

## Trade Press Release

Hanau, Germany, 06 May 2014

### **21.2% World Record Efficiency PERC Silicon Solar Cell Using Heraeus Ag Metallization Pastes**

- **Highest efficiency ever achieved on an industrial screen-printed PERC silicon solar cell**

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The Institute for Solar Energy Research Hamelin (ISFH) increases the conversion efficiency of industrial p-type silicon solar cells with screen-printed metal contacts from today's typical 17.5% to 19.5% to a record value of 21.2%, using leading-edge front-side metallization pastes supplied by the Photovoltaics Business Unit of Heraeus Precious Metals. 21.2% is the highest efficiency reported so far for industry typical silicon solar cells using screen-printed metal contacts. The measurements were confirmed by the independent institute Fraunhofer ISE CalLab.

A combination of different technologies enabled this great result on an industrial PERC solar cell. As opposed to conventional solar cells, PERC cells have a passivated rear-side, which increases the amount of energy captured from the cell. ISFH's cell design incorporates a narrow front-side grid design using a dual printing process and an advanced five busbar design. This special layout enables the reduction of finger line widths to 46  $\mu\text{m}$ , which decreases shadowing losses and serial resistance. The narrower finger lines were printed with an industry-leading front-side silver metallization paste of Heraeus that processes a high fill factor and low series resistance. The busbars were printed using Heraeus' newest low activity paste. This paste does not fire through the passivation layer, which results in an additional boost in Voc. The excellent properties of both pastes and the finely tuned process parameters have contributed to this great result.

"A 21.2% conversion efficiency for a PERC cell using standard production equipment is a true breakthrough. With the excellent processing knowledge and solar cell expertise of the ISFH, the front-side silver-pastes of Heraeus unfolded their cells' peak performance", states Dr. Weiming Zhang, Vice President of Technology of the Photovoltaics Business Unit. "Cooperation with partners within the PV industry such as the ISFH is essential for us. It's an ideal platform to exchange state-of-the-art knowledge in cell technology and processing know-how for advancing solar energy."

Learn more about Heraeus' highest performance metallization pastes for lowest cost per Wp at this year's SNEC in Shanghai, China, from May 20-22, 2014. Our booth is located in hall W3, number 560. You can also go to [www.pvsilverpaste.com](http://www.pvsilverpaste.com) for more information.

## **About the Heraeus Photovoltaics Business Unit**

The Heraeus Photovoltaics Business Unit is an industry leading developer and manufacturer of silver metallization pastes for the photovoltaic industry. For over 40 years, Heraeus has built a reputation of innovation, extensive research and new product development in thick film technologies for some of the most prominent companies within a variety of industries. In the field of photovoltaics, the Heraeus Photovoltaics Business Unit applies this history and its innovative technology to offer metallization pastes for solar cell applications. The Heraeus SOL Series of silver pastes is specially formulated to provide higher efficiencies and wider processing windows, resulting in better yields and higher output for cell manufacturers.

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Heraeus, the precious metals and technology group headquartered in Hanau, Germany, is a global, private company with more than 160 years of tradition. Our fields of competence include precious metals, materials and technologies, sensors, biomaterials and medical products, quartz glass, and specialty light sources. In the financial year 2012 Heraeus generated product revenues of €4.2 billion and precious metal trading revenues of €16 billion. With more than 12,200 employees in over 100 subsidiaries worldwide, Heraeus holds a leading position in its global markets.

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