StableNextSol – MP1307

OPV stability and degradation review

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DTU Energy
Denmark

3rd MC Meeting, 2nd WG Meeting, 2nd Conference E-MRS Symposium E @ E-MRS.
Lille, France May 11th-12th, 2015
OBJECTIVES

• Completion of OPV stability database from 2012 to 2015 --> with a focus on stability values and new materials for stability.

• Creation of Perovskite database focused on measurement/characterization and stability.
"The state of organic solar cells—A meta analysis".

PARTICIPANTS

25

- DTU: 10
- Ilmenau: 3
- Uminho: 2
- MCAST: 2
- BGU: 2
- UNIV PARIS: 1
- CIN2: 1
- TNO: 1
- UMONS: 1
- DISASOLAR: 1
• Still on time to join 😊

Ask for username & password to

nimar@dtu.dk
• Scopus search

“(degradation OR lifetime OR ageing OR stability) AND (organic* OR plastic* OR polymer* OR (small molecule*)) AND ((solar cell) OR photovoltaic* OR opv)”

2013 → 2015 (March)

1,800 number of articles have been extracted from the search
Database structure

<table>
<thead>
<tr>
<th>Solar Cells</th>
<th>Materials</th>
<th>Collaboration</th>
<th>Knowledge sharing</th>
<th>Blog</th>
<th>About us</th>
<th>Login</th>
</tr>
</thead>
</table>

**Article scanner**

<table>
<thead>
<tr>
<th>Article</th>
<th>Socio</th>
<th>Solar cell menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating</td>
<td>Recommended</td>
<td>Solar Cells</td>
</tr>
<tr>
<td>1 - Poor</td>
<td>Follow</td>
<td>freeOPV</td>
</tr>
</tbody>
</table>

**General**

<table>
<thead>
<tr>
<th>Type</th>
<th>Materials</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single solar cell</td>
<td>Polymer</td>
<td>Normal</td>
</tr>
</tbody>
</table>

**Structure info**

- Material: [add]
- Type: [add]
- Coating technique: [add]
- Thickness Divider: [add]

**Administrative menu**

<table>
<thead>
<tr>
<th>Projects</th>
<th>Life-time administrator</th>
<th>Literature search</th>
<th>Article scanner</th>
</tr>
</thead>
<tbody>
<tr>
<td>[add]</td>
<td>[add]</td>
<td>[add]</td>
<td>[add]</td>
</tr>
</tbody>
</table>

**Encapsulation**

<table>
<thead>
<tr>
<th>Encapsulation</th>
<th>Material</th>
<th>Adhesive</th>
<th>Entail</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Current weather**

- Temperature: 11.12°C

<table>
<thead>
<tr>
<th>Data</th>
<th>Socio</th>
<th>Solar cell menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ageing indicator</td>
<td>PCE Isc Voc FF</td>
<td>Total test period [hr]</td>
</tr>
<tr>
<td>Burn in</td>
<td>Yes</td>
<td>Stabilized stage</td>
</tr>
<tr>
<td>T0</td>
<td>11h</td>
<td>Td</td>
</tr>
<tr>
<td>Ts</td>
<td>E5</td>
<td></td>
</tr>
<tr>
<td>T80</td>
<td>E80</td>
<td></td>
</tr>
<tr>
<td>Ts80</td>
<td>E80</td>
<td></td>
</tr>
</tbody>
</table>

**Comments**

- [add]

**Conditions**

<table>
<thead>
<tr>
<th>Conditions</th>
<th>N/A</th>
<th>Accelerated</th>
<th>No</th>
<th>Intensity [W/m2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>[add]</td>
<td>Humidity [%RH]</td>
<td>[add]</td>
<td></td>
</tr>
<tr>
<td>Light type</td>
<td>N/A</td>
<td>Spectrum</td>
<td>Normal UV</td>
<td>Angle</td>
</tr>
</tbody>
</table>

**ISOS**

- Not compatible with ISOS Protocols

**General comments**

- [add]

**Open for edit**
What to store for Perovskites?

General
Structure info
    Materials, Coating techniques, thicknesses
Encapsulation
Degradation data (Isos Protocols?)
Conditions measurements
• Search tool

Search tool
Use this tool to make deep searches into the article database. It seems that there might be problems viewing the results when using Internet Explorer. We are currently working on the issue.

Search filter

- Free search:
- Polymer: [-] ▼ Acceptor: [-] ▼
- Stack Geometry | [-] ▼ Additive | [-] ▼
- Polymer MW: [ ] < x < [ ]
- Polymer acceptor ratio: [ ] < x < [ ]
- Fabrication environment: [-] ▼ Fabrication method: [-] ▼
- Vacuum: [-] ▼ ITO: [-] ▼
- Substrate: [-] ▼
- Annealing type: [-] ▼
- Lamp power [W]: [ ] < x < [ ]
- PCE [%]: [ ] < x < [ ]
- Voc [V]: [ ] < x < [ ]
- Jsc [mA]: [ ] < x < [ ]
- FF [%]: [ ] < x < [ ]

Year: [ ] < x < [ ]

Submit
Fig. 3. Relative number of devices versus $J_{sc}$ (left) and $V_{oc}$ (right) for different polymer types.

Fig. 4. PCE versus $J_{sc}$ plot (left) and relative number of devices versus $V_{oc}$ plot (right) for different types of acceptor materials used.
• Guidelines documents/video

Webinar
Recorded and available at

Slides Webinar
Review on OPV stability and/or novel materials for

Instructions and guidelines
• PLAN AND ORGANIZATION WORK

Time frame
OPV Scanning finalized end of summer, analysis of the results and writing September/October
Perovskites scanning start in August

Outcomes
Review on OPV stability and/or novel materials for stable OPVs
Review paper on Perovskite stability