

Solar start-ups set new efficiency records

February 8 2012, by Lisa Zyga



Image credit: Semprius

(PhysOrg.com) -- Although Alta Devices and Semprius make different types of solar panels, both start-ups have been breaking records in the past few days. Santa Clara, Calif.-based Alta Devices announced that its solar panels have achieved an efficiency of 23.5%, which has been verified by the National Renewable Energy Laboratory (NREL) as the highest solar panel efficiency to date. And Semprius, based in Durham, North Carolina, has announced that its concentrated solar panels have achieved an efficiency of 33.9%. Unlike traditional solar panels, concentrated solar panels use lenses to concentrate sunlight at intensities of up to 1,000 suns.

In addition to breaking records, another thing these two types of solar panels have in common is that they're both made of gallium arsenide (GaAs) instead of the more conventional silicon. Although GaAs is more expensive than silicon, it's much better at absorbing [sunlight](#). To keep costs down, both companies have developed designs that use minimal

amounts of the material.

Alta has developed a manufacturing technique that fabricates [solar cells](#) about 1 micron thick, which is a fraction of the thickness of other GaAs solar cells. For comparison, the company notes that a human hair is approximately 40 microns thick. In addition to being extremely thin, the solar cells are also flexible, offering the potential to be integrated into roof and building materials, transportation products, and other devices. Last summer, Alta demonstrated that one of these solar cells could achieve an [efficiency](#) of 27.6% (some efficiency is lost when multiple cells are wired together and assembled into an entire solar panel).

Alta's goal is to make solar panels that are cost-competitive with fossil fuels, and to do so without government subsidies. The company is pursuing the Department of Energy's (DOE) SunShot initiative, which aims to bring solar-generated electricity down to six cents per kilowatt-hour by the end of the decade, making it competitive with coal and natural gas. The DOE predicts that, if this goal is met, solar panels would account for 15-18% of US electricity generation by 2030, up from less than 1% today.

As for Semprius' strategy, the company's concentrated solar panels consist of thousands of GaAs microcells the size of a pencil point that Semprius claims are the world's smallest solar cells. The microcells are robotically stamped onto a substrate using a specialized micro-transfer printing process. The panels contain three layers of the microcells, each modified to convert a different part of the solar spectrum into electricity.

Semprius' 33.9% efficiency, which was verified by third parties, smashes the previous record of 32.0% for high-concentration photovoltaic (HCPV) solar panels. Further, the panel is not a prototype, but is intended for commercial use. Semprius plans to open a factory in

Henderson, North Carolina, this summer and to start manufacturing commercial [solar panels](#) later this year. Like Alta, the company also predicts it can eventually generate electricity at a cost competitive with fossil fuels, also without government subsidies.

More information: [Alta Devices \(press release\)](#), [Semprius \(press release\)](#)

via: [IEEE Spectrum](#), [Technology Review](#)

© 2011 PhysOrg.com

Citation: Solar start-ups set new efficiency records (2012, February 8) retrieved 18 April 2024 from <https://phys.org/news/2012-02-solar-start-ups-efficiency.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.