



Materials That Power Our World

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For Immediate Release

Merck KGaA, Darmstadt, Germany, and Nano-C Present Enhanced Materials for Organic Photovoltaics

Westwood, MA. – August 3, 2015 – Merck KGaA, Darmstadt, Germany, a leading company for innovative and top-quality high-tech products in the healthcare, life science and performance materials sectors, announced today, together with the US-based company Nano-C, their development and launch of promising new fullerene derivatives for the emerging field of organic photovoltaics (OPV). Merck KGaA, Darmstadt, Germany, is pursuing many projects to participate in the growing OPV sector.

Novel derivatives: highly stable, easy to process and cost effective

The new chemistries show a significant improvement in lifetime and thermal stability while increasing open circuit voltage using environmentally friendly non-halogenated solvent systems. These new C₆₀ based fullerene derivatives solve critical thermal degradation issues. Using these derivatives the Merck KGaA, Darmstadt, Germany, team developed active layer formulations ready for deposition deploying a range of industrial coating techniques. “Merck KGaA, Darmstadt, Germany, is pleased to have had the opportunity to work with an exceptional development team at Nano-C. By combining Merck KGaA, Darmstadt, Germany,’s leading-edge polymer and formulation development capabilities with Nano-C’s expertise and intellectual property in fullerene derivative development, the achieved results solidify our leading position. This will provide our customers with secure supply of high-performance materials that will shape the future of the OPV industry,” said Richard Harding, Merck KGaA, Darmstadt, Germany’s Global Head of Business Development – Photovoltaics, “The OPV installation in the German Pavilion at the EXPO 2015 in Milan using materials from Merck KGaA, Darmstadt, Germany, is an example of things to come in emerging building-integrated photovoltaic (BIPV) and other areas where the unique features of OPV will stand out.”

“The results of our collaborative development program point the way to a cost effective C₆₀ based acceptor for use with low band-gap systems, offering comparable stability to C₇₀ based fullerene derivatives in OPV” added Viktor Vejins, President and CEO of Nano-C, “Nano-C looks forward to working with Merck KGaA, Darmstadt, Germany, to scale up these chemistries and move into the commercialization phase.”

The joint development is based on intellectual property (IP) that both companies hold together. It brings together Merck KGaA, Darmstadt, Germany’s extensive experience with organic semiconducting materials and Nano-C’s unique know-how in fullerene derivatives. Under its Ilicon[®] brand, Merck KGaA, Darmstadt, Germany, is actively working on novel organic semiconducting materials for electronic and



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photovoltaic applications at the Chilworth Technical Center, its chemicals research site near Southampton, UK.

About Nano-C, Inc.

Nano-C is enabling a revolution in device design, manufacture and performance. Its innovations in the chemistry of nanostructured carbon are essential to next-generation displays, touch screens, solar cells, fuel cells, computer chips and more. They support the constant demand for devices with increasing versatility in form and function, speed, efficiency and lower cost. Nano-C develops materials that power our world. Nano-C's mission is to play a key role in enabling applications of these materials and is committed to their responsible development and use. Nano-C is a privately held company located in Westwood, Massachusetts, USA.

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About Merck KGaA, Darmstadt, Germany

Merck KGaA, 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 further 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.

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