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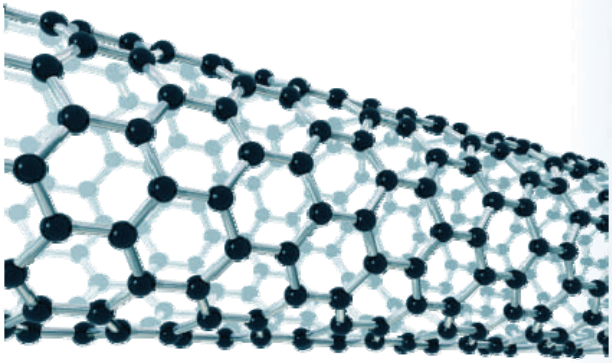
UWS Innovations

NOVEL METHOD FOR GROWTH OF CARBON NANOTUBES

Researchers at the School of Natural Sciences have developed a new method for the low-temperature and metal catalyst free synthesis of carbon nano-tubes.



Developed by Dr Adriyan Milev, Dr Kamali Kannangara and PhD student Marina Belkina, the method involves the low temperature and metal-catalyst free synthesis of CNTs on a silicone substrate.

CNTs have extraordinary properties due to their unique structure. With the development of more advanced production technologies, the market for CNTs is expected to grow largely in part due to new printed electronics and energy storage applications.

In order to produce new technologies that utilise the benefits of CNT properties, it is important that significant advances are made in the ability to produce a pure, high quality product at low temperatures.

Most CNT synthesis techniques use metal catalysts that are usually present in the final product. These impurities can adversely affect nanotube properties or accelerate their decomposition. Purity of the tubes is thus considered to be one of the key commercialisation challenges for CNTs.

Low temperature production of CNTs is also considered important as low temperatures are less likely to damage device elements of a silicon-based substrate structure forming part of an electronic device.

The UWS technology and process has the following novel features:

- Two-zone chemical vapor disposition (CVD) process;
- Low temperature (~500°C) synthesis of CNTs in second chamber of;
- Metal-catalyst free;
- Pre-treated silicone substrate contains nucleation sites for the growth of CNTs;

The use of low temperatures in conjunction with metal-catalyst free pre-treatment of the silicone substrate will potentially allow for controlled growth, improved monodispersity and a purer CNT product.

Status: Provisional patent filed
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