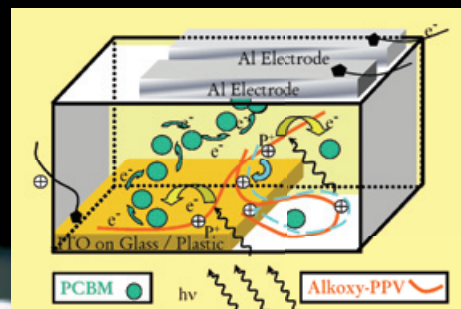
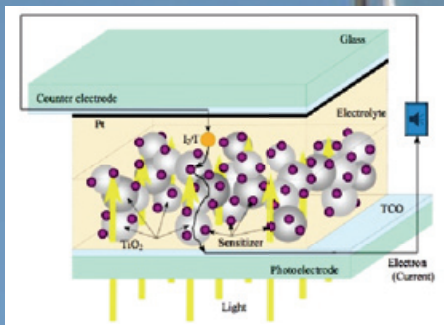
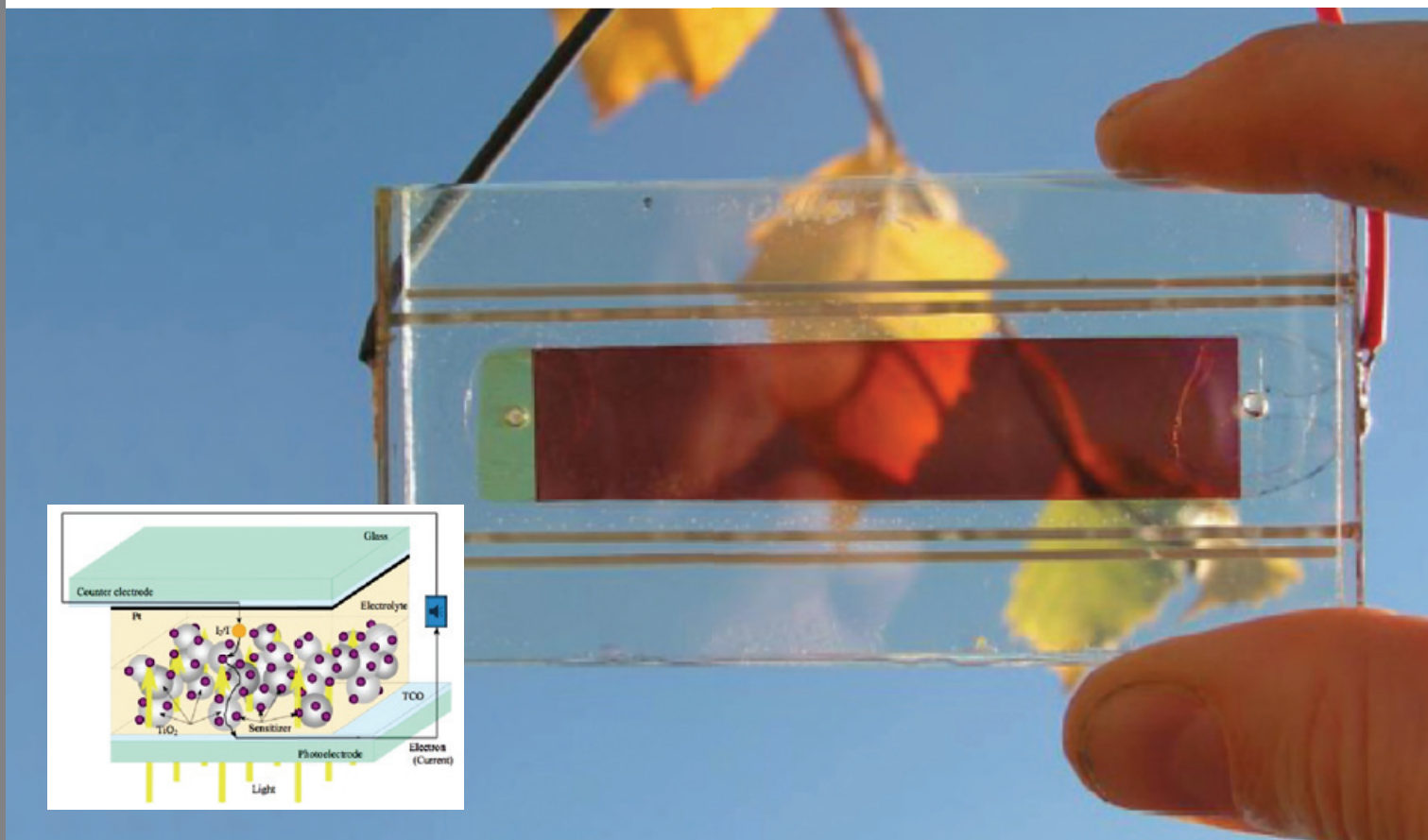


**NEW GENERATION OF ORGANIC-BASED
PHOTOVOLTAIC DEVICES
(ORGANISOLAR)**

Standing Committee for Physical and Engineering Sciences (PESC)



The European Science Foundation (ESF) is an independent, non-governmental organisation, the members of which are 80 national funding agencies, research-performing agencies, academies and learned societies from 30 countries.

The strength of ESF lies in the influential membership and in its ability to bring together the different domains of European science in order to meet the challenges of the future.

Since its establishment in 1974, ESF, which has its headquarters in Strasbourg with offices in Brussels and Ostend, has assembled a host of organisations that span all disciplines of science, to create a common platform for cross-border cooperation in Europe.

ESF is dedicated to promote collaboration in scientific research, funding of research and science policy across Europe. Through its activities and instruments ESF has made major contributions to science in a global context. The ESF covers the following scientific domains:

- Humanities
- Life, Earth and Environmental Sciences
- Medical Sciences
- Physical and Engineering Sciences
- Social Sciences
- Marine Sciences
- Nuclear Physics
- Polar Sciences
- Radio Astronomy Frequencies
- Space Sciences

Cover Figure:

Dye sensitised solar cells (EPFL): photo and device scheme
Plastic organic solar cells (LIOS): photo and device scheme

Introduction

Solar energy conversion based on organic materials is an emerging research field with substantial future prospects. A broad range of distinct device technologies are currently being developed, including dye-sensitised nanocrystalline solar cells, polymer/fullerene blends, small molecule thin films and hybrid polymer/nanocrystal devices. Several European groups have already established themselves as world leaders in this field with, for example, world-record efficiencies for both dye-sensitised and polymer/fullerene devices currently being held by research groups in Lausanne and Linz respectively. Major nationally based research programmes are under way with extensive European industrial investment.

At present the field is developing diversely across Europe, with different national programmes tending to focus on different technologies. In particular, the two largest communities in this field, namely dye-sensitised nanocrystalline devices and polymer-based devices have to date developed and functioned largely independently with few overlaps. This division is, however, becoming a growing barrier to development of the field, with scientific progress increasingly being made in device concepts which lie at the intersection of these two research communities. For example in solid state dye-sensitised solar cells employing organic hole conductors



Semiconducting organic materials

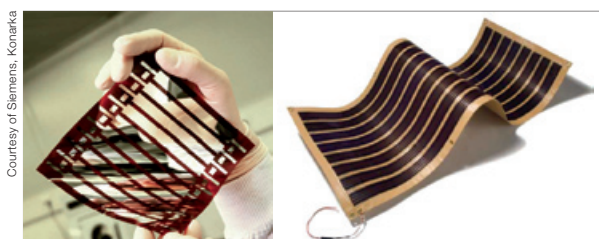
and also in hybrid polymer/nanocrystal devices which combine nanometer-scale structural control, (achieved by the use of inorganic nanocrystals) with the ease of processing inherent in the use of organic opto-electronic materials.

It is the intention of this proposed network to bring together these diverse research programmes across Europe, leading to the development of a cohesive pan-European research community targeting the development of innovative, low cost, organic-based photovoltaic cells. This programme will necessarily be positioned at the intersection between solid state physics, chemistry and materials science.

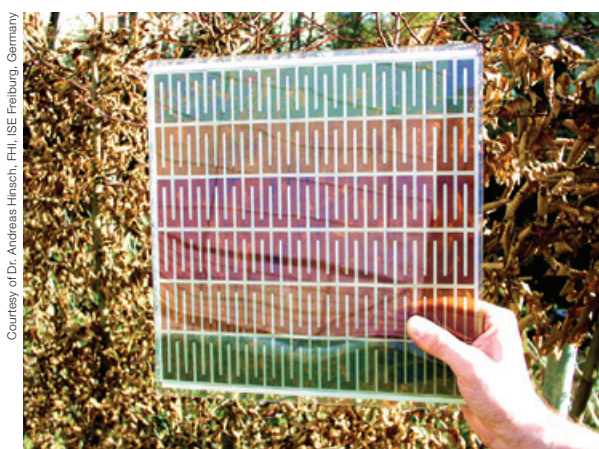
A strong interdisciplinary approach is essential with a high degree of interaction. The synergy of the know-how present in the various research groups, all with a strong international reputation in their subfields (such as design and synthesis of novel polymer materials with donor as well as acceptor properties, nano-particles, solid electrolytes, the expertise in analytical, electrical and optical characterisation techniques, modelling and device up-scaling technology), will ensure a more rapid progress and create the appropriate circumstances for breakthroughs in this fundamentally important research domain.

Through scientific meetings (workshops, international conferences) organised by the Steering Committee, the proposed network will implement more coherent national and European research activities in the field of organic-based solar cells and will allow closer relations between the various existing organisations of scientific and technological cooperation in the two largest organic solar cell communities in Western and Eastern Europe. The proposed network will also promote a greater European cohesion in this research field based on the best experiences of knowledge transfer at the European level.

The running period of the ESF ORGANISOLAR Research Networking Programme is five years from September 2006 to September 2011.



Roll-to-Roll production: light weight, low cost.
Right: Module.



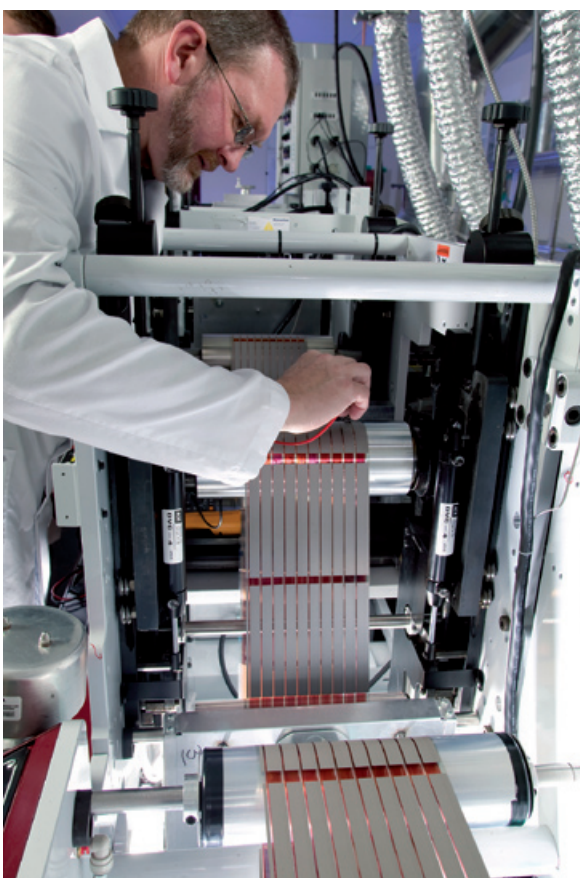
Various colors in a series-connected dye solar cell module

Mission

Solar energy represents currently a real alternative to help to mitigate the impact of fossil fuels on the planet. This is something important to understand especially for young students.

The most important mission of the ESF ORGANISOLAR Research Networking Programme is to distribute and disseminate knowledge among young scientists active in organic-based photovoltaic devices to secure the next generation.

Courtesy of Komarka



Solar cells from the Press



House of the future, Sydney Olympic Park

Scientific Aims

The general goals of the programme will be to gain a better comprehensive understanding of the electro-optical mechanisms occurring in the photoactive films, to gain a significant improvement of the photovoltaic efficiency and stability through the synthesis of new materials and the assembly of new materials systems.

The specific goals of the programme can be summarised as follows:

- The organic photovoltaic community wishes to boost the efficiency of an all solid state solar cell further from the present to >8% as a result of increasing interactions and joint collaborations via scientific meetings, and knowledge, know-how and person transfer.
- Integrate European research and development activities within chemistry, materials science, photophysics and device physics in the field of organic semiconductors. Through this interdisciplinary integration, European leadership in the field will be further established for future.
- Integrate European research and development activities within the two largest communities in this field, namely dye-sensitised nanocrystalline devices and polymer-based devices that have to date developed and functioned largely independently. A better knowledge of the advances made in the whole community of organic-based solar cells will help to establish faster and more important progress in that field.



Courtesy of RISC

- Through dissemination of these excellences in research and development to European industry, the leadership of European-based technology in the field of organic solar cells will have a better impact on the worldwide scene.

To achieve this, various tasks have to be carried out; for example, synthesis of new materials, chemical and structural characterisation, photophysical study of material systems, study of electrical transport, device modelling.



www.sakkuus.com



www.picard-lederwaren.de

Scientific Activities

Science meetings

- ORGANISOLAR has co-funded an International Conference on Excitonic Solar Cells, held at the University of Warwick from 9 to 12 September 2008.
- ORGANISOLAR has co-funded an International Conference on New Generation of Organic-based Photovoltaic Devices to be held in Benidorm (Spain) from 10 to 13 May 2009.
- ORGANISOLAR has co-funded an International Symposium on Mesoscopic Dye-Sensitised and Organic Heterojunction Solar Cells to be held as part of the E-MRS 2009 Spring Meeting in Strasbourg (France) from 8 to 12 June 2009.

Short Visit Grants

ORGANISOLAR Short Visit Grants are an increasingly popular instrument to facilitate visits between scientists involved in the ORGANISOLAR programme. The scheme funds visits for up to 15 days. Applications are evaluated by the Steering Committee of ORGANISOLAR.

Exchange Grants

ORGANISOLAR Exchange Grants facilitate exchange visits lasting from 15 days to up to six months. Applications are evaluated by the Steering Committee of ORGANISOLAR.

Coordination by the Steering Committee through annual meetings

The ORGANISOLAR Steering Committee is responsible for the implementation of the programme.

Application forms for each activity described above can be found online:

www.esf.org/organisolar

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For the latest information on this Research Networking Programme consult the ORGANISOLAR website:
www.esf.org/organisolar

