

复旦大学教授团队成功制备织物太阳能电池

RESEARCH | IN OTHER JOURNALS



A solar cell textile integrated in a fabric.

MATERIALS SCIENCE

Weaving solar energy into fabrics

Imagine a sweatshirt that charges your cell phone or a sail that powers a ship's radio. To bring solar-powered fabric closer to reality, Pan et al. modified the standard design of a dye-sensitized solar cell by sandwiching the dye and electrolyte between two flexible electrodes. Earlier approaches twisted the electrodes together into cylinders. Instead, Pan et al. stacked grids of titanium dioxide-coated titanium wires and carbon nanotube fibers, making it easier to connect multiple cells. With a solid-state electrolyte, the cells lost less than 6% of their efficiency over 300 hours of operation in air. As a proof of principle, the authors used several woven cells connected in series to power a red light-emitting diode. — JSY

Angew. Chem. Int. Ed. 53, 303002/anie.201402561 (2014)

mice treated with *N*-methyl-2-pyrrolidone (NMP) survived longer than control mice treated with other drug delivery vehicles. Further analyses of NMP in cultured cells and live mice confirmed the solvent's anti-myeloma activity. NMP shares certain mechanistic similarities with other promising drug candidates for myeloma that were discovered in more traditional ways. Plans for phase I clinical trials are under way. — PAK

Cell Rep. 7, 10.1016/j.celrep.2014.04.008 (2014)

CHEMISTRY

Nanoparticle transformations in 3D

When silver nanocubes react with gold ions, they combine into hollow-frame octahedral structures. Now Goris et al. have imaged the process with electron tomography and x-ray element mapping to see how it happens. Goris et al. reacted silver nanocubes with HAuCl₄ and found that three silver atoms were oxidized for every gold atom consumed. They removed a series of samples at different points in the reaction and used three-dimensional cryo-tomography to see how the

PHYSICS

Stretching graphene to switch it off

Graphene, which is made up of a single layer of carbon atoms arranged in a honeycomb pattern, has remarkable mechanical and electrical properties, but conducts electricity almost too well. Therefore, researchers are looking for ways to switch off graphene devices more easily. It is known that graphene sometimes develops electronic states in which it doesn't conduct electricity when it is placed on hexagonal boron nitride (hBN), another honeycomb-structured material. Woods et al. now have found that graphene stretches and adapts locally to the underlying hBN lattice so that the atoms of the two lattices lie on top of each other, as long as the angle of orientation of the graphene layer with respect to hBN is not too great. The matched areas probably contribute to the nonconducting states through the homogeneity of their electronic properties. — JS

Nat. Phys. 10, 1038/nphys2594 (2014)

技术·新能源网
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我校高分子科学系彭慧胜教授课题组近日通过一种叠加织物电极的新方法，成功制备出织物太阳能电池，这类电池可以编到各种织物中，为实现可穿戴电子设备提供了一种新的有效方法。据介绍，该项最新研究工作在线发表在国际化学领域顶级权威期刊《德国应用化学》（Angew. Chem. Int.

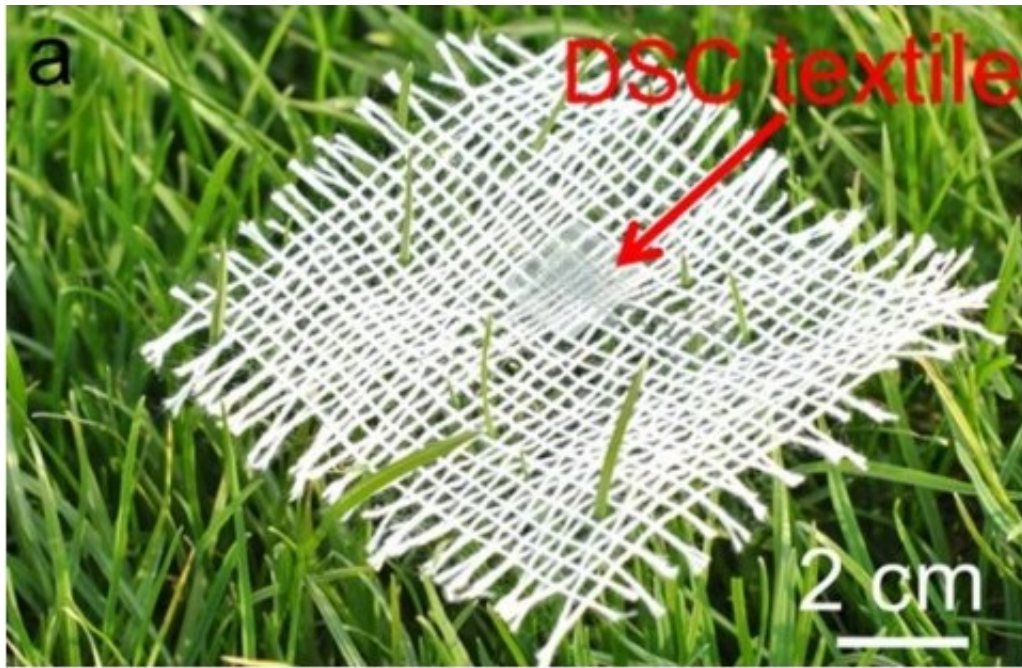
Ed.）上，论文第一作者为课题组博士生潘绍武。文章在发表后被评为热点论文（Hot Paper），同时，该期刊还以Wearable Solar Cells为题进行了专门的新闻发布，这也是该课题组继2013年12月关于可拉伸线状超级电容器被该期刊进行专题发布后再度获此殊荣。

5月30日，《科学》（Science）杂志进一步以Weaving solar energy into fabrics为题对这项研究工作进行了专门报道，引发全球多个学术和公共媒体的热点关注。

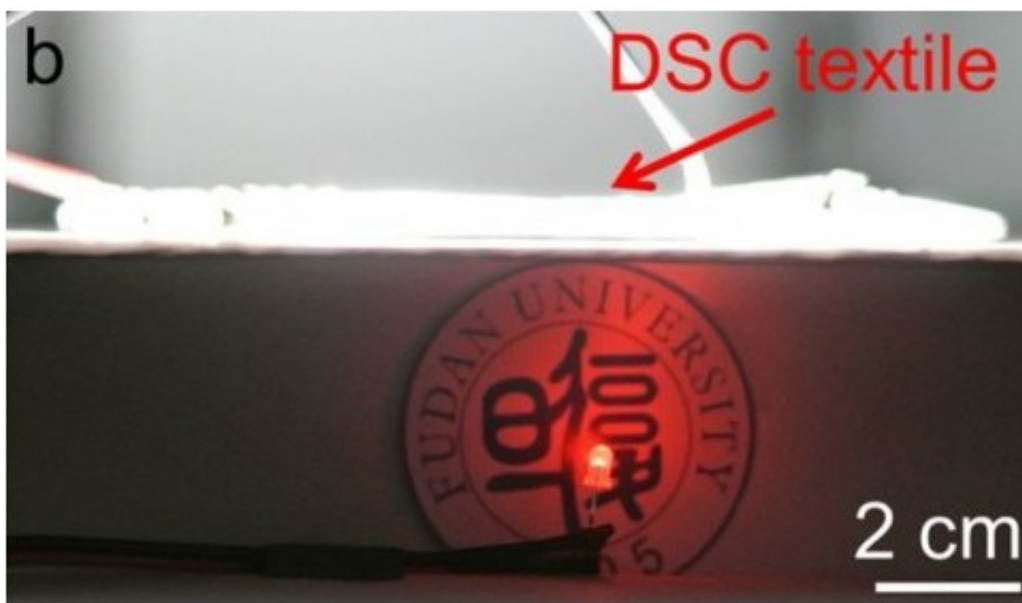
可穿戴设备是当今电子器件的主流发展方向，这类电子器件除了满足自身的功能外，还需具备质轻、柔性、可编织性等功能。近年来有许多制备线状微型太阳能电池的尝试，与传统平面状结构相比，线状器件具有质轻和可编织的优势。这些线状器件可以通过纺织技术编织到各种织物中，但如何从技术上将线状太阳能电池编成织物仍然存在一定的难度。

彭慧胜教授课题组在前期线状太阳能电池的研究基础上，在构建方法上进一步对该技术瓶颈实现突破。首先，他们将光活性物质吸附到钛丝织物上作为工作电极，再由具有优异力学和电学性能的取向碳纳米管纤维成织物作为对电极，最后对两个织物电极进行巧妙叠加，并加入电解液后封装得到织物太阳能电池。

据悉，这一新技术一旦推广至市场，将极大改变当今人类的日常用电模式，在野外出行、科考等情况下发挥太阳能充电优势，避免电量不足、寻找电源的尴尬。而易穿戴、零负担、低成本的织物设备也将融合时装设计潮流，利用电池本身的缤纷染料带来科技与美的双重体验。



编入织物中的太阳能电池



点亮发光二极管的织物太阳能电池

原文地址：<http://www.china-nengyuan.com/tech/62440.html>