

Nanotechnology Now

Your Gateway to Everything Nanotech

Google Search

Web www.nanotech-now.com

- Introduction
- News
- Press Releases
- Submit Press
- Nano Columns
- Our Products
- Nanotech Directory
- Press Kit
- Events
- Interviews
- Best Of
- Career Center
- Glossary
- About Us
- Advertising
- Manage Your Account

[Transistor data sheet](#)

Free & Easy Component Search Tool. Search Parts, Download Datasheets.

[Curious about Nanotech?](#)

Learn about Nanotechnology in an easy and convenient way!

Ads by Google

[Home](#) > [Press](#) > New kind of transistor radios shows capability of nanotube technology

Abstract:

Carbon nanotubes have a sound future in the electronics industry, say researchers who built the world's first all-nanotube transistor radios to prove it.

New kind of transistor radios shows capability of nanotube technology

CHAMPAIGN, IL | Posted on January 28th, 2008

The nanotube radios, in which nanotube devices provide all of the active functionality in the devices, represent "important first steps toward the practical implementation of carbon-nanotube materials into high-speed analog electronics and other related applications," said John Rogers, a Founder Professor of Materials Science and Engineering at the University of Illinois.

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, Md.

The paper has been accepted for publication in the Proceedings of the National Academy of Sciences, and is to be published in PNAS Online Early Edition next week.

"These results indicate that nanotubes might have an important role to play in high-speed analog electronics, where benchmarking studies against silicon indicate significant advantages in comparably scaled devices, together with capabilities that might complement compound semiconductors," said Rogers, who also is a researcher at the Beckman Institute and at the university's Frederick Seitz Materials Research Laboratory.

Practical nanotube devices and circuits are now possible, thanks to a novel growth technique developed by Rogers and colleagues at the U. of I., Lehigh and Purdue universities, and described last year in the journal Nature Nanotechnology. The growth 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 and ask the next question," Rogers said. "That question is: 'What type of electronics is the most sensible place to explore applications of nanotubes?' Our results suggest that analog RF (radio frequency) represents one such area."

As a demonstration of the growth technique and today's nanotube analog potential, Rogers and collaborators at the U. of I. and Northrop Grumman fabricated nanotube transistor radios, in which nanotube devices provided all of the key functions.

The radios were based on a heterodyne receiver design consisting of four capacitively coupled stages: an active resonant antenna, two radio-frequency amplifiers, and an audio amplifier, all based on nanotube devices. Headphones plugged directly into the output of a nanotube transistor. In all, seven nanotube transistors were incorporated into the design of each radio.

In one test, the researchers tuned one of the nanotube-transistor radios to WBAL-AM (1090) in Baltimore, to pick up a traffic report.

"We were not trying to make the world's tiniest radios," Rogers said. "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." The work was funded by the National Science Foundation and the U.S. Department of Energy.

NanoNews Digest

The latest news from around the world, FREE

Full Name
 Email Address

Ads by Google

- [Nano Companies](#)
- [Nano Materials](#)
- [Micro Bikini](#)
- [Nano Electronics](#)
- [MEMS News](#)

Premium Products

NanoNews Custom

Only the news you want to read!

[Learn More](#)

NanoTech Transfer

University Technology Transfer & Patents

[Learn More](#)

NanoStrategies

Full-service, expert consulting

[Learn More](#)

TechnologyMonitoring

Highly tailored technology monitoring service

[Learn More](#)

Our NanoNews Digest Sponsors



Subscribe to the Forbes/Wolfe Nanotech Report & Get 2 Free Reports

####



About University of Illinois

At Illinois, research shapes the campus identity, stimulates classroom instruction and serves as a springboard for public engagement activities throughout the world. Opportunities abound for graduate students to develop independent projects and launch their own careers as researchers while working alongside faculty and assisting in their research. Illinois continues its long tradition of groundbreaking accomplishments with remarkable new discoveries and achievements that inspire and enrich the lives of people around the world.

Access

Clean Technologies
Nanoscale Materials
& Nanotechnology
Funding & Consulting

For more information, please click [here](#)

Contacts:

James E. Kloeppel
Physical Sciences Editor
217-244-1073
kloeppel@uiuc.edu

John Rogers
217-244-4979
jrogers@uiuc.edu

Copyright © University of Illinois

If you have a comment, please [Contact](#) us.

Issuers of news releases, not 7th Wave, Inc. or Nanotechnology Now, are solely responsible for the accuracy of the content.

SPM Research Instruments

UHV AFM, STM, SEM, XPM, etc. Increase SPM Research Capability

www.rhk-tech.com

Ads by Google

FREE Trade Publications

FREE to Qualified Professionals. No hidden or trial offers, and no purchase necessary.



Related News Press

News and information

- [EoPlex CEO Arthur L. Chait Will Speak on the Topic of Filling the Gap Between Nano and 'Just Plain Miniature' Devices at the IEEE Meeting February 13t](#) February 3rd, 2008
- [Is hydrogen for airheads?](#) February 3rd, 2008
- [HVAC Air Purification Company Introduces Nanotechnology Air Duct UV Purifiers](#) February 3rd, 2008
- [Rising stars share their promise and potential](#) February 2nd, 2008

Nanotubes

- [Northrop Grumman and University of Illinois Researchers Make History With All-Carbon Nanotube Radio](#) February 1st, 2008
- [IP Profile: Carbon Nanotube-based Thermal Interface Material](#) January 31st, 2008
- [Watch Tower: Advances in energy storage](#) January 31st, 2008
- [Feds fund study of drug that may prevent radiation injury](#) January 27th, 2008

Discoveries

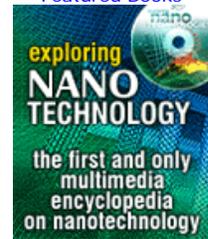
- [Researchers Create Gold Aluminum, Black Platinum, Blue Silver](#) February 2nd, 2008
- [Enzyme-powered delivery vehicles](#) February 1st, 2008
- [Northrop Grumman and University of Illinois Researchers Make History With All-Carbon Nanotube Radio](#) February 1st, 2008
- [Sketching on silicon](#) February 1st, 2008

Announcements



AMERICAN SCIENTIFIC PUBLISHERS

Nanotechnology Now Featured Books



Nanotechnology Now visitors receive a 10% discount on the Nanopolis educational series *Exploring Nanotechnology*, *Exploring Matter with Synchrotron Light* and *Exploring Matter with Neutrons* when using this link.



Subscribe to the Forbes/Wolfe Nanotech Report & Get 2 Free Reports