

The opto-electronic physics which just broke the efficiency record in solar cells (Presentation Video)

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ABSTRACT

Solar cell science and technology is changing. New efficiency records have been set. Alta Devices has reached 28.8% efficiency in a thin film single-junction cell at 1-sun, and 30.8% efficiency in a thin-film dual junction cell at 1-sun.

Counter-intuitively, efficient external fluorescence is a necessity for approaching the ultimate limits. A great Solar Cell also needs to be a great Light Emitting Diode. Why would a solar cell, intended to absorb light, benefit from emitting light? Although it is tempting to equate light emission with loss, paradoxically, light emission actually improves the open-circuit voltage, and the efficiency.

The single-crystal thin film technology that achieved these high efficiencies, is created by epitaxial liftoff, and can be produced at cost well below the other less efficient thin film solar technologies. The path is now open to a 30% efficient photovoltaic technology that can be produced at low cost.

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