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Making light of efficient photovoltaics: Evonik displays solar expertise at PVSEC

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Essen—How can solar modules be made lighter in application, more flexible in form, more efficient in current yield, more attractive in design, and more cost-effective to produce? Evonik Industries has many answers to that question, including high-purity raw materials for solar silicon, customized plastics and additives, and microstructured lenses for solar concentration. The company is presenting for the first time the full range of its solutions in the field of solar power generation at the European Photovoltaic Solar Energy Conference and Exhibition (PVSEC) in Hamburg between September 5 and 9.

One such solution can be seen in Hall B1 in the form of the Sunovation Eco Technics carport. Futuristic in design, this has everything one would expect of a high-tech parking space: solar modules for power generation, energy-conserving LED lighting, and a power socket for charging an electric vehicle. The filigree design is made possible by PLEXIGLAS® from Evonik, which is used for the roof as well as the base plate of the module. With its superior transmission properties, this plastic ensures particularly efficient utilization of solar energy as a result of increased current yield.

Highly efficient and cost effective

With more than 60 years of experience in silicon chemistry, Evonik supplies high-purity chlorosilanes and monosilane under the Siridion® brand name for production of solar silicon and photoactive layers in thin-layer solar modules. In addition, Evonik is working on processes to reduce the cost of producing solar silicon and thus make generating power from solar energy cheaper. In this way, the company is making a contribution to grid parity, where the cost to the end-consumer of self-produced power should be identical to the cost of purchasing it from the grid operator.

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Efficient energy generation is made possible by microstructured primary lenses such as PLEXIGLAS® Fresnel lenses, which focus sunlight for concentrated photovoltaics (CPV) at a secondary lens of SAVOSIL™, a product of high-purity silica glass. Positioned in front of a high-performance solar cell, this system improves the efficiency of CPV modules.

Flexible and stable

The production of flexible solar modules is made possible by a front sheet from Evonik. Like a glass plate, this protects the solar module from wind and weather, but is several times lighter. The low weight of the modules opens up new application areas for photovoltaics such as on flat roofs, which are currently ruled out on static grounds as supports for the heavy solar modules. Use on vehicle roofs and laptops is also a possibility.

The crosslinker additives TAC and TAICROS® allow shorter crosslinking times, higher transparency, and improved long-term stability for EVA (ethylene vinyl acetate) encapsulant films. These high-purity additives are now integral components in solar panel production. The methacrylate-functional silane Dynasylan® MEMO is also a good adhesion promoter for EVA encapsulant films, achieving excellent adhesion to solar cells as well as glass substrates and front sheets. Moreover, variously functionalized epoxy and vinyl silanes of the Dynasylan® brand name are successfully used in adhesives as well as in the necessary cable insulation.

Analytical and innovative

Backed by its extensive know-how and expertise as a center of excellence for analytics, AQura GmbH, a subsidiary of Evonik Industries AG, offers individual guidance and support for chemical and physico-chemical problems as well as in technical safety studies.

From increased current yields, through concentrated photovoltaics and lightweight solar modules, to solar silicon, Evonik works on a wide range of solutions to harness solar power for efficient utilization of energy. Its

Solar Power Industry Team, established two years ago, functions here as a link between the market and research activities.

Dr. Peter Nagler sums up the team's task in a question: "What are our customers' needs, and how can we support them?" As Evonik's Chief Innovation Officer, Nagler heads Innovation Management as well as the steering committee of the Solar Power Industry Team. "At Evonik we're working on very many projects for the solar market, so it makes sense to pool them into a dedicated platform. This allows us to network projects, ensure close interaction for information exchange, and provide customers with information on our wide spectrum of solutions for photovoltaics from a single source," says Nagler.

Caption:

The SUNOVATION ECO TECHNICS carport developed by Sunovation GmbH. The cover plate and base plate of the solar module are made of PLEXIGLAS®.

Evonik Industries is a worldwide manufacturer of PMMA products sold under the PLEXIGLAS® trademark on the European, Asian, African and Australian continents and under the ACRYLITE® trademark in the Americas.

About Evonik

Evonik is the creative industrial group from Germany. In our core business of specialty chemicals, we are a global leader. In addition, it has energy and residential real estate operations. Our performance is shaped by creativity, specialization, reliability and continuous self-renewal.

Evonik is active in over 100 countries around the world. In fiscal 2010 more than 34,000 employees generated sales of around €13.3 billion and an operating profit (EBITDA) of about €2.4 billion.

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