

PRESS RELEASE

Thursday, April 11, 2019



OPVIUS Introduces Novel, Cost-Efficient Acceptor Material from Nano-C in OPV Mass Production



Joint collaboration resulted in more cost-efficient manufacturing of OPV modules, and at the same time increased the modules' performance

Kitzingen, Germany and Westwood, USA – OPVIUS and Nano-C today announced that through their long-standing and close collaboration, they have successfully introduced a new, cost-efficient acceptor into OPVIUS' mass production. Nano-C is a well-respected manufacturer of fullerenes and fullerene derivatives which, due to their unique properties, meet the needs and requirements of organic photovoltaics (OPV). Working together, Nano-C and OPVIUS were able to optimize the materials which resulted in more cost-efficient manufacturing of OPV devices.

The new acceptor is easily processible via roll-to-roll printing and enables the manufacturing of commercial OPV modules with a highly competitive performance, but at significantly lower cost. In addition, the availability of the acceptor material in industrially relevant quantities is assured due to the implementation of Nano-C's large-scale manufacturing as previously announced by the company.

The use of the new acceptor material has absolutely no negative impact on the performance and long-term stability of OPV modules. In fact, with certain material combinations, lifetime and efficiency of modules could even be increased. Even though OPVIUS' focus is not on increasing efficiency, this joint project demonstrated that a new internal efficiency record of more than 6% for a module having a commercial configuration could be achieved by means of the new acceptor material.

"One of our primary objectives is the identification of more cost-efficient materials in order to reduce the cost per area of our OPV, while the performance is at the very least

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not allowed to become reduced." said Dr. Sebastian Meier, Director of Research and Development of OPVIUS GmbH. "In this context, an open-innovation approach such as the joint development work with Nano-C is part of our R&D strategy. The new acceptor material developed by Nano-C allows for OPV modules with efficiencies and lifetimes in line with the current state of the art, but combined with significant cost advantages. Therefore, the new Nano-C acceptor is an extremely attractive material for the use in OPV."

Dr. Henning Richter, Vice President of Research and Development of Nano-C, Inc., added: "We are pleased that our long-standing efforts to gain a better understanding of structure-property correlations of electron-acceptor materials such as fullerene derivatives have resulted in a product that can make a real impact on the further development of the OPV industry. We are excited that in consequence of the trustful collaboration between OPVIUS and Nano-C, increasing quantities of our newly developed material will now be used in the roll-to-roll production of OPV for commercial use."

About OPVIUS

OPVIUS GmbH, founded in 2012 and located in Nuremberg and Kitzingen (INNOPARK Kitzingen), is among the world leaders in the field of organic photovoltaics. OPVIUS produces organic solar cells with a focus on client-specific solutions. In addition, the company is also active in the field of research and development, in order to continue to provide its clients with creative and innovative solutions. In this regard, OPVIUS uses a unique production process, combining printing, lamination, and laser techniques. This advanced technology is easily scalable and allows the production of the utmost individual, customer-specific designs. OPVIUS also helps clients with system solutions in order to integrate OPVs into already existing or new products.

OPVIUS is part of the HOCH.REIN GROUP, an international, medium-sized investment holding with the aim to promote entrepreneurship. The fields of business activity encompass the areas "New Technologies", "Industrial Production", "Real Estate & IT Services" as well as "Alternative Energies & Trading".

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About Nano-C

Located in Westwood, Massachusetts, Nano-C is a leading developer of nanostructured carbon for use in energy and electronic applications. These materials include fullerenes, carbon nanotubes and their chemical derivatives. 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. For more information, please, visit <http://www.nano-c.com/>.

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