Lichttechnisches Institut
Materialwissenschaftliches Zentrum für Energiesysteme
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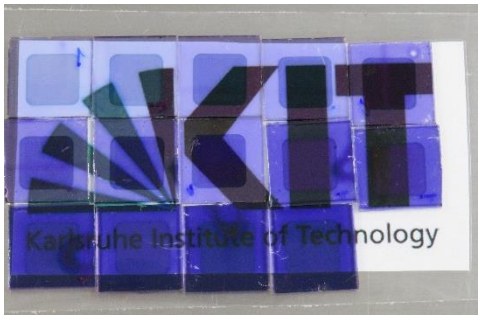
Bachelor / Master Thesis

Semitransparent organic solar cells



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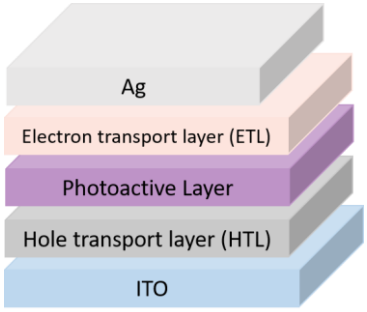

Typical organic solar cell architecture

Motivation

Organic solar cells, with advantages such as flexibility, semitransparency and all-solution processing on large scale, are increasingly attracting attention as an alternative solar technology for novel applications. With the milestone of over 20% power conversion efficiency now achieved, the long-standing argument of not being efficient enough no longer applies. However, the huge potential of organic solar cells lies not only in their efficiency, but in the fact that their optical properties can be tailored for semitransparency, allowing them to be integrated into novel photovoltaic applications such as into windows or greenhouses. As we are targeting these so-called agrivoltaic applications, our challenge is to make the best use of materials and device architectures to provide sufficient sunlight to the crops without strongly compromising the power conversion efficiency, while using simple and scalable processes that are industrially feasible and allow high-yield production.

Tasks

- Fabrication of semitransparent organic solar cells in cleanroom.
- Optimization and characterization of the optical and electrical performance, with a focus on the photoactive layer.
- Understanding the working mechanisms in photoactive layers when adding additional components

Skilled handling of technical equipment, team spirit and enthusiasm for independent and conscientious work are required. Basic knowledge of (organic) semiconductors and photovoltaics is an advantage.

Research area
Photovoltaics, Solar energy

Orientation
Experimental

Background
Materials science,
Electrical engineering,
Chemical engineering,
Physics, Chemistry,
Optics & Photonics

Entry Date
Anytime

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