Scientists create sand-grain-sized radio

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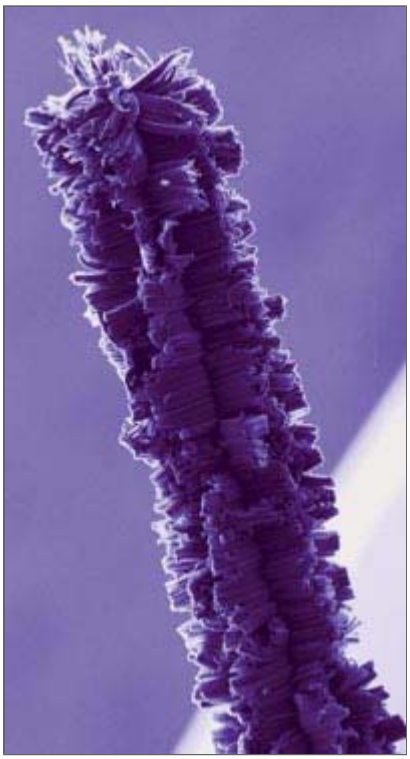
As if electronics weren't already compact enough, they could get a whole lot tinier, according to researchers at the University of Illinois who have built a radio smaller than a grain of sand.

The researchers, along with electronics engineers at Northrop Grumman Electronics Systems in Linthicum, Md., said they used microscopic carbon nanotube technology to fashion a working radio that was able to receive a traffic report from a Baltimore radio station.

Nanotubes, or tiny strands of carbon atoms, were used to create the radio's antenna and amplifiers while headphones were plugged directly into the output of a nanotube transistor.



Carbon nanotubes attached to a thin metal wire.
Rensselaer/Swastik Kar

The research team said the purpose of the project was not necessarily to build an extraordinarily small radio but to show that nanotubes could be an alternative to accepted building materials in electronics — such as silicon, which is popular in computer microprocessors.

"We were not trying to make the world’s tiniest radios," said John Rogers, a founder professor of materials science and engineering at the University of Illinois, in a statement. "The nanotube radios are a demonstration, an important milestone toward building the technology into a form that ultimately would be commercially competitive with entrenched approaches."

Practical nanotube devices and circuits are now possible, Rogers said, because of a new technique developed by the team. The procedure produces horizontally aligned arrays of hundreds of thousands of nanotubes that together act as semiconductor material.

Electric charges can move independently through each nanotube, which means the arrays can be deployed into electronic devices and circuits in much the same way that silicon-based microchips currently are.

The team's research appears in Monday's online edition of the Proceedings of the National Academy of Sciences.