

# Press Release

Freiburg  
June 24, 2016  
No. 16/16  
Page 1

## **Frank Feldmann Receives SolarWorld Junior Einstein Award 2016**

### **Two Scientists, Two Institutes, One Goal: Highest Efficiency Solar Cells**

For the eleventh year in a row, SolarWorld's prestigious Junior Einstein Award has been awarded to excellent young scientists and engineers. At the award ceremony, which took place during the Intersolar Europe in Munich on June 22, 2016, the German solar company presented this year's award to two young scientists: Dr. Frank Feldmann of the Fraunhofer Institute for Solar Energy Systems ISE and his scientific colleague Dr. Udo Roemer of the Institute for Solar Energy Research in Hameln. The jury of the international competition honored both researchers for their groundbreaking work on passivated contacts, which enables considerably higher silicon solar cell efficiencies.

In his doctoral thesis, Frank Feldmann laid the foundation for a new world record efficiency of 25.1 percent for both sides-contacted silicon solar cells. Announced in its [Press Release 27/2015](#), Fraunhofer ISE brought the world record to Germany surpassing the former record for the first time in twenty years. "Frank Feldmann succeeded by using a totally new approach that demonstrates a clear upward potential," says Jury Chair Dr. Holger Neuhaus.

The full-area passivated back contact, developed by Frank Feldmann, is the special feature of the 25.1% silicon solar cell manufactured at Fraunhofer ISE. To achieve efficiency improvements, the focus was previously on increasingly complex cell structures. In the new concept, the entire rear cell surface can be contacted without any patterning. Compared to the high efficiency solar cell structures, the manufacturing process is simpler and the efficiency higher.

**Fraunhofer Institute for  
Solar Energy Systems ISE**  
Heidenhofstrasse 2  
79110 Freiburg  
Germany  
Press and Public Relations  
Karin Schneider  
Phone +49 761 4588-5150  
Fax +49 761 4588-9342  
info@ise.fraunhofer.de

www.ise.fraunhofer.de

# Press Release

**Freiburg**  
**June 24, 2016**  
**No. 16/16**  
**Page 2**

“I am very pleased to receive this award,” says the award recipient from Freiburg. “First, I would like to thank the jury. Many thanks also goes to my thesis supervisor, Prof. Dr. Oliver Paul at the Faculty of Engineering, University of Freiburg and the second supervisor, Prof. Dr. Gerard Willeke, at Fraunhofer ISE.

Frank Feldmann is a member of the research team led by Dr. Martin Hermle, department head of “High Efficiency Silicon Solar Cells” at Fraunhofer ISE. The group around Hermle is working on the so-called TOPCon-Technology (Tunnel Oxide Passivated Contact), in which metal contacts are applied to the rear side without patterning. The selective passivated contact developed by Feldmann allows the majority charge carriers to pass and prevents the minority carriers from recombining. The thickness of the intermediate passivation layer is reduced to one or two nanometers, allowing the charge carriers to “tunnel” through it. Subsequently, a thin coating of highly doped silicon is deposited over the entire layer of ultra-thin tunnel oxide. This novel combination of layers allows electrical current to flow out of the cell with nearly zero loss.

In the photovoltaics industry, the majority of solar cells have an aluminum-alloyed back contact covering the entire rear side. This type of contact, however, limits the efficiency. Therefore, the industry currently retrofits their production to incorporate the PERC (Passivated Emitter Rear Cell) technology in order to increase the solar cell efficiency. With PERC technology, only a small area on the rear side is contacted in order to reduce recombination. PERC, however, requires additional patterning steps and leads to longer current conduction paths in the silicon wafer. TOPCon, on the other hand, offers a possible approach to reduce these loss mechanisms and increase the efficiency.

Prof. Dr. Stefan Glunz, division director of “Solar Cells – Development and Characterization” is pleased that a young

**Fraunhofer Institute for  
Solar Energy Systems ISE**

Heidenhofstrasse 2  
79110 Freiburg  
Germany  
Press and Public Relations  
Karin Schneider  
Phone +49 761 4588-5150  
Fax +49 761 4588-9342  
info@ise.fraunhofer.de

[www.ise.fraunhofer.de](http://www.ise.fraunhofer.de)

# Press Release

Freiburg  
June 24, 2016  
No. 16/16  
Page 3

researcher at Fraunhofer ISE has again received the SolarWorld Junior Einstein Award. "With his research work, Frank Feldmann has made an important contribution to the evolutionary development of both sides-contacted silicon solar cells."

Including Frank Feldmann, this is the fifth SolarWorld Junior Einstein Award that has been given to a young researcher at Fraunhofer ISE. The others are: Oliver Schultz 2008, Paul Gundel 2001, Pierre Saint-Cast 2013 and Michael Rauer 2015.

**Text of the PR and photos** can be downloaded from our web site: [www.ise.fraunhofer.de](http://www.ise.fraunhofer.de)

**Contact Person for further information:**

Dr. Frank Feldmann, Fraunhofer ISE  
Phone +49 761 4588-5287  
[frank.feldmann@ise.fraunhofer.de](mailto:frank.feldmann@ise.fraunhofer.de)



**Fraunhofer Institute for  
Solar Energy Systems ISE**  
Heidenhofstrasse 2  
79110 Freiburg  
Germany  
Press and Public Relations  
Karin Schneider  
Phone +49 761 4588-5150  
Fax +49 761 4588-9342  
[info@ise.fraunhofer.de](mailto:info@ise.fraunhofer.de)

[www.ise.fraunhofer.de](http://www.ise.fraunhofer.de)

SolarWorld Junior Einstein Award 2016. (f.l.t.r.) Frank Asbeck, founder and CEO of SolarWorld, the award recipients Dr. Frank Feldmann and Dr. Udo Römer and jury chairman Dr. Holger Neuhaus. ©SolarWorld AG/Milton Arias