

Trade Press Release

West Conshohocken, PA 09.18.2014

Heraeus to Exhibit at the 28th EU PVSEC

• Heraeus PV to highlight its successful European collaborations and Strengthen Intellectual Property Portfolio

The Heraeus Photovoltaics Business Unit will be attending the 28th European Photovoltaic Solar Energy Conference and Exhibition [EU PVSEC 2014] at the RAI Convention & Exhibition Centre in Amsterdam, the Netherlands from September 23rd – 25th 2014. Exhibiting in Hall 1, Booth D6, Heraeus will be highlighting several of the research and development projects their organization worked on in partnership with several of the leading solar institutes in Europe.

With roots in Hanau German, Heraeus uses its history of innovation and leverages its European relationships to develop new metallization pastes for the photovoltaic industry. In a statement from Andreas Liebheit, Global Manager of the Heraeus Photovoltaics Business Unit, he says “Heraeus’ goal is to assist the photovoltaic industry in reducing the cost per watt of solar installations. Our core competency is the development of innovative, high performance metallization pastes for solar cells. We achieve the development of industry leading pastes through two approaches. We work with customers and leading research institutes such as Fraunhofer, ISFH and ECN to understand the current and future needs of the industry. By working with these institutes, we gain insight into the potential barriers of advanced cell designs.” Mr. Liebheit continued stating, “Second, we invest heavily in research and development to break through these barriers, developing unique metallization paste formulations unlike any available on the market today. This collaboration and intense investment in research and development is the foundation of our robust patent portfolio in metallization paste technology. It also increases our ability to help our customers and the industry lower the cost per watt for solar.”

Dr. Weiming Zhang, Vice President of Technology of the Heraeus Photovoltaics Business Unit, continues regarding Heraeus’ investment in R&D by stating, “Heraeus has over a forty year history in the investment in

the research and development of metallization pastes. Since our entry into the PV Industry over nine years ago, we have made specific investments in fundamental research in this market to improve metallization characteristics such as contact, adhesion, processing window voltage, finger line geometries and cell efficiency for conventional and advanced c-Si cell designs. The results have allowed us to amass a patent portfolio that allows us to work freely with leading research institutes and customers to develop innovative formulations that solve technical hurdles.” Dr. Zhang concluded by saying, “We embrace the challenges presented by our partners because it forces us to develop new ground breaking technologies that also strengthen our intellectual property position in the market.”

During the EU PVSEC 2014, Heraeus will be highlighting several of their collaborations in Europe. Heraeus’ partnership with the Fraunhofer Institute for Solar Energy Systems in the development of pastes for extrusion technology enabled 30 micron finger lines with an increase in efficiency up to 0.40% absolute relative to traditional screen printing. Fraunhofer ISE will highlight recent results in their Visual Presentation 2CV.4.12 during the EUPVSEC conference, named “*Ultrafine Front Side Metallization on Silicon Solar Cells by Industrial Dispensing Technology*”. In cooperation with the Photovoltaics Innovation Alliance, Heraeus and SolarWorld Innovations GmbH successfully demonstrated coextrusion metallization technology, achieving fired finger lines less than 30 micron and average efficiency gains of 0.25% absolute relative to traditional screen printing. Through the use of improved coextrusion pastes for high ohmic emitters, potential efficiency gains of about 0.5% are projected as achievable. The record PERC cell performance of 21.2% cell efficiency by ISFH has been reported in several prior press releases. Heraeus’ work with ISFH assisted in this accomplishment, but also reduced the cost of silver to below \$0.01 per watt. The ECN n-Pasha program, commercializing the production of n-Type solar cells, used Heraeus n-Type metallization pastes modified for ECN’s cell design. Currently, there are two manufacturing sites that are using ECN’s n-Pasha process, demonstrating cell efficiencies greater than 20%. Cell efficiencies of 20.5% are projected with newer Heraeus metallization pastes.

To discuss these projects and the Heraeus metallization pastes used, visit the Heraeus Photovoltaics Business Unit at this year’s EU PVSEC at the

RAI Convention & Exhibition Centre in Amsterdam, the Netherlands from September 23rd – 25th 2014 in Hall 1, Booth D6.

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.

The Hanau-based precious metal and technology group Heraeus is a globally active family-run enterprise with a history of more than 160 years. We provide high-end solutions to our customers to lastingly strengthen their competitive position. Our areas of competence include precious metals, materials and technologies, sensors, biomaterials and medical devices, quartz glass and specialty light sources. In the financial year 2013, Heraeus achieved a revenue from the sale of products of €3.6 bn, while the revenue from precious metal trading was €13.5 bn. With about 12,500 employees in more than 110 companies world-wide, Heraeus is in a leading position on its global sales markets.

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