'Oscar Madison' approach to solar cells may outshine 'Felix Unger' design

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Sometimes neatness may not be necessary. Researchers have demonstrated that a tangled coating of randomly positioned nanowires can increase solar cell efficiency by absorbing more light.

In the race to enhance the efficiency of solar cells, spending the time and effort to get tiny nanowires to line up neatly on the top of ordinary silicon wafers may not be worth the effort.

An international team of researchers has for the first time demonstrated that random, haphazardly grown silicon nanowires can significantly boost the power-producing capabilities of solar cells by trapping a broad spectrum of light waves and capturing sunlight streaming in from a wide variety of angles.

The nanowires, which are wrapped in a shell of silicon oxide, serve as an antireflective coating on top of the usually shiny silicon wafer. The scraggly tangle captures light ranging in color from red to violet, and the random orientation of the wires means the coating would continue to absorb light even as the angle of the Sun changes throughout the day. The researchers fabricated the jumbled, yet effective, antireflective coating by vaporizing silicon powder and then depositing it on top of a silicon wafer.

The process, described in the AIP's new journal *AIP Advances,* is relatively inexpensive and could be scaled up for large manufacturing operations. For future work the team plans to create structures that are

more ordered to test if the messy arrangement really is better.

More information: “Graded index and randomly oriented core-shell silicon nanowires for broadband and wide angle antireflection” by P. Pignalosa et al. is published in *AIP Advances*.

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