

Research on sustainable new generation organic solar cells with cellulose

Organic photovoltaic (OPV) cells have unique features such as flexibility, lightweight, nontoxic, transparency and large-area OPV panels can be fabricated by low-cost solution processing methods.

In the past few years a novel polymer PBDB-T-2F (PM6) and the combination of the new non-fullerene acceptors BTP-4F (Y6) with PC71BM were highly studied. These organic solar cells (OSC) show efficiencies up to 17%, not only on rigid glass but also on flexible substrates. Besides the advantage of a big bandgap in PM6, the active layer shows also an extraordinary long diffusion length (100-300 nm) of the exciton. This enhances the probability to transfer the charges successfully to the electrodes and therefore increases the efficiency of the OSC.

The aim of this project is to study the influence of cellulose on the efficiency of the OSC. In the first step fully functional organic solar cells will be prepared by spin and spray coating. In the next step the cellulose will be spray deposited on the back of OSC. Afterwards the characteristic parameters of the solar cells need to be determined, e.g. power conversion efficiency, EQE. In an additional step the surface roughness and the thickness will be measured using AFM. In the last step the results should be analyzed and interpreted.

Field

A1: Solid-state physics and nanoscience (application oriented)

DESY Place

Hamburg

DESY Division

FS

DESY Group

FS-SCS

Special Qualifications:

Primary authors: ERBES, Elisabeth (FS-SCS (Strukturdynamik Chemischer Systeme)); TECHERT, Simone (DESY); ROTH, Stephan (FS-PETRA-D (FS-PET-D Fachgruppe P03))