Groups claim breakthroughs in solar cells

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SAN JOSE, Calif. -- Two groups--Fraunhofer and the University of Illinois--have separately claimed breakthroughs in solar cell production.

Gallium arsenide (GaAs) and related compounds claim to offer nearly twice the efficiency as silicon in solar cells. But solar cells based on these materials are expensive to make.

The University of Illinois claims to have developed a lower-cost method of manufacturing compound semiconductors such as GaAs for many electronic device applications, including solar cells.

The group deposited multiple layers of the material on a single wafer, creating a layered, "pancake" stack of gallium arsenide thin films.

"Next the researchers individually peel off the layers and transfer them. To accomplish this, the stacks alternate layers of aluminum arsenide with the gallium arsenide. Bathing the stacks in a solution of acid and an oxidizing agent dissolves the layers of aluminum arsenide, freeing the individual thin sheets of gallium arsenide," according to the group.

"A soft stamp-like device picks up the layers, one at a time from the top down, for transfer to another substrate -- glass, plastic or silicon, depending on the application. Then the wafer can be reused for another growth," according to the group.

The paper's co-authors include two scientists from Semprius Inc., a North Carolina-based startup company that is beginning to use this technique to manufacture solar cells.

Semprius is developing concentrator photovoltaic (CPV) modules for large-scale solar power generation. Semprius' micro-transfer printing technology enables CPV modules constructed from a large array of very small gallium arsenide-based, multi-junction solar cells. Module cost is minimized by using high concentration ratio.

X-Fab Semiconductor Foundries AG will serve as the foundry for flexible IC technology vendor Semiprius after X-Fab made a strategic investment of $1.5 million in the former University of Illinois spinout.

"For photovoltaics, you want large area coverage to catch as much sunlight as possible. In an extreme case we might grow enough layers to have 10 times the area of the conventional route," said U. of I. Professor John Rogers, in a statement. "You really multiply the area coverage, and by a similar multiplier you reduce the cost, while at the same time eliminating the consumption of the wafer."

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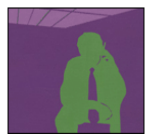

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