



Power Generation

Solar cells use old material in new way



US researchers have devised solar cells based on silicon that are flexible enough to be put on curved surfaces or even fabric – opening the way a broad range of new applications.

Until now, flexible solar cells have required the use of plastics, which make for less efficient devices. Alternatives using much more efficient silicon aren't very flexible.

John A. Rogers and colleagues from the University of Illinois at Urbana-Champaign and Northwestern University have come up with a new fabrication method where very thin silicon components are lifted and transferred onto plastic substrates. Because the silicon devices are so thin, they are flexible, but they also maintain their high performance and efficiency.

The innovative production technique allows the researchers to use 'old' and well-established materials like silicon in a whole different way.

"[The] designs enable us to accomplish properties that would be impossible with conventional monocrystalline cells (which are rigid, planar and brittle)," explains Rogers.

The centimetre-sized solar cells are among the most efficient flexible device reported to date.

"The work could create new ways to use silicon in photovoltaics – as 'tinting' films in architectural or automotive glass (e.g. sunroofs); as large area 'rollable' sheets; or as lightweight 'solar skins' for integration onto structural surfaces on buildings or even aircraft," says Rogers.

What the researchers haven't figured out yet, he admits, is whether the increased production costs of the new devices are outweighed by having to use less material.

For further information:

[Yoon, J., et al., Ultrathin silicon solar microcells for semitransparent, mechanically flexible and microconcentrator module designs. *Nature Materials* \(2008\), doi: 10.1038/nmat2287](#)

06 October 2008

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