



Project no. PITN-GA-2012-316488

Project Acronym: KESTCELLS

Project title: Training for sustainable low cost PV technologies: development of kesterite based efficient solar cells.

Collaborative project

FP7-PEOPLE-2012-ITN

Duration: 48 months

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Project coordinator organization name: IREC

Project website address: www.kestcells.eu

Deliverable 8.2

Annual review of dissemination activities

Delivery date:

Dissemination Level

PU Public

Document details:

Work package	8. Dissemination & Outreach.
Partners	ALL.
Authors	E.Saucedo /JM.Sanjuan
Document ID	D8.2
Release Date	05/09/2013



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During the first 12 months of the project (September 2012 to August 2013) the following dissemination and outreach activities have been performed:

SECTION 1: Contributions to International Conferences

Several contributions have been presented to international conferences in the form of oral and poster presentations with the aim to contribute to a first international diffusion of KESTCELLS project. These contributions are listed below and all they acknowledge the EC for funding through the KESTCELLS project:

- 1) Schorr, S.; Gurieva, G.; Toebbens, D.; Muska, K.; Holopainen, T. A neutron diffraction study of CZTSSe monograins. *MRS Spring Meeting*, 1st - 5th April 2013, San Francisco,US. (poster) [FUB]
- 2) Gurieva, G.; Levcenco, S.; Huang, Y. S.; Kravtsov, V.; Irran, E.; Schorr, S. Structural characterization of $\text{Cu}_2\text{ZnSiSe}_4$ single crystals. *MRS Spring Meeting*, 1st - 5th April 2013, San Francisco,US. (poster) [FUB]
- 3) Gurieva, G.; Levcenco, S.; Nateprov, A.; Schorr, S.; Arushanov, E. Structural characterization of $\text{Cu}_2\text{ZnGeSe}_4$ grown by different methods. *MRS Spring Meeting*, 1st - 5th April 2013, San Francisco,US. (poster) [FUB]
- 4) Schorr, S. Structural aspects of point defects in CZTS *9th Workshop on Future Direction of Photovoltaics*, 7th - 8th March, 2013, Tokio, Japan. (invited oral) [FUB]
- 5) Schorr, S. Point defect analysis in thin film solar cell absorber materials: a neutron diffraction study. *International Conference on Neutron Scattering*, 8th - 12th July, 2013, Edinburgh, GB. (oral) [FUB]
- 6) Thin film solar cells: crystallography from A to Z *28th European Crystallographic Meeting*, 26th - 30th August, 2013, University of Warwick, GB. Thin film solar cells: crystallography from A to Z (keynote lecture) [FUB]
- 7) Redinger, A.; Djemour, R.; Weiss, T.P.; Sendler, J.; Gütay, L.; Siebentritt, S. Molecular beam epitaxy of $\text{Cu}_2\text{ZnSnSe}_4$ thin films grown on GaAs(001), *IEEE PVSC Conference*, June 2013. Tampa Florida. (Poster) [UL]
- 8) Caballero, R.; Merino, J.M.; Puschkarsky, K.; López, N.; Friedrich, E.J.; León, M. $\text{Cu}_2\text{ZnSnS}_4$ thin films grown by a two stage process: flash evaporation of bulk compounds and thermal treatment in Ar atmosphere. *3rd European Workshop on Kesterites*, November 2012, Luxemburg. (poster). [UAM]
- 9) Caballero, R.; Merino, J.M.; López, N.; Friedrich, E.J.; León, M. Investigation of $\text{Cu}_2\text{ZnSnS}_4$ thin films prepared by flash evaporation of different bulk compounds and thermal treatment. *Materials Research Society Spring Meeting 2013*, San Francisco (USA). (poster) [UAM]
- 10) D. Cozza, D. Duché, C.M. Ruiz Herrero, J.J. Simon, L. Escoubas, E.Saucedo, *NextGen Nano PV – Cargese*. Corsica, France. April 2013. (poster) [AMU]



SECTION 2: Papers

The project is starting with the first publications. Considering that the ESR's are in the first months of the Thesis, the number of publications will start to increase in the next period of the Project.

- 1) Redinger, A; Djemour, R; Weiss, TP; Sendler, J; Gütay, L; Siebentritt, S, (2013), Molecular beam epitaxy of $\text{Cu}_2\text{ZnSnSe}_4$ thin films grown on GaAs(001). IEEE proceedings [UL]

SECTION 3: Organization of Seminars and Workshops:

The host centres have the compromise to organize a minimum of six seminars specifically designed for each ESR. The content is defined between the ESR and the supervisor following the Personal Career Development Plan. The seminars have duration of one day and are open to the members of the local institutors as well as to all the members of the network. During the first 12 months the following seminars have been done:

Seminar	Name	Date
IREC01	Kesterites: an overview	10th of July, 2013.
IREC02	Chemical routes for the synthesis of Kesterites	23rd of July, 2013.
ULUX01	Bonds and crystals of semiconductors (ionic and covalent bonds, basic crystal structures, miller indices, reciprocal space)	18th of June, 2013
ULUX02	Electrons in semiconductors - band structure (E-k relationship, (in)direct band gaps)	25th of June, 2013
ULUX03	Electronic defects (hydrogen model for shallow defects, behaviour of deep defects)	27th of June, 2013
ULUX04	Doping (charge carrier statistics in equilibrium, p-, n-type doping)	9th of July, 2013
ULUX05	Charge Carrier transport (conductivity, mobility, scattering mechanisms)	11th of July, 2014
ULUX06	Non-equilibrium (quasi-Fermi levels, SRH recombination)	16th of July, 2015
ULUX07	p/n-homojunction (band structure, IV (diode factor 1 and 2), QE)	29th of July, 2016
ULUX08	p/n-heterojunction, (band structure, IV, QE)	30th of July, 2017
UAM01	Principles of basic characterization of solar cells	8th to 10th of May, 2013
ASC-01	Mechanical properties of thin films	11th to 20th of June, 2013
FUB01	Extracting information from Rietveld refinement	29th of April, 2013



SECTION 4: Multimedia releases (Video Clips)

The first Multimedia releases are being recorded and will be released during the month of September 2013 (M13). This video clips promote the research of the first recruited PhD students Eduard García Llamas (UAM), Mirjana Dimitrievska, Markus Neuschitzer (IREC) and Dario Cozza (AMU), as well as the scopes of project KESTCELLS presented by the coordinator.

SECTION 5: Articles in local press

Following several press releases from the consortium the project Kestcells appeared in 51 national and regional newspapers and websites. Full detail of press clipping can be found in the website of the project (<http://www.kestcells.eu/press-releases-clipping>).

SECTION 6: Other dissemination or outreach activities.

Launching of the website of the project. The website of the project (www.kestcells.eu) was launched in month 4 (December 2012). The structure of the web was described in D8.1 (submitted in month 6). The home page of the web includes the full-title, acronym and logo of the project as well as EU-FP7 logo, acknowledge the source of funding and start/end dates. The page has a link to the related Call Cordis page and to the Marie Curie Home Page among other relevant pages. The web included as open access sections the summary of the project, the objectives of the work packages, a short description of the partners involved, information about job offers in the project, a project brochure and sections specifically related to dissemination and outreach activities as Publications, Seminars, Conferences, Project Brochure and Press Releases and Clipping. The web is regularly updated with the principal news of the project, the seminars and workshops organized within the network and the available positions. The page is designed to be eye-catching and to august 2013 had recorded more than 35000 visits.

A project brochure was designed and produced at the early stage of the project (month 6) describing the goals, strategies and motivation of KESTCELLS. The brochure has been distributed at the following International Conferences, events and institutions where researchers of the project participate.

- Faculty of Sciences Universidad Autónoma de Madrid
- Nicolás Cabrera Institute (Instituto Universitario de Ciencia de Materiales Nicolás Cabrera). [UAM]
- Centre for Micro Analysis of Materials (Centro de Micro-Análisis de Materiales) Consejo Superior de Investigaciones Científica. [UAM]
- Instituto de Ciencia de Materiales de Madrid. [UAM]
- VIII Conference Barcelona Global Energy Challenges (Barcelona, Spain, 13-14 June 2013). [IREC]
- Dissemination of the the project also has been made trough different contributions that the researchers of the project made in forums such a round tables, summer schools and workshops:
- "1ères rencontres françaises sur les kësterites pour applications photovoltaïques" (13 – 14 June 2013) Chatou (Paris). [AMU]
- Summer School on "Computational design and development of Materials for renewable energy - photovoltaics" 1st July - 5th July, 2013 Baku, Azerbaijan. [FUB]
- Roundtable "sustainable energy - European energy transition through research?", 10th December, 2012, Brussels, Belgium, organized by FONA (Forschung für Nachhaltige Entwicklung/BMBF) [FUB]
- 39th IEEE Photovoltaic Specialists Conference, June 16-21, 2013, Tampa, Florida, USA [IREC]
- 2013 MRS Spring Meeting & Exhibit, April 1-5, 2013, San Francisco, California, USA [IREC]