Solar Cells Reporting Summary

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▶ Experimental design

Please check: are the following details reported in the manuscript?

1. **Dimensions**

   - [ ] Yes
   - [ ] No
   - **Area of the tested solar cells**
   - **Method used to determine the device area**

2. **Current-voltage characterization**

   - [ ] Yes
   - [ ] No
   - **Current density-voltage (J-V) plots in both forward and backward direction**
   - **Voltage scan conditions**
     - *For instance: scan direction, speed, dwell times*
   - **Test environment**
     - *For instance: characterization temperature, in air or in glove box*
   - **Protocol for preconditioning of the device before its characterization**
   - **Stability of the J-V characteristic**
     - *Verified with time evolution of the maximum power point or with the photocurrent at maximum power point; see ref. 7 for details.*

3. **Hysteresis or any other unusual behaviour**

   - [ ] Yes
   - [ ] No
   - **Description of the unusual behaviour observed during the characterization**

   Related experimental data

   - [ ] Yes
   - [ ] No
   - **We envisioned that this would not be the case for this type of Solar Cell (Dye Sensitized Solar Cells).**

4. **Efficiency**

   - [ ] Yes
   - [ ] No
   - **External quantum efficiency (EQE) or incident photons to current efficiency (IPCE)**
     - **A comparison between the integrated response under the standard reference spectrum and the response measure under the simulator**
   - **For tandem solar cells, the bias illumination and bias voltage used for each subcell**

   - [ ] Yes
   - [ ] No
   - **IPCE is measured form 414–723 nm and the integrated photocurrent gives 2.10 mA cm-2 while the J-V curve gives 1.97 mA cm-2. See Supplementary Information Section 2.4. Page 25.**
   - **Not applicable.**
5. Calibration
Light source and reference cell or sensor used for the characterization
Confirmation that the reference cell was calibrated and certified
Calculation of spectral mismatch between the reference cell and the devices under test

6. Mask/aperture
Size of the mask/aperture used during testing
Variation of the measured short-circuit current density with the mask/aperture area

7. Performance certification
Identity of the independent certification laboratory that confirmed the photovoltaic performance
A copy of any certificate(s)
Provide in Supplementary Information

8. Statistics
Number of solar cells tested
Statistical analysis of the device performance

9. Long-term stability analysis
Type of analysis, bias conditions and environmental conditions
For instance: illumination type, temperature, atmosphere, humidity, encapsulation method, preconditioning temperature

See Supporting Information Section 2.2. Page 21.
See Supporting Information Section 2.2. Page 21. Certificates can be found in Supporting Information Supplementary Section 4. Page 50.
Spectral Mismatch correction factor M = 0.996 +/- 0.004, See Supporting Information Section 2.4. Page 25.
There was minimal variance of surface area between the screen printed devices as can be found in Supporting Information Section 2.10. Supplementary Figure 30, Page 37. Photocurrents measured for cells with and without masks vary very little (7%). As the DSSCs under study are extremely sensitive towards oxygen and required immediate measurement no masks were used in this study.
There was minimal variance of surface area between the screen printed devices as can be found in Supporting Information Section 2.10. Supplementary Figure 31 Page 37.
No records are reported, as this is not applicable for our study. The performance of the DSSCs in this study are compared with each other.
Not applicable.
A total of 9 solar cells were studied for Pstation and P1 and 5 solar cells for PPEG4
Manuscript Page 17, Table 2.
See Supporting Information Section 2.5. Table 7 and Table 8 Page 26, 27.
See Supporting Information Section 2.5. Table 9 and Figure 19 Page 27.