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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	see Methods
Method used to determine the device area	☒ Yes ☐ No	see Methods

2. Current-voltage characterization

Current density-voltage (J-V) plots in both forward and backward direction	☒ Yes ☐ No	see Supplementary Figure 20
Voltage scan conditions *For instance: scan direction, speed, dwell times*	☒ Yes ☐ No	see Methods
Test environment *For instance: characterization temperature, in air or in glove box*	☒ Yes ☐ No	see Methods
Protocol for preconditioning of the device before its characterization	☒ Yes ☐ No	see Methods
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.*	☒ Yes ☐ No	see Supplementary Figure 21

3. Hysteresis or any other unusual behaviour

Description of the unusual behaviour observed during the characterization	☒ Yes ☐ No	see Supplementary Table 3
Related experimental data	☒ Yes ☐ No	see Supplementary Figure 20

4. Efficiency

External quantum efficiency (EQE) or incident photons to current efficiency (IPCE)	☒ Yes ☐ No	see Supplementary Figure 24
A comparison between the integrated response under the standard reference spectrum and the response measure under the simulator	☒ Yes ☐ No	see Methods
For tandem solar cells, the bias illumination and bias voltage used for each subcell	☐ Yes ☒ No	This is not a tandem solar cell

5. Calibration

Light source and reference cell or sensor used for the characterization	☒ Yes ☐ No	see Methods
Confirmation that the reference cell was calibrated and certified	☒ Yes ☐ No	see Methods

Calculation of spectral mismatch between the reference cell and the devices under test	☒ Yes ☐ No	see Methods

6. Mask/aperture

Size of the mask/aperture used during testing	☒ Yes ☐ No	see Methods
Variation of the measured short-circuit current density with the mask/aperture area	☒ Yes ☐ No	see Methods

7. Performance certification

Identity of the independent certification laboratory that confirmed the photovoltaic performance	☐ Yes ☒ No	We do not perform efficiency certification
A copy of any certificate(s) *Provide in Supplementary Information*	☐ Yes ☒ No	We do not perform efficiency certification

8. Statistics

Number of solar cells tested	☒ Yes ☐ No	see Supplementary Figure 22 and 23
Statistical analysis of the device performance	☒ Yes ☐ No	see Supplementary Figure 22 and 23

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	see Supplementary Figure 29