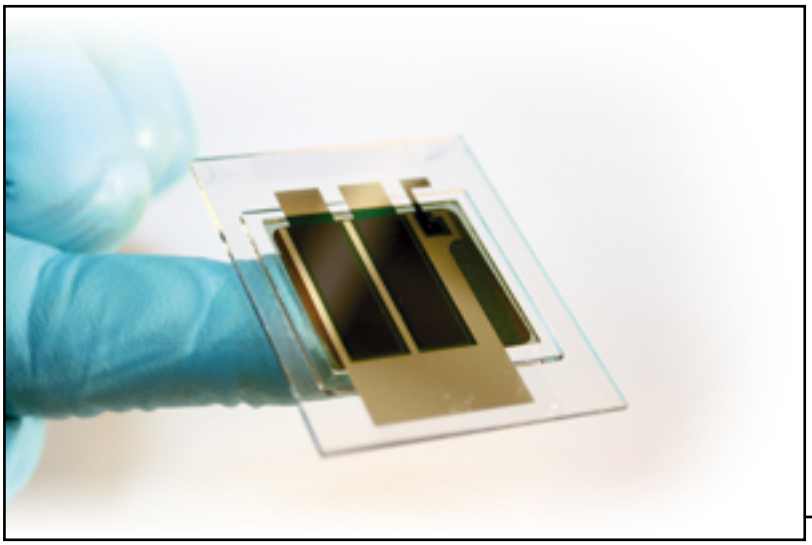
Heliatek Organic Solar Cells Achieve a Record 9.8 Percent Efficiency

Heliatek GmbH has set a new world record for organic solar cells after Fraunhofer ISE CalLab certified a cell efficiency of 9.8% for a 1.1 cm^2 tandem cell manufactured with a low temperature deposition process. This new record makes the third time in a row that Heliatek has set a world record for efficiency in the field of organic photovoltaic and demonstrates its continuous technology leadership in organic solar.

One year ago, Heliatek GmbH set a world record for efficiency of 8.3 % for an active surface of 1.1 cm^2. Thanks to its most recent developments, Heliatek has now been able to make a remarkable 1.5 % leap in cell efficiency, to 9.8 %. This new record was measured and certified by the independent Fraunhofer ISE CalLab (Freiburg, Germany) under standard test conditions.

Dr. Martin Pfeiffer, co-founder and CTO of Heliatek, explains: “Heliatek is the only solar company in the world focused on the deposition of small molecules with low temperature processes, a method that has already been widely adopted by the market for use with organic LEDs (OLEDs). Heliatek develops and synthesizes in-house the molecules responsible for capturing light in solar cells and converting this light into electricity. The new world record is a clear indication that Heliatek is headed in the right direction. Organic solar cells from Heliatek have now reached the level of efficiency of conventional solar cells made from amorphous silicon.”

Heliatek has both its own chemistry research department as well as a physics research department. This unique combination creates efficient synergies, enabling simultaneous work on material quality and cell design. Heliatek was able to optimize the absorber layer system of the record-breaking cells through synthetizing the right materials. Furthermore, by improving the deposition process, cell morphology was significantly improved, leading to an increase in power output and in fill factor.



The record-breaking cell construction will gradually be integrated into Heliatek's manufacturing process after the scheduled start of production in the second half of 2012. Heliatek's in-house measurements have shown that scaling up the record-breaking cells to a panel with a size factor >120 results in an efficiency over 9 % for the active module area.

Thibaud Le Séguillon, CEO of Heliatek, concludes: "I am delighted by this new result which confirms our technology leadership in this field. The next step on our way to 15 % will be a cell with over 10 % efficiency sometime next year. This latest record validates once again the decision taken at the outset by our investors and our team to commit ourselves to the production of organic solar based on small molecules using low temperature processes. Our flexible, thin and light panels open up new fields of applications that were so far impossible to address with conventional PV technologies. After our third investment round scheduled for 2012 - during which we plan to raise some €50 million in new capital from current and new investors - we plan to expand our production capacity with additional manufacturing lines. This will allow us to market our high-performance panels into new areas, such as windows and facades for BIPV. This technology has really the potential to revolutionize the solar industry."

For achieving this new record efficiency result, Heliatek acknowledges comprehensive financial support of its R&D projects by the German Federal Ministry of Education and Research (BMBF) under project numbers 13N9869 and 13N9716, as well as the European Regional Development Fund (ERDF) and Freistaat Sachsen under project number 71070.

Dr. Martin Pfeiffer (CTO of Heliatek GmbH), together with his fellow researchers Prof. Karl Leo (Director of IAPP) and Dr. Jan Blochwitz-Nimoth (Novaled AG), has been nominated for the 2011 Deutschen Zukunftspreis for successful research in the field of organic electronics. On December 14, German President Christian Wulff will announce the winner from the three teams of scientists in the running for the prize.

About Heliatek's Technology:
Organic photovoltaic technology (OPV) is the third generation of solar technology, after classic crystalline and thin film solar technology. OPV can be divided into two

approaches: polymer-based (large molecules) and oligomer-based (small molecules) OPV, such as those used at Heliatek. The advantage of Heliatek's technology based on small molecules lies in better process control, higher efficiency, and longer lifespan, in contrast to OPV based on printed polymers currently available on the market.

Heliatek's competitive edge stems from its patents portfolio covering the production of organic solar cells with doped transport layers. Using patented tandem cell technology (two solar cells stacked on top of each other) it is possible to absorb a very broad solar spectrum using extremely thin organic layers, altogether only 500 nm thin - one decisive factor for higher efficiency. Heliatek's unique and highly coordinated activities in chemical synthesis and device physics result in a sharp climb in technological progress.

Heliatek plans to use a low-temperature roll-to-toll process to fabricate solar panels, a process that is extremely cost efficient in mass production. Since "small molecules" have already replaced the use of polymers in the organic electronics industry (OLED displays and lighting), Heliatek can benefit from their manufacturing experience.

Heliatek's solar panels will offer four major key benefits compared to conventional solar panels, thus opening up new dimensions for the application of solar technology:

As the low process temperatures allow for the use of plastic film as substrate material, the modules will be flexible, ultra-thin and extremely lightweight. The modules at only 0.5 kg/m² (versus 12 to 17 kg/m² for conventional PV) provide solar options for all kind of mobile applications and for roofs with low bearing loads.

The great design freedom offers various choices in module color, dimensions and transparency levels. Windows with semi-transparent OPV can perform a dual function of solar energy collection and shading and they can even be made with a range of tints to suit the architect's design requirements.

In addition, Heliatek modules also excel in real-life performance compared to common solar panels: Whereas the efficiency of traditional solar modules drops off as the temperature rises, Heliatek OPV modules maintain its efficiency independent of the module temperature. Similarly, if the light intensity decreases, average modules become less efficient yet Heliatek panels offer the same efficiency from full sun down to a tenth (1/10th) of full sun, typical for very cloudy winter days. This makes Heliatek modules perfectly suitable for sunny regions as well as for northern regions, for integrated solutions with little module ventilation and for integration into facades or roofs that suffer from poor orientation.

Finally, Heliatek's organic solar technology is the truly green solar technology. The solar cells are made of fully organic, readily available material and they do not contain any known toxic ingredients or heavy metals. Only 1 gram of organic material is required to produce one square meter of solar panel. The non-toxic manufacturing process is environmentally friendly as it doesn't require any solvents

or high input of energy. Transportation costs with their associated carbon footprint are also significantly less for the ultra-lightweight panels compared to common modules with their heavy, fragile sheets of protective glass.

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