SEARCH
Go > Search Tips

- HOME
- STORIES

Coat of armour creates hardy 'super-cells'
'Crash-tested' skulls throw light on extinctions
IBM creates working racetrack memory device
Nanoscale freighter hauls its first load
Yahoo flirts with Google to avoid Microsoft deal

- TECHNOLOGY BLOG
- INVENTION BLOG
- VIDEO
- SPECIAL REPORTS
- SUBSCRIBE
- SEARCH
- FEEDS

PRINT EDITION

> Current issue
> Archive
> Full Access

NewScientist.com

> Bacteria tails could protect against 'dirty' bomb
13:55 11 April 2008
> Coat of armour creates hardy 'super-cells'
12:57 11 April 2008
> How the placenta adapts to make mammals a success
12:51 11 April 2008

NewScientistSpace

> Ocean mud yields secrets of past Earth impacts
20:28 10 April 2008
> Soap bubbles recreate Jupiter's turbulent storms
17:40 10 April 2008
> Smallest exoplanet may have been found
16:32 10 April 2008

Stretchy circuits promise elastic gadgets

18:00 27 March 2008
NewScientist.com news service
Phil McKenna

The first elastic, foldable, integrated silicon circuits could take previously brittle electronics to new locations, including the surface of the human brain.

John Rogers of the University of Illinois at Urbana-Champaign, US, and colleagues made flexible silicon and plastic circuits that are just 1.5 micrometres thick.

"Making it thin makes it bendable, just as a piece of paper is bendable whereas a piece of wood is not," Rogers says. The silicon in the circuits is just one crystal thick. Until now integrated circuits had been limited by a dependence on much thicker, brittle silicon wafers.

As well as being thin, the circuits are designed so that the plastic, and not the silicon, absorbs most of the stress when the chips are bent. The final product is a chip so flexible it can be folded around the edges of a US one cent coin, Rogers says.

Accordion bellows

To make the elastic circuits, the team binds the silicon wiring to a thin sheet of rubbery plastic that has been stretched out to be approximately 15% wider and longer than it was before.

Once the two materials are bound together, the researchers release all tension from the rubber. "It snaps back to its pre-stretched state and buckles with the attached circuit like an accordion bellows," Rogers says. A video (see right), shows this process happening under a microscope.

Although the deformations look violent at the scale shown in the video, the buckling is actually a gentle wave formation, says Rogers. The performance of the circuits is unaffected and they can be stretched by up to 15 percent without fracturing.

"People have talked about foldable and stretchable integrated circuits for decades but nobody has been able to do this," says Zhenqiang Ma, of the University of Wisconsin in Madison, US, who wasn't involved in the study but is working on developing similar circuits. "This will not completely transform the integrated circuited world, but it will fill an important gap, where regular semiconductors can not go."

Seizure prediction

Flexible circuitry could help efforts to create clothing containing wearable gadgets. Rogers says his circuits could also be useful inside the human skull and is collaborating with Brian Litt and colleagues at the University of Pennsylvania, Philadelphia, US, to take the elastic circuits there.

"We'd like to have an electric circuit that could wrap around part of the brain and detect signal patterns to predict the onset of seizure before it happens," Rogers says.

Flexible electronics made without silicon from semi-conducting plastics are also in development. But Rogers says flexibility alone is not enough to wrap circuits around rounded objects like the brain.

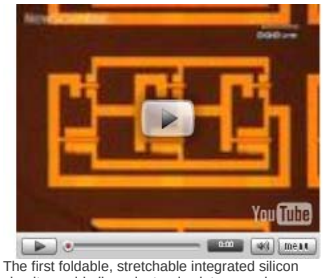
"You can't take a sheet of plastic and wrap a brain, you really need stretchability," he says. Silicon-based circuits also benefit from using an already established material, Rogers adds.

Journal Reference: *Science* (DOI:10.1126/science.1154367)

Comment subject
Comment

No HTML except lower case italic tags or lower case bold

PRINT SEND RSS FEEDS SYNDICATE



The first foldable, stretchable integrated silicon circuits could allow electronics into new places, from the human brain to clothing
Watch the full-size video

Tools
digg MY YAHOO! Google Reader reddit newsvine citeulike

Related Articles

Modified ink printer churns out electronic circuits
18 April 2007
Goodbye wires and silicon, hello plastic chips
25 January 2007
Nanowire splicing to make ultra-small circuits
30 June 2005

Search New Scientist
Contact us

Web Links

John Rogers, University of Illinois at Urbana-Champaign
Zhenqiang (Jack) Ma University of Wisconsin
Brian Litt, University of Pennsylvania

Subscriber Login
username:
password:
Your login is case-sensitive
Log in > Help
> Forgotten your password?
> Subscriber? Register now!
> Subscribe now
> Institutional Subscribers
> Athens login

Subscriptions

> Subscribe
> Renew
> Change address
> Customer service
> Free E-Zine
> RSS

Explore by Subject
> Health
> Fundamentals
> Being Human
> Living World
> Opinion
> Sex and Cloning

tags, please:
<i> or <b>

Your name

Your email

We need your email in case we need to contact you about the comment. We will not use it for any other purpose.

Submit

There is 1 comment on 1 page Back to Article »

Stretchy Circuits Promise Elastic Gadgets VIEW THREAD >>

By Klappstuhl
Fri Mar 28 15:50:16 GMT 2008
What would be interesting would be a bendable mp3-Player using this invention.
REPORT | REPLY

There is 1 comment on 1 page Back to Article »

All comments should respect the New Scientist House Rules. If you think a particular comment breaks these rules then please use the "Report" link in that comment to report it to us.

If you are having a technical problem posting a comment, please contact technical support.

PRINT SEND RSS FEEDS SYNDICATE