

Graphene – an exceptional “next generation” material

At a glance

Graphene is a two-dimensional layer of carbon atoms and was first isolated in 2004 by Prof Andre Geim and Dr Kostya Novoselov at The University of Manchester. This discovery led to the award of the Nobel prize for Physics in 2010.

Graphene has exceptional electronic properties that have the potential to revolutionise electronics but it is also the strongest and stiffest known material.

Graphene has the potential to replace carbon fibres in high performance materials used to build aircraft, to make structural, lightweight components for fuel efficient vehicles, and to significantly improve energy storage devices.

Challenge

In order to realise the full potential of this fascinating material, new methods to make and process Graphene on an industrial scale are needed.

A team led by Dr. Ian Kinloch at the University of Manchester is taking up the challenge. Their integrated research approach will follow Graphene through from its production to processing and two target applications; composites and electrodes for energy storage.

Approach

The key stages in the project are:

1. To develop new production methods for Graphene
2. Develop the processing techniques for making controlled architectures
3. Realise Graphene/polymer composites for aerospace, automotive, construction, adhesive and packing applications.
4. Develop manufacturing routes for high performance electrodes for energy storage (e.g. rechargeable batteries and fuel cells).
5. Transfer the technology developed into industry and academia.

Links have been established with industrial partners to take the work through the supply chain from manufacturers (Thomas Swan) to material producers (Huntsman, Technical Fibre Products) and end users (DSTL, Airbus and Morgan Advanced Materials).

Benefits

The ultimate objective of this project is to put Graphene based engineering components into the hands of industry.

