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Printing solar panels

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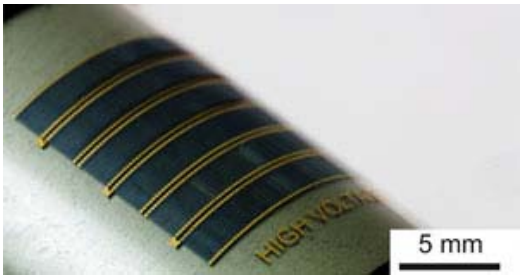
Solar cells could become part of your coat or backpack thanks to flexible silicon technology developed by US scientists.

Silicon is a high performance, reliable material used in solar cell technology, normally in the form of thick, planar rigid structures that restrict its applications. John Rogers at the University of Illinois at Urbana-Champaign and colleagues have developed a way to make very small (micrometre size) silicon microcells that connect together to form flexible solar panels.



By stamping hundreds of these microcells onto plastic substrates, Rogers' team obtained lightweight, flexible devices that bend without measurable changes in their electrical or mechanical properties, making them ideal for integration on fabrics such as backpacks, clothes and cases. They could also prove invaluable in special operations or expeditionary missions when size, space or weight are an issue says Rogers. High or low voltage devices can be made simply by arranging the microcells in different ways.

'We foresee a much more widespread penetration of silicon-based technologies into areas that are currently served only by devices that use organic semiconductors for the active materials - with comparatively poor performance and reliability,' says Rogers. This would bring many benefits as 'mechanical flexibility also reduces the cost of transport and installation,' he adds.

'The high voltage silicon solar cell modules are another very interesting application of printable silicon,' comments Heiko Jacobs, an electrical and computer engineering expert from the University of Minnesota, Minneapolis, US. 'The process lends itself to the realisation of modules that produce high voltages enabling a compact and mechanically flexible design,' he adds.

Amaya Camara-Campos

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Compact monocrystalline silicon solar modules with high voltage outputs and mechanically flexible designs
Alfred J. Baca, Ki Jun Yu, Jianliang Xiao, Shuodao Wang, Jongseung Yoon, Jae Ha Ryu, Darren Stevenson, Ralph G. Nuzzo, Angus A. Rockett, Yonggang Huang and John A. Rogers, *Energy Environ. Sci.*, 2010, **3**, 208
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