# Organic Solar Cell User Group

What is an organic solar cell (OSC)?

An organic solar cell (OSC) or plastic solar cell is a type of photovoltaic that uses organic electronics,a branch of electronics that deals with conductive organic polymers or small organic molecules,for light absorption and charge transport to produce electricity from sunlight by the photovoltaic effect.

What is organic solar cell?

Organic solar cell with 15.8% efficiency on a cell surface of 1cm²: current world record. Organic photovoltaics offers unique potential for the generation of environmentally friendly electrical energy. The semiconducting materials essentially consist of hydrocarbons, ranging from small molecules to polymers.

How do organic solar cells work?

In an organic solar cell the process is the other way around: light is efficiently absorbed by organic molecules and converted into electricitythat can then be stored in a battery,or go directly into the electricity grid.

What are organic photovoltaic cells?

Most organic photovoltaic cells are polymer solar cells. Fig. 2. Organic Photovoltaic manufactured by the company Solarmer. The molecules used in organic solar cells are solution-processable at high throughput and are cheap,resulting in low production costs to fabricate a large volume.

How to design organic solar cells?

Designing organic solar cells requires optimization of a large number of structural and compositional parameters,such as band gaps and layer thicknesses. Numerical device simulation can provide instrumental insight to identify the optimum stack configuration. This allows reducing the requested time for the development of efficient solar cells.

What is the research topic 'organic photovoltaics'?

In the research topic "Organic Photovoltaics" we focus on the following fields of work: At Fraunhofer ISE, we benefit from this infrastructure for our research and development activities: A 1 cm2 Organic Solar Cell with 15.2% Certified Efficiency. Detailed Characterization and Identification of Optimization Potential

The active layer of solar cells contains the donor organic material and the acceptor organic material, used in a layer-by-layer fashion in bilayer heterojunction and are combined together in bulk heterojunction solar cells [30]. Light crosses from the transparent electrode followed by the hole transport layer to incorporate into the active layer.

Our research proposes to harness this potential through the development of solar cells. This can be achieved for example through the development of novel cells using polymer of small dye molecules to absorb light and

convert it into electricity, or by designing systems mimicking photosynthesis, through our multidisciplinary "artificial leaf ...

Developing thickness-insensitive organic solar cells (OSCs) is of vital importance for meeting the requirements of the mass production of solar panels. Herein, the molecular aggregation behaviour of non-fullerene acceptors was manipulated via two different solvent additives, namely, 1-phenylnaphthalene (PN) and 1-chloronaphthalene (CN), to ...

Two simple fully non-fused ring acceptors PTR-2Cl and PTR-4Cl with good planarity were designed and synthesized with four steps. Compared with the control molecule PTR-2Cl-based devices achieve a moderate PCE of 11.05%, the PTR-4Cl-based OSCs provide a high PCE of 14.72% with a high V oc of 0.953 V, which is one of the best results for NFREAs ...

The impacts of ambient factors on solar cell fabrication remain unclear. In this work, the effects of ambient factors on cell fabrication are systematically investigated, and it is unveiled that the oxidation and doping of ...

Organic solar cells (OSCs) are promising renewable energy sources due to their low cost, lightweight, flexibility, and tunability, with power conversion efficiencies reaching 20%. ... Tegegne leads a research group focused on understanding efficiency and stability factors in organic solar cells, investigating structure-property relationships ...

Organic solar cells (OSCs) are considered promising candidates for powering these wearable electronics, owing to their lightweight, ... the Ye group used a thermoplastic elastomer, polystyrene-block-poly ... which is a DOE Office of Science User Facility under contract no. DE-AC02-05CH11231.

Donor in organic solar cells (OSCs) is essential for promoting charge transport and enhancing photoelectric conversion efficiency. In this work, five new donors M1-M5 were designed by changing the end group to 3-hexyl-2,4-dithiothiazolidine, dicyano-hexylrhodanine, 1,1-dicyanomethylene-3-indanone, 1,3-indenedione and 1,1-dicyano-5,6-difluoroindanone, ...

Organic solar cells (OSCs) are attracting great attention for their lightness and flexibility, roll-to-roll printability, and the application prospect of architectural integration and ...

Asymmetric substitution on donors has been shown to be an effective approach to optimize the morphology and photovoltaic performance of all-small-molecule organic solar cells (ASM-OSCs), but this strategy is rarely applied in liquid crystalline small-molecule donors (SMDs). Herein, one of the two rhodanine ( Journal of Materials Chemistry A HOT Papers

This review focuses on A-D-A type non-fullerene acceptors, exploring modifications to the end-groups, central core and side-groups to regulate the aggregation behavior of acceptor molecules. The aim is to enhance the photoluminescence quantum yield (PLQY), thereby reducing non-radiative energy losses (DE nr) in

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