ELECTRONICS360, TUESDAY, 30 JANUARY 2018
http://electronics360.globalspec.com/article/11029/watch-supercapacitor-for-wearable-tech-maintains-power-when-stretched-four-times-its-size

Industrial Electronics

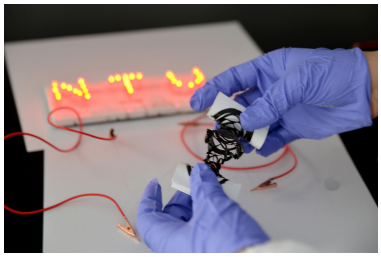
Watch: Supercapacitor for Wearable Tech Maintains Power When Stretched Four Times its Size

Siobhan Treacy

30 January 2018

Wearable technology is a fast-moving trend for 2018. There are new developments in wearable technology every day. Today's wearable tech news comes from the Nanyang Technological University (NTU), Singapore. NTU researchers have created a power source for wearables that is similar to fabric. This power source can be manipulated without losing the power function.

Professor Chen Xiaodong led the research team that developed this wearable power source called a supercapacitor. The supercapacitor is essentially a fast-charging battery.



The supercapacitor functions well even when stretched. (Source: NTU Singapore)

The team developed this wearable supercapacitor can be customizable for each manufacturer to use to their liking while keeping the power source working. Other stretchable supercapacitors already exist, but their designs are predetermined and cannot be changed once they are manufactured. The new supercapacitor is different. It can be stretched in any direction, making it easy to operate when connected to other electronic components. This supercapacitor can hold a charge four times higher than the competing wearable supercapacitor. It keeps 98% of the original charge even when stretched to four times the original length.

The team performed many experiments to test this power source. These experiments proved that the supercapacitor performed better than competing supercapacitors when worn on the human body. It could maintain a stream of signals when the body was in motion, which is a major issue in developing supercapacitors for wearable technology.

The researchers say this supercapacitor can be mass produced. Mass producing will be easy because producing doesn't require any new technology. This means costs will stay low, making it even more attainable for wearable tech companies.

"A reliable and editable supercapacitor 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," said Professor Chen, "My own dream is to one day combine our 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."

What is this magical supercapacitor made out of? It is made out of strengthened manganese dioxide nanowire composite material. Manganese dioxide is not a revolutionary or even new material to create supercapacitors. Most supercapacitors are made out of manganese. But it is the ultra-long nanowire structure that is strengthened by carbon nanowires and nanocellulose fibers that support the stretching abilities that make this supercapacitor different than others.

Dr. Loh Xian Jun, Senior Scientist and Head of the Soft Materials Department at the Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR) and collaborator on this project, said, "Customizable 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."

A paper on the new stretchable supercapacitor was published in *Advanced Materials*.

To contact the author of this article, email Siobhan.Treacy@ieeeglobalspec.com