Crystal Engineering for Molecular Organic Semiconductors

Fact Sheet

Project Information

CEMOS
Grant agreement ID: 336506

Status
Closed project

Start date
1 January 2014

End date
31 December 2018

Funded under
FP7-IDEAS-ERC

Overall budget
€ 1 477 472

EU contribution
€ 1 477 472

Hosted by
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
Switzerland

Objective

"The urgent need to develop inexpensive and ubiquitous solar energy conversion cannot be overstated. Solution processed organic semiconductors can enable this goal as they support drastically less expensive fabrication techniques compared to traditional semiconductors. Molecular organic semiconductors (MOSs) offer many advantages to their more-common pi-conjugated polymer counterparts, however a clear and fundamental challenge to enable the goal of high performance solution-processable molecular organic semiconductor devices is to develop the ability to control the crystal packing, crystalline domain size, and mixing ability (for multicomponent blends) in the thin-film device geometry. The CEMOS project will accomplish this by pioneering innovative methods of “bottom-up” crystal engineering for organic semiconductors. We will employ specifically tailored molecules designed to leverage both thermodynamic and kinetic aspects of molecular organic
semiconductor systems to direct and control crystalline packing, promote crystallite nucleation, compatibilize disparate phases, and plasticize inelastic materials. We will demonstrate that our new classes of materials can enable the tuning of the charge carrier transport and morphology in MOS thin films, and we will evaluate their performance in actual thin-film transistor (TFT) and organic photovoltaic (OPV) devices. Our highly interdisciplinary approach, combining material synthesis and device fabrication/evaluation, will not only lead to improvements in the performance and stability of OPVs and TFTs but will also give deep insights into how the crystalline packing—indeed from the molecular structure—affects the optoelectronic properties. The success of CEMOS will rapidly advance the performance of MOS devices by enabling reproducible and tuneable performance comparable to traditional semiconductors—but at radically lower processing costs."

Field of science

/engineering and technology/materials engineering/coating and films
/humanities/arts/modern and contemporary art/film
/engineering and technology/environmental engineering/energy and fuels/energy conversion
/natural sciences/physical sciences/electromagnetism and electronics/semiconductor device
/natural sciences/physical sciences/electromagnetism and electronics/electrical conductivity/semiconductor
/engineering and technology/materials engineering/crystals
/natural sciences/mathematics/pure mathematics/geometry
/engineering and technology/environmental engineering/energy and fuels/renewable energy/solar energy
/social sciences/social and economic geography/transport

Programme(s)

Topic(s)

Call for proposal

ERC-2013-StG

Funding Scheme

ERC-SG - ERC Starting Grant

Host institution
### Beneficiaries (1)

<table>
<thead>
<tr>
<th>Address</th>
<th>Activity type</th>
<th>EU contribution</th>
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<tbody>
<tr>
<td>Batiment Ce 3316 Station 1 1015 Lausanne Switzerland</td>
<td>Higher or Secondary Education Establishments</td>
<td>€ 1 477 472</td>
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**Website** [link]  
**Contact the organisation** [link]  
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**Last update:** 11 March 2015  
**Record number:** 110236  

**Permalink:** [https://cordis.europa.eu/project/id/336506](https://cordis.europa.eu/project/id/336506)

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