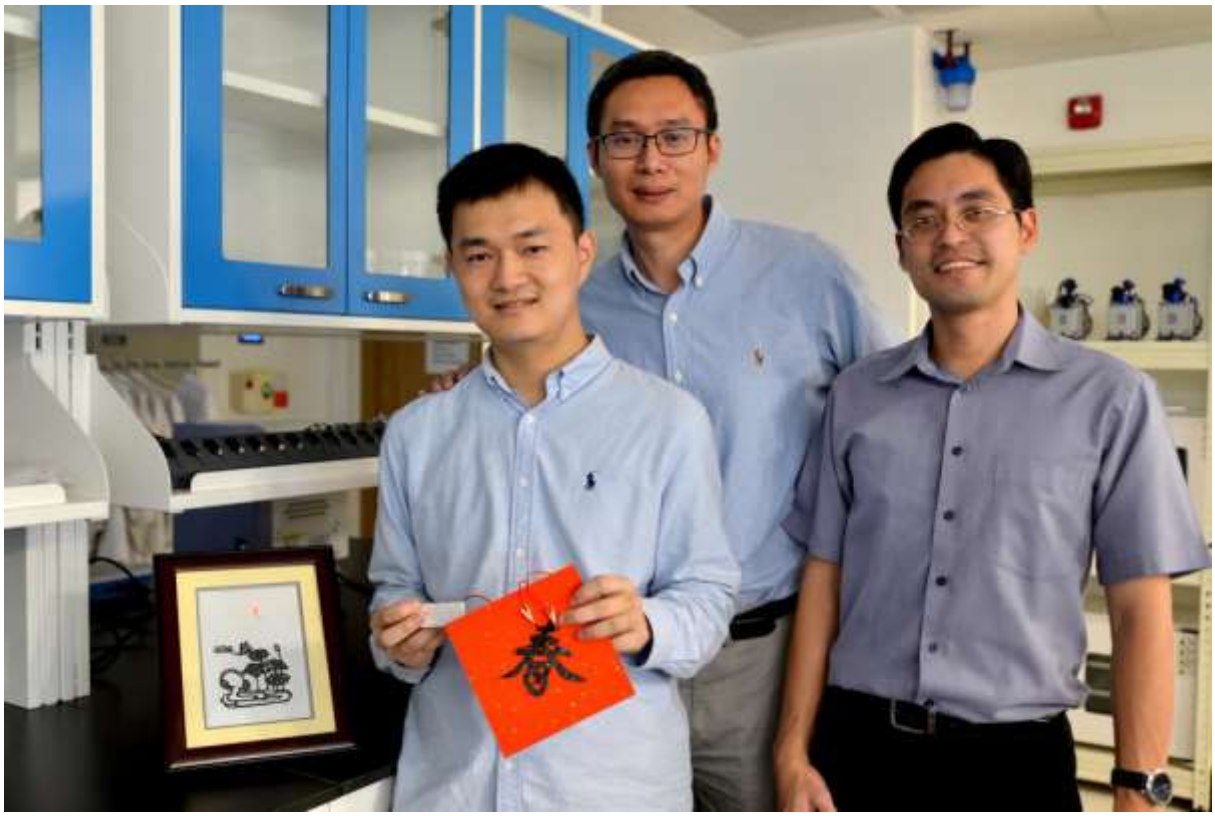
TODAY, TUESDAY, 30 JANUARY 2018

We set you thinking
TODAY

WEDNESDAY 31 JANUARY 2018

NTU scientists invent customisable, fabric-like 'battery'

BY **ASYRAF KAMIL**



(From left) NTU Singapore PhD student Lv Zhisheng, Professor Chen Xiaodong and A*STAR senior scientist Dr Loh Xian Jun are part of the team that developed the customizable power source. Photo: NTU

Published **30 JANUARY, 2018** **UPDATED 30 JANUARY, 2018**

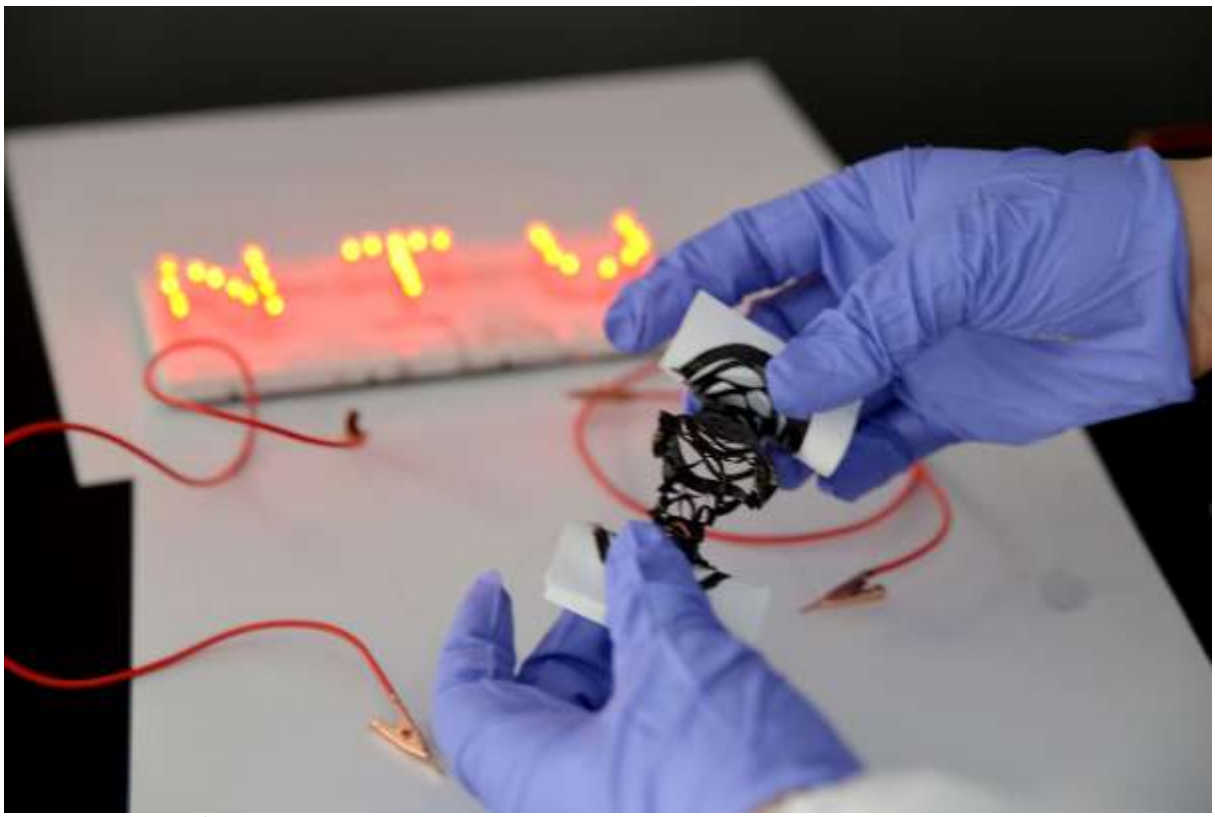
SINGAPORE — Imagine a power source – a battery – that feels like a fabric. One that could be cut up, folded and stretched, without losing its function.

That is what scientists at Nanyang Technological University (NTU) have created.

In a press statement on Tuesday (Jan 30), NTU said that a team from its School of Materials Science and Engineering, led by Professor Chen Xiaodong, has created a "wearable power source, a supercapacitor, which works like a fast-charging battery and can be recharged many times".

Such an invention can used to light up Chinese New Year decorations, or be a power source for wearable electronics.

Although stretchable supercapacitors do exist currently, they are made into predetermined designs and structures. What sets NTU's invention apart is that it can be customised — meaning its structure and shape can be changed after it is manufactured, while retaining its function as a power source.



The supercapacitor functions well even when stretched. Photo: NTU

Tests by the team have shown that when edited into a honeycomb-like structure, it has the ability to store an electrical charge four times higher than most existing stretchable supercapacitors. And even when stretched to four times its original length, it maintains nearly 98 per cent of its initial ability to store electrical energy, even after 10,000 stretch-and-release cycles.

Prof Chen said this invention is "important for the development of the wearable electronics industry".

“It also opens up all sorts of possibilities in the realm of the ‘Internet-of-Things’ when wearable electronics can reliably power themselves and connect and communicate with appliances in the home and other environments,” he said, adding that his dream is to combine these flexible supercapacitors with wearable sensors for health and sports performance diagnostics.

“With the ability for wearable electronics to power themselves, you could imagine the day when we create a device that could be used to monitor a marathon runner during a race with great sensitivity, detecting signals from both under and over-exertion,” he said.

Experiments done by Prof Chen and his team showed that when the editable supercapacitor was paired with a sensor and placed on the human elbow, it performed better than existing stretchable supercapacitors. It was also able to provide a stable stream of signals even when the arm was swinging, which are then transmitted wirelessly to external devices, such as one that captures a patient’s heart rate.

The team worked with Dr Loh Xian Jun, senior scientist and head of the Soft Materials Department at the Institute of Materials Research and Engineering, Agency for Science, Technology and Research on the project.

“Customisable and versatile, these interconnected, fabric-like power sources are able to offer a plug-and-play functionality while maintaining good performance. Being highly stretchable, these flexible power sources are promising next-generation ‘fabric’ energy storage devices that could be integrated into wearable electronics,” said Dr Loh.

The NTU team believes that the product could be easily mass-produced, and estimates that the production costs of the product to be just “about S$0.13 to produce 1 sq cm of the material”.

They have also filed a patent for the technology.