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2009 : July 2009 - New Hot Papers : Ingrid Repins

NEW HOT PAPERS - 2009

July 2009



Ingrid Repins talks with *ScienceWatch.com* and answers a few questions about this month's New Hot Paper in the field of Engineering. The author has also sent along images of their work.



Title: 19.9%-efficient ZnO/CdS/CuInGaSe₂ solar cell with 81.2% fill factor
Authors: Repins, I;Contreras, MA;Egaas, B;DeHart, C;Scharf, J;Perkins, CL;To, B;Noufi, R
Journal: PROG PHOTOVOLTAICS, Volume: 16, Issue: 3, Page: 235-239, Year: MAY 2008
 * Natl Renewable Energy Lab, MS 3219,1617 Cole Blvd, Golden, CO 80401 USA.
 * Natl Renewable Energy Lab, Golden, CO 80401 USA.

SW: Why do you think your paper is highly cited?

There is a currently a great deal of interest in thin-film photovoltaics. This interest has been generated by a number of factors, including improvements in the technology, First Solar's profitability in manufacturing thin-film photovoltaics, plausible paths to grid parity put forth by several companies, and increased consciousness of the environment and security costs of conventional power.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

The paper describes a new record power conversion efficiency for thin-film solar cells.

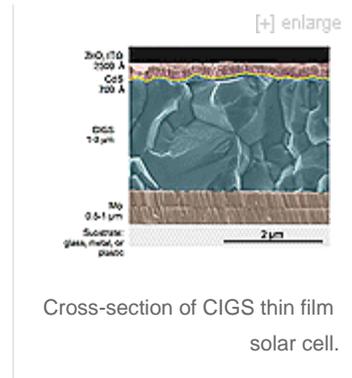
SW: Would you summarize the significance of your paper in layman's terms?

Solar cells convert sunlight to electricity. Thin-film solar cells are made by large-area coating, rather than growing a single crystal, so they can be cheaper than some older technologies.

SW: How did you become involved in this research, and were there any problems along the way?

I became involved in this research because I decided when I was twelve that I was going to solve the world's energy problems, and it turned out to be a tougher problem than I expected!

The ability of the team at the National Renewable Energy Laboratory to set records in power conversion efficiency (PCE) and point the way for the technology is a testament to years of support from the Department of Energy and hard work from the researchers. There were many difficult problems solved



Cross-section of CIGS thin film solar cell.

along the way, each resulting in incremental improvements or advances in understanding that often occurred without much fanfare.

SW: Where do you see your research leading in the future?

Recent results leave no doubt that thin films can compete with traditional crystalline silicon technology in terms of conversion efficiency. Our next step is to understand the factors related to getting these results onto the factory floor (for example, rate, process control, and yield).

SW: Do you foresee any social or political implications for your research?

The research described in the paper is one small piece in the march of photovoltaics toward grid parity and large-scale energy production. Large-scale energy generation using photovoltaics of course has numerous social and political implications: it will change our relationship with the environment. It will change how power companies manage the grid. It will change the distribution of wealth and balance of power among countries involved in generating energy.

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KEYWORDS: CIGS; THIN FILM SOLAR CELLS; RECORD EFFICIENCY; FILL FACTOR; RECOMBINATION; DIODE QUALITY; SATURATION CURRENT; SURFACE.



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