Boffins tune in carbon nanotube radio

Sound future predicted for nanotube technology

Robert Jaques, vnunet.com, 29 Jan 2008

Boffins are predicting a "sound future" for carbon nanotubes after building a transistor radio in which nanotube devices provide all of the active functionality.

The devices represent "important first steps toward the practical implementation of carbon-nanotube materials into high-speed analogue electronics and other related applications", said John Rogers, a Founder Professor of Materials Science and Engineering at the **University of Illinois**.

Professor Rogers is a corresponding author of a paper that describes the design, fabrication and performance of the nanotube-transistor radios, which were achieved in a close collaboration with radio frequency electronics engineers at **Northrop Grumman Electronics Systems** in Linthicum.

"These results indicate that nanotubes might have an important role to play in high-speed analogue

electronics, where benchmarking studies against silicon indicate significant advantages in comparably scaled devices, together with capabilities that might complement compound semiconductors," said Professor Rogers.

The nanotube circuits are possible thanks to a novel growth technique developed at the University of Illinois, Lehigh and Purdue universities, and described last year in the journal *Nature Nanotechnology*.

This technique produces linear, horizontally aligned arrays of hundreds of thousands of carbon nanotubes that function collectively as a thin-film semiconductor material in which charge moves independently through each of the nanotubes.

The arrays can be integrated into electronic devices and circuits by conventional chip-processing techniques.

"The ability to grow these densely packed horizontal arrays of nanotubes to produce high current outputs, and the ability to manufacture the arrays reliably and in large quantities, allows us to build circuits and transistors with high performance," Professor Rogers explained.

"The next question is what type of electronics is the most sensible place to explore applications of nanotubes. Our results suggest that analogue radio frequency represents one such area."

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