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May 07, 2015

Merck KGaA, Darmstadt, Germany, Presents Organic Photovoltaic Materials at EXPO 2015 in Milan

- **Modern printed high-performance polymers from Merck KGaA, Darmstadt, Germany, provide for power generation by futuristic solar trees at the German Pavilion**
- **As part of the Organic Photovoltaic Technology Consortium, Merck KGaA, Darmstadt, Germany, wants to raise awareness of the resource-conserving, flexible and cost-effective technology**
- **Color solar panels create new building design perspectives for architects**

Darmstadt, Germany, May 07, 2015 – The German Pavilion at EXPO 2015 in Milan has integrated a new solar cell technology into architecture: flexible organic photovoltaics (OPV). With its innovative materials, Merck KGaA, Darmstadt, Germany, is providing the key active component of the so-called solar trees that feature this new technology. Visitors to the World Expo, which opened in May, can experience the energy-efficient modules that have been integrated into stylized trees. The futuristic plants are a central design element of the German Pavilion. They symbolize idea seedlings, thus embodying the pavilion's name "Fields of Ideas". Germany is presenting itself as a vital, fertile landscape filled with ideas to nourish the future. The power-generating OPV modules in the solar trees are produced with printable formulations of modern high-performance polymers that Merck KGaA, Darmstadt, Germany, offers under the lisicon® brand name. The blue color of the hexagonal OPV modules comes from these materials. They convert the incident light into charge carriers that can be collected in order to generate electricity. The integrated OPV system is being realized by a network of partners: the Organic

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Merck KGaA

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Photovoltaic Technology Consortium (ARGE OPV) – consisting of the companies Belectric OPV, Carl Stahl, Hager SE as well as U.I. Lapp, Merck KGaA, Darmstadt, Germany, and Schmidhuber – with support from the German Federal Ministry of Education and Research.

Brian Daniels, Head of the Advanced Technologies business unit at Merck KGaA, Darmstadt, Germany, is delighted by the attention the future technology has attracted in Milan: “Organic photovoltaics is one of our key growth platforms, in which we develop innovative materials for the cost-effective production of flexible, printed solar panels. These panels are not only efficient and long-lived, but also beautiful for architectural applications. The solar trees at the Expo in Milan are a great example of how these features inspire architects for smart buildings with energizing facades. OPV has the potential to change modern city life. With OPV we can attach single solar-farms to each building so that the countryside can be used to producing food or remain beautifully natural. This ties in perfectly with the theme of the Expo, which is ‘Feeding the Planet, Energy for Life’”.

New solar cell technology offers many impressive advantages

Organic photovoltaic films have several advantages over conventional silicon cells. Photoactive organic materials are printed in extremely thin layers on transparent plastic film. The patented special inks used in printing consist of formulated blends of materials which after coating create electricity when exposed to light. This technology allows lightweight and flexible semi-transparent modules. As a result, they can be used on all kinds of surfaces. In Germany alone, it is estimated that around 2 to 3 billion square meters of façades and roofs could be equipped with these types of solar panels. A further key advantage is that the modules generate relatively constant output, for instance even if it is cloudy or artificial light is being used. In addition, they can be produced in different colors and thus adapted to the surroundings. This is a property that creates new possibilities, particularly for building design. The cost-effective production of the OPV modules is also advantageous. Since these polymer materials can be processed as liquid solutions, they are suitable for multiple printing processes: spin coating, ink-jet printing or roll-to-roll processing such as gravure and flexographic printing. In contrast to



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many other polymers for OPV, the materials from Merck KGaA, Darmstadt, Germany, can be coated from non-halogenated solvents without any detriment to performance. This minimizes the environmental impact during production and thus corresponds entirely to the concept of green energy generation.

Under the motto “**Energizing SurFaces Power Modern Life**” the partners of the **Organic Photovoltaic Technology Consortium (ARGE OPV)** will held an **exclusive event** with experts from the OPV scene. It will take place at the German Pavilion **on June 8, 2015 in Milan**. As a key-note speaker Lennart Wiechell from SCHMIDHUBER, the architect of the German Pavilion, will share his insights and vision about energizing potentials of the OPV technology in modern and sustainable architecture.

Journalists that are interested to report on the new technology can receive an invitation. Please get in contact with us via pm_communications@emdgroup.com.

The **Organic Photovoltaic Technology Consortium (ARGE OPV)** is the partner network for the development and installation of the organic photovoltaic technology in the German Pavilion. The ARGE OPV is made up of the companies BELECTRIC OPV, Carl Stahl GmbH, Hager Group, U.I. Lapp GmbH, Merck KGaA, Darmstadt, Germany, and SCHMIDHUBER. The project is being supported by the German Federal Ministry of Education and Research.

About the German Pavilion: On behalf of the German Federal Ministry of Economic Affairs and Energy, Messe Frankfurt has been entrusted with the organization and running of the German Pavilion at Expo 2015 in Milan. The design, planning and realization of the German Pavilion have been taken on by the ARGE, a consortium made up of SCHMIDHUBER (pavilion’s spatial concept, architecture and general planning), Milla & Partner (content concept, exhibition and media design) and Nüssli Deutschland (project management and construction).

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Merck KGaA of Darmstadt, Germany, is a leading company for innovative and top-quality high-tech products in healthcare, life science and performance materials. The company has six businesses – Biopharmaceuticals, Consumer Health, Allergopharma, Biosimilars, Life Science and Performance Materials – and generated sales of € 11.3 billion in 2014. Around 39,000 employees work in 66 countries to improve the quality of life for patients, to foster the success of customers and to help meet global challenges. Merck KGaA, Darmstadt, Germany, is the world’s oldest pharmaceutical and chemical company – since 1668, the company has stood for innovation, business success and responsible entrepreneurship. Holding an approximately 70% interest, the founding family remains the majority owner of the company to this day. Merck KGaA, Darmstadt, Germany holds the global rights to the Merck name and brand. The only exceptions are Canada and the United States, where the company operates as EMD Serono, EMD Millipore and EMD Performance Materials.