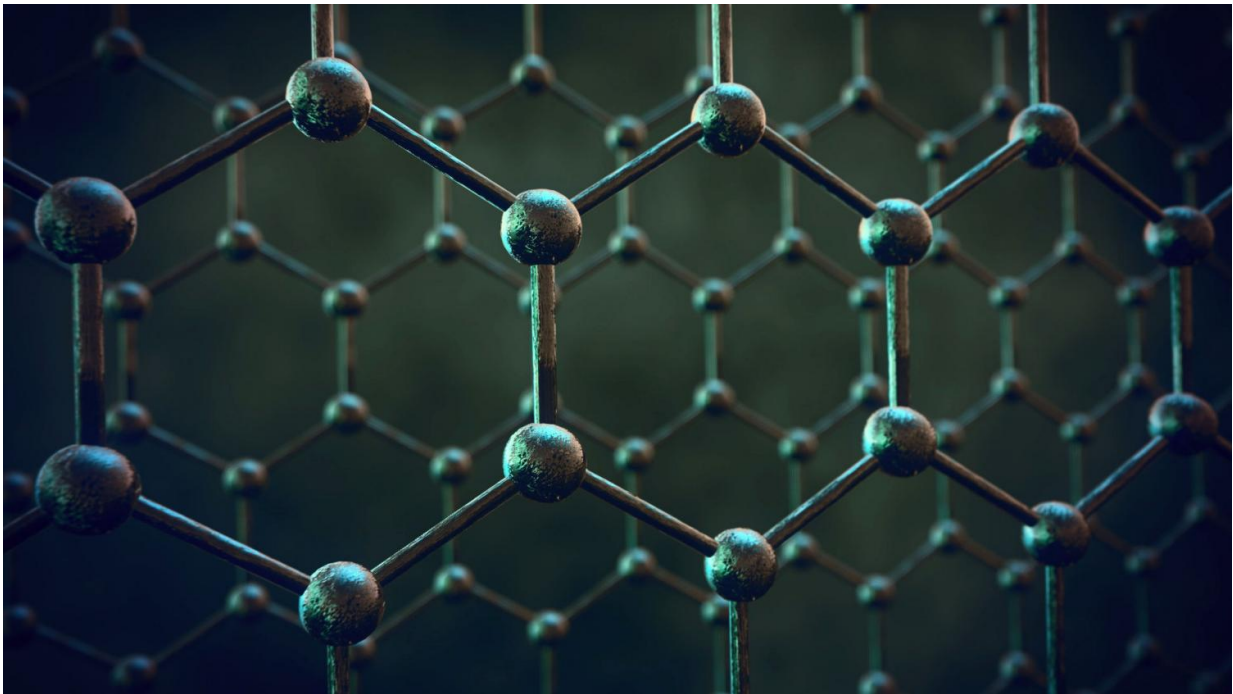


Scientists develop a new method to revolutionize graphene printed electronics

December 18 2018, by Charlotte Powell



This visualisation shows layers of graphene used for membranes. Credit: University of Manchester

A team of researchers based at The University of Manchester have found a low cost method for producing graphene printed electronics, which significantly speeds up and reduces the cost of conductive graphene inks.

Printed electronics offer a breakthrough in the penetration of information technology into everyday life. The possibility of printing [electronic circuits](#) will further promote the spread of Internet of Things (IoT) [applications](#).

The development of printed conductive inks for electronic applications has grown rapidly, widening applications in transistors, sensors, antennas RFID tags and wearable electronics.

Current conductive inks traditionally use metal nanoparticles for their high electrical conductivity. However, these [materials](#) can be expensive or easily oxidised, making them far from ideal for low cost IoT applications.

The team have found that using a material called dihydrolevogucosenone known as Cyrene is not only non-toxic but is environmentally- friendly and sustainable but can also provide higher concentrations and conductivity of [graphene](#) ink.

Professor Zhiurn Hu said: "This work demonstrates that printed graphene technology can be low cost, sustainable, and environmentally friendly for ubiquitous wireless connectivity in IoT era as well as provide RF energy harvesting for low power electronics".

Professor Sir Kostya Novoselov said: "Graphene is swiftly moving from research to application domain. Development of production methods relevant to the end-user in terms of their flexibility, cost and compatibility with existing technologies are extremely important. This work will ensure that implementation of graphene into day-to-day products and technologies will be even faster".

Kewen Pan, the lead author on the paper said: "This perhaps is a significant step towards commercialisation of printed graphene

technology. I believe it would be an evolution in printed electronics industry because the material is such low cost, stable and environmental friendly".

The National Physical Laboratory (NPL), who were involved in measurements for this work, have partnered with the National Graphene Institute at The University of Manchester to provide a materials characterisation service to provide the missing link for the industrialisation of graphene and 2-D materials. They have also published a joint NPL and NGI a good practice guide which aims to tackle the ambiguity surrounding how to measure graphene's characteristics.

Professor Ling Hao said: "Materials characterisation is crucial to be able to ensure performance reproducibility and scale up for commercial applications of graphene and 2-D materials. The results of this collaboration between the University and NPL is mutually beneficial, as well as providing measurement training for Ph.D. students in a metrology institute environment."

Graphene has the potential to create the next generation of electronics currently limited to science fiction: faster transistors, semiconductors, bendable phones and flexible wearable electronics.

Provided by University of Manchester

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