

Solar Cells Reporting Summary

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► Experimental design

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

1. Dimensions

Area of the tested solar cells	☒ Yes ☐ No	Area of the tested solar cells is provided in methods, section "Device characterization and measurement"
Method used to determine the device area	☒ Yes ☐ No	The method is provided in methods, section "Device characterization and measurement"

2. Current-voltage characterization

Current density-voltage (J-V) plots in both forward and backward direction	☐ Yes ☒ No	Just J-V plot in forward direction since there is no hysteresis in organic solar cell.
Voltage scan conditions <i>For instance: scan direction, speed, dwell times</i>	☒ Yes ☐ No	The scan conditions are provided in methods, section "Device characterization and measurement"
Test environment <i>For instance: characterization temperature, in air or in glove box</i>	☒ Yes ☐ No	Test environment is provided in methods, section "Device characterization and measurement"
Protocol for preconditioning of the device before its characterization	☐ Yes ☒ No	No preconditioning protocol.
Stability of the J-V characteristic <i>Verified with time evolution of the maximum power point or with the photocurrent at maximum power point; see ref. 7 for details.</i>	☐ Yes ☒ No	we only tested the long-term stability.

3. Hysteresis or any other unusual behaviour

Description of the unusual behaviour observed during the characterization	☐ Yes ☒ No	No. In general, organic solar cells do not have hysteresis problems.
Related experimental data	☐ Yes ☒ No	NO.

4. Efficiency

External quantum efficiency (EQE) or incident photons to current efficiency (IPCE)	☒ Yes ☐ No	EQE curve is shown in Figure 2d
A comparison between the integrated response under the standard reference spectrum and the response measure under the simulator	☒ Yes ☐ No	The comparison is provided in methods, section "Device characterization and measurement"
For tandem solar cells, the bias illumination and bias voltage used for each subcell	☐ Yes ☒ No	Our cells were only fabricated for single solar cells.

5. Calibration

Light source and reference cell or sensor used for the characterization	☒ Yes ☐ No	Relative information is provided in methods, section "Device characterization and measurement"
Confirmation that the reference cell was calibrated and certified	☒ Yes ☐ No	Relative information is provided in methods, section "Device characterization and measurement"

Calculation of spectral mismatch between the reference cell and the devices under test

☐ Yes
☒ No

There is no reference cell for measuring the emission intensity of the indoor light source, so we measured the light intensity by a luminescence efficiency measurement system. This part of information is provided in methods section "Instruments and Measurement".

6. Mask/aperture

Size of the mask/aperture used during testing

☒ Yes
☐ No

Size of the mask is provided in methods, section "Device characterization and measurement"

Variation of the measured short-circuit current density with the mask/aperture area

☐ Yes
☒ No

Our cells were only measured by the mask with 0.994 cm² area.

7. Performance certification

Identity of the independent certification laboratory that confirmed the photovoltaic performance

☐ Yes
☒ No

There are not the independent certification laboratory for indoor application. But, the device performance was measured independently in Beijing and Linköping.

A copy of any certificate(s)
Provide in Supplementary Information

☐ Yes
☒ No

There are not the independent certification laboratory for indoor application.

8. Statistics

Number of solar cells tested

☒ Yes
☐ No

Number of solar cells tested is provided in Table 1.

Statistical analysis of the device performance

☒ Yes
☐ No

Statistical results of the devices are listed in Table 1.

9. Long-term stability analysis

Type of analysis, bias conditions and environmental conditions

☒ Yes
☐ No

Long-term stability analysis can be found in the section "Photovoltaic performance under indoor light conditions"

For instance: illumination type, temperature, atmosphere humidity, encapsulation method, preconditioning temperature