

**Nano Scale Measurements**

Super Precision Electrical Measurement Tools  
from Keithley  
[www.keithley.com/nano](http://www.keithley.com/nano)

**NanoLab Carbon Nanotubes**

Purified, length & diameter control Powders,  
arrays, papers, devices  
[www.nano-lab.com](http://www.nano-lab.com)

**Elicarb™ SW**

Single-wall carbon nanotubes Comm  
supplies  
[www.thomas-swan.co.uk](http://www.thomas-swan.co.uk)

Ads by Goooooogle

Advertise

**Navigation**

Home

**NEW!** Bargain Bin  
CCN Magazine  
Local Jobs  
News Topics  
Newsletter  
Websites

About Us  
Advertise  
Advertiser List  
Contact Us  
Link to Us

**Current Issue****Current Ads**

**Making Money**  
Magazine

**HYBrid Realty**

**Turbo Mortgage**

**Business Web**  
Hosting

**Phoenix Schools**

**SureWest Disaster**  
Recovery

**Tech-Line**  
Computers



## New NanotubeArray Offers Path to High-Performance Electronics

2007-03-25 20:06:10

Despite the attractive electrical properties and physical features of single-walled carbon nanotubes, incorporating them into scalable integrated circuits has proven to be a challenge because of difficulties in manipulating and positioning these molecular scale objects and in achieving sufficient current outputs.

Now, researchers at the University of Illinois, Lehigh University and Purdue University have developed an approach that uses dense arrays of aligned and linear nanotubes as a thin-film semiconductor material suitable for integration into electronic devices.

### [Powerful Enterprise Email Product](#)

Enterprise Messaging Security used by over 57% of Fortune 500. Try now!

[www.securecomputing.com](http://www.securecomputing.com)

Ads by Kanoodle

The nanotube arrays can be transferred to plastic and other unusual substrates for applications such as flexible displays, structural health monitors and heads-up displays. The arrays also can be used to enhance the performance of devices built with conventional silicon-based chip technology.

"The aligned arrays represent an important step toward large-scale integrated nanotube electronics," said John A. Rogers, a Founder Professor of Materials Science and Engineering at Illinois, and corresponding author of a paper accepted for publication in the journal Nature Nanotechnology, and posted on its Web site.

To create nanotube arrays, the researchers begin with a wafer of single-crystal quartz, on which they deposit thin strips of iron nanoparticles. The iron acts as a catalyst for the growth of carbon nanotubes by chemical vapor deposition. As the nanotubes grow past the iron strips, they lock onto the quartz crystal, which then aligns their growth.

The resulting linear arrays consist of hundreds of thousands of nanotubes, each approximately 1 nanometer in diameter (a nanometer is 1 billionth of a meter), and up to 300 microns in length (a micron is 1 millionth of a meter). The nanotubes are spaced approximately 100 nanometers apart.

The arrays function as an effective thin-film semiconductor material in which charge moves independently through each of the nanotubes. In this configuration, the nanotubes can be integrated into electronic devices in a straightforward fashion by



A \$49.9  
Absolut  
Instant D

**News Top**

**Innovation:**  
Internet  
Networking  
New Produ  
Security  
Storage  
Training/Ec  
Wireless

**Top Barga**

**Sling Media**  
100 Pro Inter  
Broadcaster

**Pinzon 4-Pie**  
Setting \$26 :

**Pinzon 3.5-C**  
Hard Anodiz

Ads by Goooooogle

**[Nanotechnology Investment](#)**

New nanotechnology that may reverse aging and treat disease  
[www.504bank.com/telodpo.asp](http://www.504bank.com/telodpo.asp)

**[Carbon Nanotube Synthesis](#)**

Complete CVD Systems Built to Spec.  
 Components, Tools & Catalysts  
[www.atomate.com](http://www.atomate.com)

**[Carbon Nanotubes](#)**

5 grams for \$100.  
 Great Quality.  
 Prices Can't be Beat! Visit Today  
[www.nanomaterialstore.c](http://www.nanomaterialstore.c)

**[Silicon Wafer Processing](#)**

Silicon backgrinding, dicing, inspection and pick-place services.  
[www.chipworkslc.com](http://www.chipworkslc.com)

Advertise on this site

conventional chip-processing techniques.

A typical device incorporates approximately 1,000 nanotubes, and can produce current outputs 1,000 times higher than those of previously reported devices that incorporate just a single nanotube. Many devices can be built from each array, with good device-to-device uniformity. Detailed theoretical analysis of these unusual devices reveals many aspects of their operation.

Using the arrays, the researchers built and tested a number of transistors and logic gates, and compared the properties of nanotube arrays with those of individual nanotubes.

"This is the first study that shows properties in scalable device configurations that approach the intrinsic properties of the tubes themselves, as inferred from single-tube studies," said Rogers, who also is a researcher at the university's Beckman Institute.

Nanotube arrays aren't likely to replace silicon, Rogers said, but could be added to a silicon chip and exploited for particular purposes, such as higher speed operation, higher power capacity and linear behavior for enhanced functionality. They can also be used in applications such as flexible devices, for which silicon is not well suited.

"Nanotubes have shown potential in the past, but there hasn't been a clear path from science to technology," said Moonsub Shim, a professor of materials science and engineering at Illinois, and a co-author of the paper. "Our work seeks to bridge this gap."

**Other****[Advertising by Adfuel](#)****[OpenRussia Featured Products](#)****[Online Networking](#)****[Life Insurance Quotes](#)****[Bathroom Designs](#)**

Featuring bathroom design and remodeling tips

**[Software Downloads](#)**

Download &amp; Purchase quality shareware.

**[Toner, Ink Cartridges & Drums](#)**

Marquee Office Solutions. Free Shipping. Toner, Cartridges, Developer & Drums for all major brands, to include Xerox, Canon, HP, Ricoh, Gestetner, Minolta, Brother, Lanier, Copystar, Savin, Okidata.

**[Cosmetics and Gifts](#)** - Private collection of cosmetics and gifts for women and men.

**[Ear Infection](#)** - Unique tool empowers parents to treat & detect ear infections. Receive the information that you'll need to treat ear infection ear aches, ear fluid, and ear wax build up early!

**[employee recognition award](#)**

**[1000s ebooks for download](#)** Download or sell ebooks with PayPal.

**[laptop case](#)**

Great deals on on laptop cases.

**[Software Antivirus](#)**

Desktop antivirus and security management software

**[Russian business directory](#)**

Sauce Pan w  
 \$17.50

&lt;&lt; more

**Coupons**

**\$10 off \$25 C**  
 at Office Dep

**\$10 off one i**  
**\$20 off two i**  
 ShoeBuy

**\$5 off \$50 Ne**  
 Customer C  
 Buy.com

**Free 30-Day**  
**24-Hour Fitn**  
**Jamba Juice**  
**Purchase**

**\$5 off \$25 in-**  
**coupon at T**  
 << more

**Hot Deal**

Today's Sp

Browse th  
 faster. Get **Fi**  
 Google To



Save from 25% to 80% on Dental Services  
 Check It Out  
 We are looking for part time managers

Copyright © 2007 CCN Magazine | [Privacy Policy](#)