

## 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 See Methods; "OSC device fabrication".  
 No
- Method used to determine the device area  Yes See Methods; "OSC device fabrication".  
 No

## 2. Current-voltage characterization

- Current density-voltage (J-V) plots in both forward and backward direction  Yes See Methods; "OSC device testing".  
 No
- Voltage scan conditions  Yes See Methods; "OSC device testing".  
*For instance: scan direction, speed, dwell times*  
 No
- Test environment  Yes See Methods; "OSC device testing".  
*For instance: characterization temperature, in air or in glove box*  
 No
- Protocol for preconditioning of the device before its characterization  Yes The devices were not preconditioned before characterization.  
 No
- Stability of the J-V characteristic  Yes As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, no stability measurements were performed.  
*Verified with time evolution of the maximum power point or with the photocurrent at maximum power point; see [ref. 7](#) for details.*  
 No

## 3. Hysteresis or any other unusual behaviour

- Description of the unusual behaviour observed during the characterization  Yes No unusual behaviour.  
 No
- Related experimental data  Yes No unusual behaviour.  
 No

## 4. Efficiency

- External quantum efficiency (EQE) or incident photons to current efficiency (IPCE)  Yes See supplementary information.  
 No
- A comparison between the integrated response under the standard reference spectrum and the response measure under the simulator  Yes As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, no comparison was performed.  
 No
- For tandem solar cells, the bias illumination and bias voltage used for each subcell  Yes No tandem cells reported.  
 No

## 5. Calibration

- Light source and reference cell or sensor used for the characterization  Yes See Methods; "OSC device testing".  
 No
- Confirmation that the reference cell was calibrated and certified  Yes See Methods; "OSC device testing".  
 No

- Calculation of spectral mismatch between the reference cell and the devices under test  
 Yes  
 No As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, we did not calculate the spectral mismatch.
6. Mask/aperture
- Size of the mask/aperture used during testing  
 Yes  
 No As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, we did not measure the devices with a mask.
- Variation of the measured short-circuit current density with the mask/aperture area  
 Yes  
 No As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, we did not measure the devices with a mask.
7. Performance certification
- Identity of the independent certification laboratory that confirmed the photovoltaic performance  
 Yes  
 No As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, the efficiency values were not certified.
- A copy of any certificate(s)  
*Provide in Supplementary Information*  
 Yes  
 No No certification performed.
8. Statistics
- Number of solar cells tested  
 Yes See Methods; "OSC device testing".  
 No
- Statistical analysis of the device performance  
 Yes See Methods; "OSC device testing".  
 No
9. Long-term stability analysis
- Type of analysis, bias conditions and environmental conditions  
*For instance: illumination type, temperature, atmosphere humidity, encapsulation method, preconditioning temperature*  
 Yes  
 No As the purpose of the devices is only to demonstrate charge generation in neat organic semiconductors, no stability measurements were performed.