

STEEP UP – Next Generation Materials for Organic Photovoltaics

Dresden, Mons, Paris, Warsaw, 05 July 2023

In June, the EU-wide research project STEEP-UP, coordinated by the Leibniz Institute of Polymer Research Dresden (IPF), has started its work on the development of novel absorber materials for vacuum-processable, organic solar cells. This technology has been developed by Heliatek GmbH (Dresden, Germany) over the past decade and has been commercialized as Heliatek's organic solar film product HeliaSol®. With a carbon footprint of less than 10 g CO₂e/kWh, the HeliaSol® films are the greenest of all solar technologies, having a Carbon Payback Time of less than 100 days. STEEP UP unites four European leading research institutes with Heliatek to accelerate the development of next generations of organic solar materials, with higher efficiency without compromising on durability. Starting with quantum chemical simulations of material properties at the University of Mons (Belgium), research centers in France (CNRS MOLTECH-Anjou) and in Poland (Polish Academy of Sciences), experts in the field of organic synthetic chemistry, will develop new organic compounds for enhanced organic solar cell performance. The materials properties are analyzed by IPF Dresden, and are tested in specially adapted solar cell structures at Heliatek GmbH, Dresden. Overall goal of the project is a fast transfer of new academic knowledge to the environmentally friendly production of organic solar cell film modules by Heliatek.

The project STEEP UP is funded under the EU M-ERA.NET program, a Europe-wide network of national funding organization authorities.

Project Partners & Expertise:

Heliatek (Dresden, Germany): Development, production, and commercialization of organic solar films

Leibniz Institute of Polymer Research Dresden (Dresden, Germany): Coordinator - Analysis of optical and molecular material properties, study of nanomorphology of organic thin film layers

University of Mons (Mons, Belgium): Quantum chemical simulation of molecular aggregates and material properties

CNRS MOLTECH-Anjou Research Center (Angers, France): Development of new dye systems with steep absorption edge for organic solar cells

Institute of Organic Chemistry of the Polish Academy of Science (Warsaw, Poland): Synthesis of novel chromophores for application in organic solar cells

Statement Guido van Tartwijk, CEO Heliatek:

“At Heliatek, we have developed and commercialized a revolutionary solar technology with virtually infinite application opportunities and an industry leading carbon footprint. Our solar films are light-weight and bendable and an ideal fit for all those building surfaces where traditional solar is not possible or very costly to install. To accelerate the potential of our technology, we are now bundling global R&D expertise in the STEEP UP project to develop new materials that will boost the overall performance of our solar films further and faster.”



Research on organic solar cells (symbolic image). Copyright: Heliatek GmbH

About: Heliatek

As the technology leader in organic photovoltaics, Heliatek develops, produces and distributes industrial-grade organic PV solar solutions for virtually any building surface (horizontal, vertical, curved, rigid, and flexible). Heliatek stands for energy solutions designed for various traditional and never been possible before applications based on its unique features – it is ultra-light, flexible, ultra-thin and with a Carbon Footprint of less than 10 g CO₂e/kWh a truly green solar solution. Heliatek employs more than 250 people at the Dresden and Ulm locations in Germany.

About: Leibniz Institute of Polymer Research Dresden (IPF)

New challenges in the sectors of energy, mobility, health, sustainability, and communication require new technologies and materials. Polymers offer unique opportunities to design materials and to enable innovative technologies. At the IPF, researchers of different disciplines work closely together to exploit this fascinating potential. As a member of the Leibniz Association, the institute is doing application-oriented basic research. The IPF is involved in the DRESDEN-concept network and in numerous national and international co-operations. In the STEEP UP project, the IPF uses its numerous advanced methods for structure analysis of thin films for organic photovoltaics, and aims to make an important contribution to the formulation of structure-property relationships for novel materials.

The IPF work in the project STEEP UP is co-financed with tax funds based on the budget passed by the Saxon state parliament.

About: University of Mons

The laboratory for chemistry of novel materials at the University of Mons has a longstanding expertise in the modelling of semiconducting materials for energy-related applications, including Organic Photovoltaics (OPV). We seek to gain an in-depth understanding of the various optoelectronic processes going on in working devices and guide synthetic efforts towards optimized molecular and device architectures. With STEEP-UP, we hope will be able to contribute to a better understanding of what is causing energy disorder and voltage losses in molecular-based materials for OPV.

About: CNRS MOLTECH-Anjou Research Center

MOLTECH-Anjou is a unique research unit, from CNRS and the University of Angers, which has a strong expertise in the synthesis and the characterization of π -conjugated systems endowed with electronic properties as well as their use as active materials in organic electronic devices such as organic solar cells (OSCs). Within the STEEP-UP project, we will synthesize new evaporable molecules with appropriate electronic properties for efficient vacuum-processed OSCs, making relationships between their photovoltaic performance and the structural organization of molecules in the solid state.

About: Institute of Organic Chemistry of the Polish Academy of Science

The Institute of Organic Chemistry is a governmental research institute operated by the Polish Academy of Sciences. In the official classification, it is ranked no. 1 in organic chemistry and no. 2 in all scientific fields in Poland. Institute is led by Prof. Daniel T. Gryko, who is ERC Advanced Grant recipient. It employs several well-known group leaders including three winners of Poland's most prestigious scientific award from the Foundation for Polish Science and three members of the Polish Academy of Sciences. Alumni of ICO PAS have started several companies such as: OncoArendi and Apeiron Synthesis.

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