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New method of growing carbon nanotubes will revolutionise electronics **11/08/2006**

Researchers at the University of Cambridge have successfully grown nanotubes at a 350 deg C, which temperature permits their full integration into CMOS devices.

Carbon nanotubes are flavour of the times, world wide, in advanced materials, because of their excellent mechanical and electronic properties and extremely small sizes, pointing the way to devices even smaller than those conceivable today.

Until now, it was thought impossible to grow nanotubes below 500 deg C, whereas temperatures above 400 to 450 deg C are known to damage the inter-metal dielectrics commonly employed in CMOS device fabrication.

A group of researchers at the Department of Engineering at the University of Cambridge, led by Mirco Cantoro, Stephan Hofmann, Andrea Ferrari and John Robertson, in collaboration with colleagues at the Cambridge Hitachi Laboratory and the Department of Materials Science, University of Cambridge, has, however, succeeded in growing single-wall carbon nanotubes at temperatures as low as 350 °C by thermal Chemical Vapour Deposition.

As well as showing a way forward for ultra small electronics, the process sheds new light on the possible mechanisms that occur during carbon nanotube growth. Previously, it was assumed that the catalyst has to be liquid, but at these lower temperatures evidence has been found of a solid catalyst. These findings also apply to the catalytic growth of other nanostructures.

The work has been recently published in Nano Letters.1, M. Cantoro et al. "Catalytic chemical vapor deposition of single-wall carbon nanotubes at low temperatures", Nano Letters 6, 1107 (2006). A full copy of the article can be found at: http://pubs3.acs.org/acs/journals/doilookup?in_doi=10.1021/nl060068y

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