



## Meeting Minutes

### **4<sup>th</sup> MC Meeting, 3<sup>rd</sup> WG Meeting StableNextSol COST Action no. MP1307**

Action Title: Stable Next-Generation Photovoltaics: Unraveling degradation mechanisms of Organic and Perovskite Solar Cells by complementary characterization techniques (StableNextSol)

**Venue: Vilnius University, Vilnius, Lithuania, from 19<sup>th</sup> to 20<sup>th</sup> October 2015.**

**Meeting Room: Senate Hall, Universiteto str. 3**

1. Welcome to participants
2. Adoption of agenda
3. Approval of minutes and matters arising of last meeting
4. Update from the Action Chair
  - a. Status of Action, including participating countries
  - b. Action budget status
  - c. STSM status and new applications
5. Promotion of gender balance and of Early Stage Researchers (ESR)
6. Update from the Grant Holder
7. Update from the COST Association
8. Follow-up of MoU objectives
  - a. Progress report of working groups
9. Scientific planning
  - a. Scientific strategy
  - b. Action Budget Planning
  - c. Long-term planning (including anticipated locations and dates of future activities)
  - d. Dissemination planning (Publications and outreach activities)
10. Requests for new members
11. Non-COST applications to the Actions
12. AOB
13. Location and date of next meeting
14. Summary of MC decisions
15. Closing



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### **4<sup>th</sup> MC Meeting – Monday 19<sup>th</sup> October 2015, morning**

#### **1. Welcome of participants**

The meeting started at 9:30h with the Action Chair, Dr Monica Lira-Cantu (MLC), welcoming all participants followed by the Local Organiser and Host of the meeting, Prof Vaidotas Kazukauskas welcoming all participants to Vilnius.

#### **2. Update from the COST Office**

MLC started the update of the Action presenting an update on behalf of Dr Maria Moragues, Scientific Officer (SO) of the Action. Focus of the COST Office remains in encouraging excellence and inclusiveness, the participation of Early Career Investigators (ECI, formerly known as Early Stage Researchers), gender balance and the organization of activities in Inclusiveness Countries.

#### **3. Update from the Action Chair. Status of the Action.**

MLC gave an update of the status of the MP1307 Action:

Duration of the 2<sup>nd</sup> Grant Period (GP2): MLC informed the MC Members that **GP2 will end on 30.04.2016** (instead of 31.05.2016). This change was communicated by the SO and is due to the seasonality of the Specific Grant Agreements (SGA) the COST Association is signing with the European Commission (EC). The budget will remain as approved.

Participants: The number of participant countries remains at a total of 27 COST countries, 1 NNC COST country (Russia) and 2 IPC COST countries (China, USA). Belarus has shown interest in joining as NNC COST country. The number of participants has increased to around 360 members, fact that has decreased the gender balance. Of the 27 COST countries, 13 are COST targeted Inclusiveness Countries. Due to the increasing impact of perovskite solar cells, it is considered interesting to involve new industries from the perovskite sector in the Action.



#### Organizational updates:

- The position of Dr Nieves Espinosa as WG1 Leader will be discussed later in the meeting, as DTU will be officially leaving the Action on November 1<sup>st</sup>.
- The Working Group on Perovskites has now been included in the Action webpage, temporarily named as WG7. Dr Francesca Brunetti is its WG Leader. The final position of perovskites in the WG organization will be discussed later in the meeting, as Dr Brunetti will arrive later during the day.
- Proposal for a change in leadership in the Industrial Advisory Board (current IAB Leader is Graphenea) to a co-leadership between two industries, one working on OPV and one on perovskite solar cells to better match the work carried out in the Action. Heliatek will be proposed as OAB leader working on OPV and companies working on perovskites have been approached (Dyename, Dyesol, Abengoa, Ossila).

Mid-term Monitoring Progress Report: The report will be submitted during the current month. MCs and meeting participants are asked to submit information about papers published or in publication and submitted project proposals that have not been included there yet. It is also reminded how to acknowledge the Action in publications and that scientific contributions (papers, presentations, etc.) are desired and expected as a scientific output of the Action (e.g. as a result of STSMs).

#### **4. Action Budget status**

MLC presented a financial summary of the 1<sup>st</sup> Grant Period (GP1) and explained the budget status of GP2. The ESOS Training School that took place in June in Corsica, co-organized with Establis ITN resulted in less expenses than initially budgeted (budget = 52140.00€, expenses = 28851.63€). It is proposed to use the remaining budget to increase the STSM budget. The MCs approve the proposal.

#### **5. Additional Matters**

Future activities: There is a training school on Perovskites in June 2016 in Poland (XVIth International Krutyn Summer School 2016). It is proposed to consider the possibility of organizing an activity in parallel.

StableNextSol webpage: The current status the Action webpage (<http://StableNextSol.eu>) is presented by MLC. Content of the page is continuously being updated. Members are kindly asked to report any missing or incomplete information to the Dissemination group coordinator, so it can be taken care of.

COST Action objectives: MLC went through the different objectives of the Action, commenting their status.

#### **6. Short Term Scientific Missions**

STSM Coordinator, Dr Koen Vandewal (KV), summarized the status of STSMs for GP2 presenting the data (approval rate, geographical spread, gender balance, etc.) for the first call of the period. It is agreed to open a new call for STSMs during GP2 after the meeting. The call will open on 02.11.2015 and the deadline for submissions will be 11.12.2015. Participants are reminded that STSMs for GP2 must finish before 30.04.2016 (end date of GP2). A third call for the period might take place in early 2016 if there is still budget left after the second call.



KV also presented a summary of the STSMs carried out during GP1, together with general information regarding this activity. Participants were reminded that scientific papers and conference presentations are expected as outcome of the work carried out in STSMs and that the Dissemination group coordinator should be informed to include them in the project webpage.

Results achieved in STSMs finished between the previous meeting and the current one are presented, either by the beneficiary or the host/home researchers:

- Ms Emily Speller presented the results of her STSM *"Device stability evaluation"*.
- Dr Alina Chanaewa presented the results of her STSM *"Understanding the role of traps in hybrid photovoltaic devices using impedance spectroscopy and modelling"*.
- Dr Beatriz Romero presented the results of Mr Guillaume Schuchardt's STSM *"STANDIS (Stability of TANDem solar cells by Impedance Spectroscopy)"*.
- Dr Elizabeth von Hauff presented the results of Mr Xingyuan Shi's STSM *"Evaluation of OPV devices under degradation using time- and frequency-resolved methods and modelling"*.
- Dr Gonzalo del Pozo presented the results of his STSM *"Degradation of PTB7:PC70BM solar cells characterized by Impedance Spectroscopy"*.
- Mr Ivan Ramirez presented the results of his STSM *"Investigation of the stability of low-donor organic solar cells"*.
- Dr Monica Lira-Cantu presented the results of her STSM *"Analysis of metal oxides as transport layers for solution processable perovskite solar cells"*.

## 7. Final matters

It is agreed that the pending issues will be voted at the end of the afternoon session, during the WG meeting.

The MC Meeting is closed.

## 3<sup>rd</sup> WG Meeting – Monday 19<sup>th</sup> October 2015, afternoon

### 8. Science and Technology I: Invited talks

Before the start of the first science and technology session, devoted to the invited talks, the Grant Holder, Dr Marta Fonrodona, reminded participants about the travel reimbursement procedure and deadlines.

The session consisted in scientific talks by experts within the Action and was chaired by Dr Harald Hoppe.

- Dr Jan Cermak – *"Scanning Probe Approach for Photovoltaics"*
- Prof Viktoriya Aviyente – *"Modelling donor materials in organic photovoltaic cells"*
- Dr Davor Gracin – *"Structural properties of TiO<sub>2</sub> nanotubes on TCO by grazing incidence small/wide angle x-ray scattering"*



- Prof Elias Stathatos – “Advanced materials and devices for third generation photovoltaics”
- Dr Elizabeth von Hauff – “Frequency resolved opto-electronic spectroscopy to understand solar cell stability”
- Dr Dan Sporea – “Testing materials and devices under ionizing radiation for terrestrial applications and space missions”
- Prof Alexander K. Fedotov – “Presentation of the Energy Physics group at Belarusian State University”

## 9. Summary of GP1 and GP2 activities

Dr Harald Hoppe and Dr Elizabeth von Hauff summarized the facts and figures of the Symposium E of the E-MRS Spring Meeting, which took place in Lille (France, May 2015) after the MC and WG Meetings and was organized by the StableNextSol COST Action.

Dr Monica Lira-Cantu presented a review of the ESOS Training School that took place in Cargèse (Corsica, France, June 2015) co-organized with the ITN Establis.

Dr Maria Omastova presented the next StableNextSol COST conference “New trends in solar cells” that will take place in Bratislava (Slovakia) 19-22 April 2016, together with the 5<sup>th</sup> MC and 4<sup>th</sup> WG Meetings.

## 10. COST Action Decisions

Change of leadership in the Industrial Advisory Board: A change in leadership in the IAB is proposed, to a co-leadership of two industries, one focused on OPV fabrication and one working on perovskite solar cells. The MCs approve the proposal.

Heliatek is proposed as IAB leader for OPV. Dr Toni Müller from Heliatek (and DE MC Member) accepts the position and the MCs agree as well.

Four different companies (already part of or approached by StableNextSol) are proposed as possible IAB leader for perovskites: Dyesol, Dyenamo, Abengoa and Ossila. MCs agree to first contact Dyesol for the position.

Working groups re-organization: Leadership in WG1 and official inclusion of perovskite solar cells in the WG structure.

- WG1 leadership: DTU is leaving the StableNextSol COST Action, and a change in WG1 leadership has to be considered. DTU is the current affiliation of WG1 leader, Dr Nieves Espinosa.

- Perovskites: Their impact, efficiency and development status suggest that they are explicitly incorporated into the WGs. Work on perovskites has already been started in the so-called WG7, even though it was not reflected in the original MoU.

The Action Chair makes two proposals for the MCs to consider. Final decision will be made during the second day of the meeting.

1) Appoint Dr Francesca Brunetti (WG7 leader) as WG1 leader and fuse both WGs.



2) Keep the same WG route for perovskite solar cells as for OPV within the Action, i.e., rename WG2 as “Solar Cell Fabrication” (current name “OPV Fabrication”) and have two sub-groups within the WG: WG2-OPV (leader Dr Yulia Galagan) and WG2-PSC (leader Dr Francesca Brunetti). In the same way, also rename WG3 as “Solar Cell Degradation”.

### 3<sup>rd</sup> WG Meeting – Tuesday 20<sup>th</sup> October 2015, morning

#### **11. Science and Technology II: Experimental**

The experimental part of the WG meeting started with MLC giving a general overview of the status of the scientific and experimental work within the action and continued with the WG leaders updating the status of the ongoing experiments.

Dr Harald Hoppe (HH), WG4 leader, explained the present status and upcoming steps within “Experiment 1”. This ongoing experiment aims to compare different commercially available P3HT materials. To this purpose, several groups make devices (each in their preferred configuration) aiming to relate stability and other device-related parameters to differences in material properties and device layer structure. HH summarized the status, problems faced and timing of the experiment. Afterwards, the experiment was open for discussion.

Dr Sjoerd Veenstra (SV), WG3 leader, presented the status of “Experiment 3 – Testing the test”. The goal of this experiment is to compare degradation conditions (following the ISOS protocols) using (close to) identical samples. Samples planned to be degraded within this experiment were to be submitted by DTU. A new device provider will be needed as DTU left the Action. Heliatek will consider providing the required solar cells to carry out Experiment 3. SV described the ISOS protocol conditions and pointed out that it is desired to have at least two different groups per condition (the number of samples to be degraded remains to be decided). SV also explained the experiment structure and timeline.

SV also presented information about the Rera database that will be used to share, treat and store data. A link to the database will be placed in the StableNextSol webpage in due course.

During the discussion, HH proposed analysing two types of solar cells in the same experiments, small molecule devices provided by Heliatek and polymer solar cells his group could provide.

Dr Yulia Galagan (YG), WG2 leader, updated the participants on the status of “Experiment 4”. In this experiment, many cell producers will fabricate devices (the only limitation being using PCDTBT as absorber material, the rest of device parameters, including device architecture, will be decided by the manufacturer) and all devices will be degraded together. The objective of the experiments is to provide the different labs with information on how to improve and get state-of-the-art devices.

First task within the experiment is to identify device providers and collect requirements information. The second task will be to identify the groups doing the aging and which ISOS protocols will be followed. These groups should be able to measure 20-40 devices. The updated timeframe of the experiment was also presented.



YG also introduced a new idea for an experiment aiming to separate the two contributions to the stability of a solar cell: the stability of the device itself and the stability of the encapsulation. The proposed experiment would be taking a stable device (e.g. Heliatek's) and study the effect of different encapsulations (encapsulation carried out in different labs).

Dr Francesca Brunetti (FB), leader of the perovskite activities, presented her lab and the Action's activity on perovskites. A survey for intended parties to join the perovskite working group is being prepared and will be available on the Action's webpage. The first experiment on perovskites, labelled "Experiment 6", will test the stability of small area perovskite solar cells, encapsulated and with different device architecture.

## 12. Final MC decisions

MLC pointed out the interest that the fact that the Action focuses its work both in OPV and perovskites is reflected in the Action title. This inclusion would give more visibility to the Action and could be positive for members when submitting proposals related to perovskite solar cells within H2020. It is proposed to ask the COST Office to officially change the Action name from "Unraveling Degradation Mechanisms of Organic Solar Cells by Complementary Characterization Techniques" to "**Unraveling Degradation Mechanisms of Organic and Perovskite Solar Cells by Complementary Characterization Techniques**". The MCs approve the proposal and the Action Chair will contact the COST Office on how to proceed.

Regarding WG organization, the proposal approved by the MCs is that WG2 is renamed as "Solar Cell Fabrication" and has two groups within: WG2-OPV, led by Dr Yulia Galagan, and WG2-PSC, led by Dr Francesca Brunetti. In the same way, WG3 will be renamed to "Solar Cell Degradation" and will also deal with both types of devices. As for WG1, the decision to appoint a new group leader will be postponed until January, when Dr Nieves Espinosa has a new position.

## 13. Closing

MLC closes the meeting. Next MC and WG meeting will take place in April in Bratislava.

