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Microscopic radio hints at future of wireless comms

Alex Serpo, ZDNet.com.au

31 January 2008 04:23 PM

Tags: [carbon nanotube](#), [radio](#), [efficiency](#), [transistor](#), [electronics](#), [device](#), [amplifier](#), [research](#)

US researchers have created a radio using carbon nanotubes so tiny it can fit on a grain of sand, showing how nanotubes could soon be used to make more efficient electronic devices.

Professor of materials science and engineering at the University of Illinois, Tim Rodgers, who led the researchers said: "Our radio is unique in that it uses nanotube-based transistors for all of the active components of the device, from the resonant antenna to the RF amplifiers, RF mixers and even the audio amplifier." Headphones can then be connected directly to the output of a nanotube transistor, he added.

Rodgers noted, however, that the device is merely a demonstration potential of carbon nanotubes in circuitry.

"We sought to demonstrate realistic, reproducible means for using nanotubes for RF electronics," he told *ZDNet.com.au*. "The radio is just a tangible demonstration that we can create all of the key building blocks for this type of electronics ... radios are not the primary goal, general wireless communications devices are."

[Carbon nanotubes](#) are hexagonal arrays of carbon atoms arranged into tubes, and are a topic of intense research around the world due to their unique properties. They are the strongest material known, with more than 50 times more tensile strength than stainless steel. Unlike other forms of carbon such as diamond, the nanotubes also act as effective semiconductors.

The researchers used the semiconducting properties of the nanotubes to construct them into transistors. Each transistor was composed of perfectly aligned nanotubes grown on a metal substrate, or supporting medium.

Rodgers said that some of the unique properties of nanotubes will carry over into electronics: "We see, for example, that for devices with similar dimensions, many key parameters of the nanotube transistors are better than silicon devices."

The nanotubes could also improve electronic devices, he noted: "Better means higher gain, lower power consumption, increased range in communication capabilities [and] better detection sensitivity."

However, Rodgers said more work needs to be done before nanotube electronics could be manufactured on a commercial scale. "Many challenges remain, but we feel that we've taken some important first steps towards realistic, competitive nanotube electronics technology," he said.

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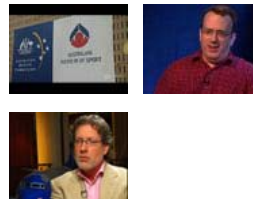
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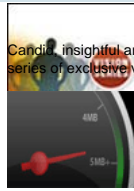
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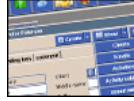


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