

国大世界首创

塑料垃圾袋变电池

谢贤宁已经获得新加坡与麻省理工学院学术联盟和国立研究基金会30万元的拨款。来自美国、德国和香港的创业资本家也正在探讨如何把这项研究成果商业化。

孙伟伦 报道

一公斤的塑料垃圾袋，能转化成一公斤的电池。这不是科幻小说的情景，而是新加坡国立大学理学院的精心研究成果。

国大纳米科学与纳米科技项目高级研究员谢贤宁博士（44岁）率领的团队在用了一年半时间，研发世界首个高效储能膜（high performance energy storage membrane），把塑料改装成电池。

研发如纸一样薄的电池并不稀奇，但使用塑料来制成能储能导电的电池，相信是世界首创。

谢贤宁在一次偶然的情况下，发现塑料在经过化学加工后，可以储存电能并导电。

他昨天接受记者访问时说：“我当时就马上搁置我当时的研究，全面投入这项研究计划上。偶然的发现，如果不把握好，会稍纵即逝。”

从溶解塑料，到添加化学物质，再制成储能膜只需要一天半。只要把储能膜夹在两片导电金属，充电后就可以释放电能。

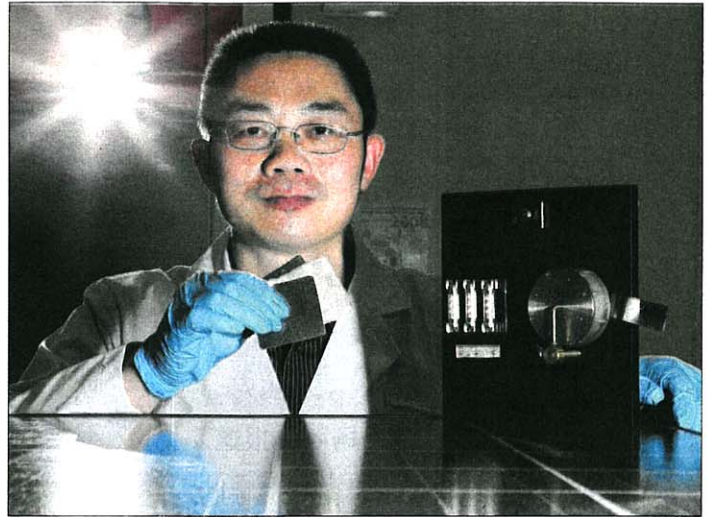
仅有0.01公分的储能膜能储存每小时10瓦的电能。此外，储能膜可以进行至少5000次的充电，这是可充电的五倍。

谢贤宁透露，他已经同国家环保局联系，讨论该如何把收集到的塑料袋运往实验室，进行储能膜的制作。

他说，用焚烧炉把塑料袋烧毁会从造成空气污染，若把塑料转化成电池，则可减少污染，让废物再循环。

储能膜虽然已经研发而成，但要把它推上市面，仍有距离。谢贤宁指出，目前主要的工作就是探讨该如何加强储能膜保存电流的能力，减低电能流失量。

此外，要如何把储能膜组成可以方便使用的电池单位是另一大挑战。谢贤宁估计仍需要约一



谢贤宁手中所握着的储能膜原料来自废弃的塑料袋。只要配上导电金属片，它就能成为一个环保高效电池。（邱启聪摄）

年的时间来调解，储能膜才能推到市面上去。

目前，储能膜已经引起一些研究机构和创业资本家的注意。

谢贤宁已经获得新加坡与麻省理工学院学术联盟（Singapore-MIT Alliance for Research and Technology）和国立研究基金会30万元的拨款。

来自美国、德国和香港的创业资本家也正在探讨如何把这项研究成果商业化。

英国知名科学学报《自然》（Nature）8月也在网站上，介绍谢贤宁的储能膜研究项目。

谢贤宁说：“希望能尽早研发成功，帮助大家节能又环保。”

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Lianhe Zaobao, 30 September 2011 (Page 9)

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NUS INVENTS TECHNOLOGY THAT CAN TRANSFORM PLASTIC BAGS INTO BATTERIES

Dr Xie Xianning from the NUS Nanoscience and Nanotechnology Initiative (NUSNNI) has received \$300,000 in funding from the Singapore-MIT Alliance for Research & Technology (SMART) and National Research Foundation (NRF). Venture capitalists from the US, Germany and Hong Kong are also exploring ways to commercialise the result of this study.

Soon Weilun

One kilogramme of plastic bags can be transformed into one kilogramme of batteries. This is not science fiction but rather the result of extensive research by the NUS Faculty of Science.

A team led by Dr Xie Xianning, 44, a senior research fellow from the NUS Nanoscience and Nanotechnology Initiative (NUSNNI), spent a year and a half developing the world's first high performance energy storage membrane that can transform plastic bags into batteries.

The development of paper-thin batteries is not new but this technology is believed to be the first in the world that can transform plastic into batteries with energy storage and electricity conductivity capacities.

Dr Xie had discovered by accident that plastic can be used to store energy and have electrical conductivity after chemical processing.

He said when interviewed by reporters yesterday: "I immediately stopped the research that I was doing at the time and dedicated myself fully to this project. This accidental finding would disappear if I fail to take full advantage of the opportunity presented."

The process of adding chemical materials to dissolved plastics in order to turn them into energy-storing membrane requires a day and a half to complete. The membrane will be able to release the stored energy when placed between two pieces of conductive metals and charged.

The 0.01 cm storage membrane can store 10 watts of energy per hour. In addition, they can be charged at least 5,000 times. This is five times the lifespan of ordinary rechargeable batteries.

Dr Xie revealed that he is already in contact with the National Environment Agency (NEA) to discuss how to ship collected plastic bags to the laboratory to be made into energy-storing membrane.

He said that burning plastic bags in incinerators will create air pollution. However, if they are transformed into batteries, this can in turn reduce pollution and allow the recycling of waste materials.

Even though the energy-storing film has been developed, it is still some time away from being introduced to the market. Dr Xie pointed out that the main objective now is to explore ways to boost the electricity-storage capacity of the film and reduce the amount of energy loss.

In addition, another major challenge is to assemble the energy-storing film into easy-to-use battery units. Dr Xie estimates that he still needs around a year to make adjustments before the membrane can be marketed.

The membrane has already gotten the attention of some research institutions and venture capitalists.

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Venture capitalists from the US, Germany and Hong Kong are also exploring ways to commercialise the result of this study.

Renowned British scientific journal Nature introduced Dr Xie's energy-storing membrane project on its website in August.

He said: "We hope the development can succeed as soon as possible in order to help people save energy and contribute to the protection of the environment."

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