as aircraft leading edges and wings, but can then be thermally activated in order to prevent ice build-up**. The opportunity to detect and limit ice build-up on structures has a broad range of application opportunities including aircraft structures, wind turbines, power line insulators and antennae masts. This grant was awarded to Haydale under Innovate UK's "Advancing the Commercialisation of Graphene" competition in November 2015. The project involves Thales and Bath University and is expected to take 12 months to complete starting in April 2016.

3. **The development of graphene reinforced polyolefin materials for lightweight extruded products such as filaments for nets and filtration.** The goal of this project is to increase the strength and operating temperature of commodity polyolefin materials such as polyethylene and polypropylene to those of engineering polymers (such as nylon), and then manufacture and test a range of prototype products. This grant was awarded to Haydale under Innovate UK's "Advancing the Commercialisation of Graphene" competition in November 2015. This collaborative project involves Thomas Swan, Delstar and the University of Bradford as partners and is expected to take 12 months to complete starting in April 2016.

4. **The development of graphene enhanced epoxy resins with improved durability, wear resistance and thermal cycling performance**. This project aims to develop industrial methods for the efficient dispersion and mass production of graphene enhanced epoxy resin masterbatch and processes for dilution into resin. This grant was awarded to Haydale under Innovate UK's "Advancing the Commercialisation of Graphene" competition in November 2015. The project partners with Huntsman Corporation and Warwick Manufacturing Group and is expected to take 12 months to complete starting in April 2016.

5. **The development of graphene enhanced carbon-carbon composites materials for use in high performance brake systems**. The aim of this project is to improve the thermal conductivity, wear and friction of carbon-carbon materials in a wide range of applications where careful thermal management is critical such as brakes for aircraft. This grant was awarded to Haydale under Innovate UK's "Advancing the commercialisation of Graphene" competition in November 2015.

HCS is working in conjunction with Meggitt Aircraft Braking Systems on this project which is expected to take 12 months to complete starting in April 2016.

The anticipated April start dates remain subject to completion of various standard conditions in relation to finalisation of the grant awards.

Commenting on the winning these grants , Dr Mat Turner, R&D Director of HCS said:

"We have a well-defined product development strategy and are committed to developing graphene enhanced polymer and polymer composite products in targeted markets including aerospace, automotive, rail and marine. Successfully gaining these research grants underpins this strategy. The ability to significantly improve the mechanical, electrical and thermal characteristics of polymers, polymer composites, resins, coatings and adhesives through the incorporation of functionalised graphene and other nanomaterials is one of the most exciting enabling technologies for a generation and could lead to a whole new range of materials."

Ray Gibbs, Haydale CEO added:

"I am extremely pleased that the British Government recognises the potential that graphene and other nanomaterials offer and are backing British business to develop the next generation of materials here in the UK. Haydale will be collaborating with leading global organisations across the aerospace, automotive, rail and marine markets and these projects will enable us to expand our technical team and our capabilities in these areas."

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About Haydale

Haydale has developed a patented scalable plasma process to functionalise graphene and other nanomaterials. This enabling technology can provide Haydale with a rapid and highly cost-efficient method of supplying tailored solutions to enhance applications for both raw material suppliers and product manufacturers.

Functionalisation is carried out through a low-pressure plasma process that treats both mined, organic fine powder and other synthetically produced nanomaterial powders, producing high-quality few layered graphenes and graphene nanoplatelets. The process can functionalise with a range of chemical groups, with the level of functionalisation tailored to the customer's needs. Good dispersion improves the properties and performance of the host material and ensures the final product performs as specified.

The Haydale plasma process does not use wet chemistry, nor does it damage the material being processed; rather, it can clean up any impurities inherent in the raw material. The technology is a low energy user and most importantly environmentally friendly. The Haydale process is an enabling technology, allowing the Group to work with a raw material producer who seeks to add value to the base product and tailor the outputs to meet the target applications of the end user.

Haydale, based in South Wales and housed in a purpose-built facility for processing and handling nanomaterials, is facilitating the application of graphenes and other nanomaterials in fields such as inks, sensors, energy storage, photovoltaics, composites, paints and coatings.

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