Partners

Contact

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Scale nano

SCALENANO aims at contributing to a further reduction of manufacturing costs of PV solar modules, in line with the 20/20/20 target for 2020 established by the European Commission and the European Strategic Energy Technology Plan (SET-Plan).

$Cu(In,Ga)(S,Se)_2$ PV technologies, have already entered the stage of mass production. However, current production methods typically rely on costly, difficult to control over large surfaces, vacuum-based deposition processes that require for very expensive equipment with initial high CAPEX. This compromises the potential reduction of material costs inherent to thin film technologies.

At the forefront of this, SCALENANO will develop alternative environmental friendly and vacuum free processes based on the electrodepositon of nanostructured precursors. The project also includes the exploration and development of alternative processes with very high potential throughput and process rate, as well as their extension to next-generation kesterite based absorbers, that will allow the proposition of an industrial roadmap for the future generation of chalcogenide based cells and modules.

Acronym
SCALENANO

Full title
Development and scale-up of nanostructured based materials and processes for low cost high efficiency chalcogenide based photovoltaics

Project: no
FP7-NMP-ENERGY-2011-284486

Coordination
IREC

Consortium
IREC, NEXCIS Photovoltaic Technology, EMPA, Merck KGaA, IIT, UNOTT, IMPT, UL, CEA, HZB, Semilab, SUPSI, FUB.

Project web site
www.scalenano.eu

Strategy / Scientific Objectives

The main objectives of the project are:

- To develop a low cost and efficient electrodeposition based technology with improved lateral homogeneity;
- To develop a new alternative scalable process using nanoparticle-based solutions compatible with high throughput requirements;
- To develop optimised TCO layers by scalable non vacuum based processes.

Achievement of these objectives involves following strategies:

- Development of new cell architectures based on the implementation of nanostructured TCO;
- Development and implementation of in-situ/on-line quality control and process monitoring techniques for scaled-up processes in large area substrates.

The project will also include the validation and development of highly innovative processes and materials for the future generation of chalcogenide based cells and modules, as:

- Novel non-vacuum processes based on cost efficient deposition techniques such as ESAVD (Electrostatic Spray assisted Vapour Deposition);
- Extension of the developed processes to the synthesis of $Cu_2ZnSnS_4(Se)_4$ kesterite-based devices to address the problem that will be created in the future massive deployment of CIGS technologies by scarce materials.

Work Packages

The work of SCALENANO is organised through 10 distinct work packages:

1. Electrodeposition based solar cells
2. Alternative high throughput processes for absorbers
3. Synthesis of TCO by scalable non vacuum based processes
4. New cell architecture for higher efficiencies
5. Scale up processes: from cells to modules
6. Quality control and process monitoring
7. Industrial take up
8. Dissemination and exploitation
9. Scientific Coordination
10. Project Management

Consortium

Scalenano involves an interdisciplinary and well-balanced Consortium formed by 13 R&D groups with complementing experiences and facilities, including:

- Five Research Institutes: IREC, EMPA, Italian Institute of Technology, CEA, HZB;
- Four Universities: Univ. Nottingham, Univ. Luxembourg, Scuola Universitaria Professionale della Svizzera Italiana (SUPSI), Free University Berlin;
- Four Companies from different sectors: Merck KGaA (Chemical), NEXCIS (Photovoltaics), IMPT (Thin film technologies), Semilab (Metrology and Characterisation).

Timeframe

SCALENANO runs from 1 February 2012 – 31 July 2015