

Flex16 Research Project: New Organic Semiconductor Materials to Enhance the Efficiency of Organic Solar Cells

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In the new research project Flex16, the Heliatek researchers have set the goal of significantly increasing the efficiency of organic solar films by developing new organic semiconductor materials and new cell designs.

A main goal of research and development in the field of organic photovoltaics (OPV) is to increase efficiency and transfer the results into commercial manufacturing processes and marketable products. The current efficiency of the mass-produced HeliaSol® solar films by Heliatek is 8-9%. Higher efficiencies are an important step in further increasing power generation from the same area, thereby enhancing economic attractiveness for users. Already today, solar films make surfaces usable for solar power generation that cannot be utilized with conventional solar solutions, offering an economically attractive solution for clean and independent electricity for many users.

The Flex16 research project focuses precisely on these potentials:

(1) Development of new semiconductor materials for OPV solutions

An important step in increasing efficiency is the development of new semiconductor materials that aim to improve the current laboratory efficiencies to exceed 16%. A core task for researchers is to develop new absorber materials for various spectral ranges to produce more efficient solar cells. A particular challenge is that these materials must be highly thermally stable so that they can later be used in mass production. This excludes many substances known from literature that achieve high efficiencies on a small scale but are not suitable for production. Furthermore, completely new technological approaches to material combinations are being investigated.

(2) Improved cell design

In addition to materials, another focus of the research team is on cell design, specifically on how organic solar cells can be built more efficiently. This cell design is crucial for the efficiency of a solar cell and is also an important factor for the cell's lifespan. The goal here is to develop new approaches to cell design and to explore how to produce efficient and durable solar cells – a key success factor for the commercial success of organic photovoltaics. The importance of this is demonstrated by the fact that recently, the organic solar films from Heliatek became the first OPV product to meet the stringent requirements of the IEC 61215 standard – the independent and recognized proof of a solar cell's durability.

The Flex16 research project started on May 1, 2024 and lasts for three years.

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Press Release



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. HeliaSol® is a ready-to-use solar solution, ideal for retrofitting on existing building structures. Heliatek employs more than 250 people at the Dresden and Ulm locations in Germany.

The Free State of Saxony, the Federal Republic of Germany, and the European Union funded research and development, as well as the installation of the production technology.

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