

# Organic and bio-organic molecular devices for solar energy conversion

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## Abstract:

Organic photovoltaic cells are maturing from the academic research into the industrial development, entering the markets. Pure organic nanostructures and organic/inorganic hybrid nanostructures are comparatively studied for such devices. This talk gives an overview of materials' aspect and devices.

In order to account for a sustainable future, the application of biodegradable and biocompatible systems for organic optoelectronics are needed. The use of cheap electronic devices in a large scale will introduce a "consumable electronics" into the market of "consumer electronics". Therefore environmentally friendly materials are important to use. This is a next great challenge to material science in organic electronics. New developments of bio-inspired and/or bio-origin, bio-compatible materials are interesting. Such materials can also be used to interface the biological and biomedical research with the organic electronics field.

Last but not least the conversion of CO<sub>2</sub> to methane (or other synthetic fuels) using solar energy is an important step to make an efficient, large scale energy storage. At the same time this will make a cyclic and sustainable CO<sub>2</sub> economy. We report organic as well as bio-organic catalysts which can be used in photo-electro-catalytic conversion devices. Such bio-catalysts can be enzymes as well as living bacteria immobilized on electrodes. Selectivity of such bio-catalysts is very high and combined with the room temperature operation of such bio-electro-catalytic systems makes them industrially highly attractive.